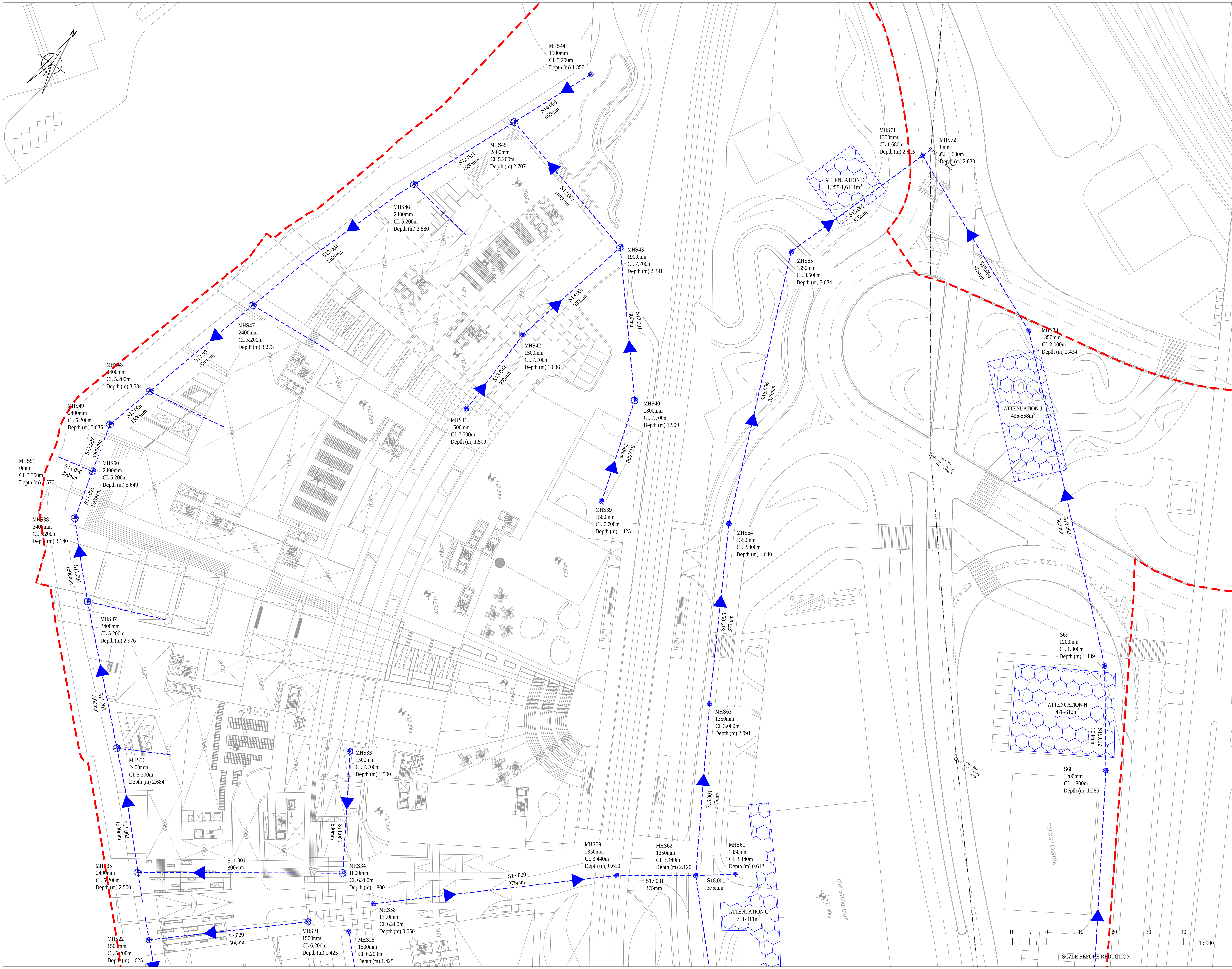

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CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

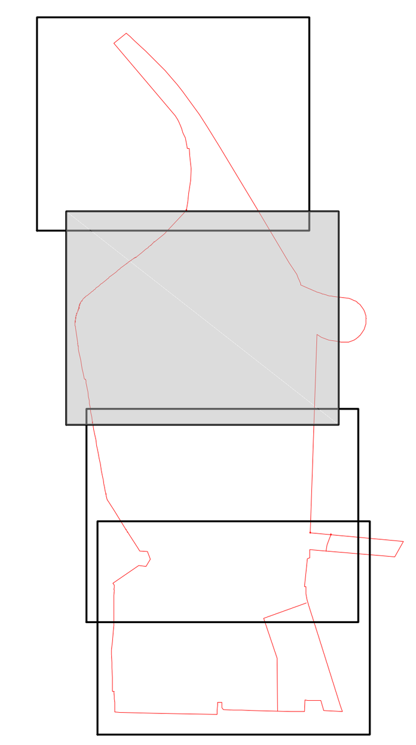
NOTES

LEGEND

THAMES SIDE WEST SITE BOUNDARY

PROPOSED SURFACE WATER DRAINAGE

EXISTING SURFACE WATER DRAINAGE



Rev	Description	Date	Drn	Ch'd
D	FOR INFORMATION	05.03.20	JF	LJ
C	FOR INFORMATION	21.06.19	JF	LJ
B	FOR INFORMATION	08.05.19	JF	LJ
A	FOR INFORMATION	01.11.18	DJ	LJ

INFORMATION

Status of drawing

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Architect

Project: THAMESIDE WEST

Drg Title: PROPOSED SURFACE WATER DRAINAGE PLANS SHEET 3 OF 4

Scales@A1	1:500
Drawn by	DJ
Checked by	LJ
Date	MARCH 2020
Job No.	035668
Drawing No.	C3123
Rev	D

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NOTES

SURAFACE WATER DRAINAGE WITHIN LANDSCAPING TO BE DISCHARGED TO THE RIVER THAMES - LOCAL DRAINAGE CHANNELS SUBJECT TO DETAILED DESIGN, THEREFORE NOT SHOWN

MHS44
1500mm
CL 5.200m
Depth (m) 1.350

LEGEND

- THAMES SIDE WEST SITE BOUNDARY
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE

10 5 0 10 20 30 40
SCALE BEFORE REDUCTION
1 : 500

Rev	Description	Date	Drn	Ch'd
D	FOR INFORMATION	05.03.20	JF	LJ
C	FOR INFORMATION	21.06.19	JF	LJ
B	FOR INFORMATION	08.05.19	JF	LJ
A	FOR INFORMATION	01.11.18	DJ	LJ

INFORMATION

Status of drawing

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Architect

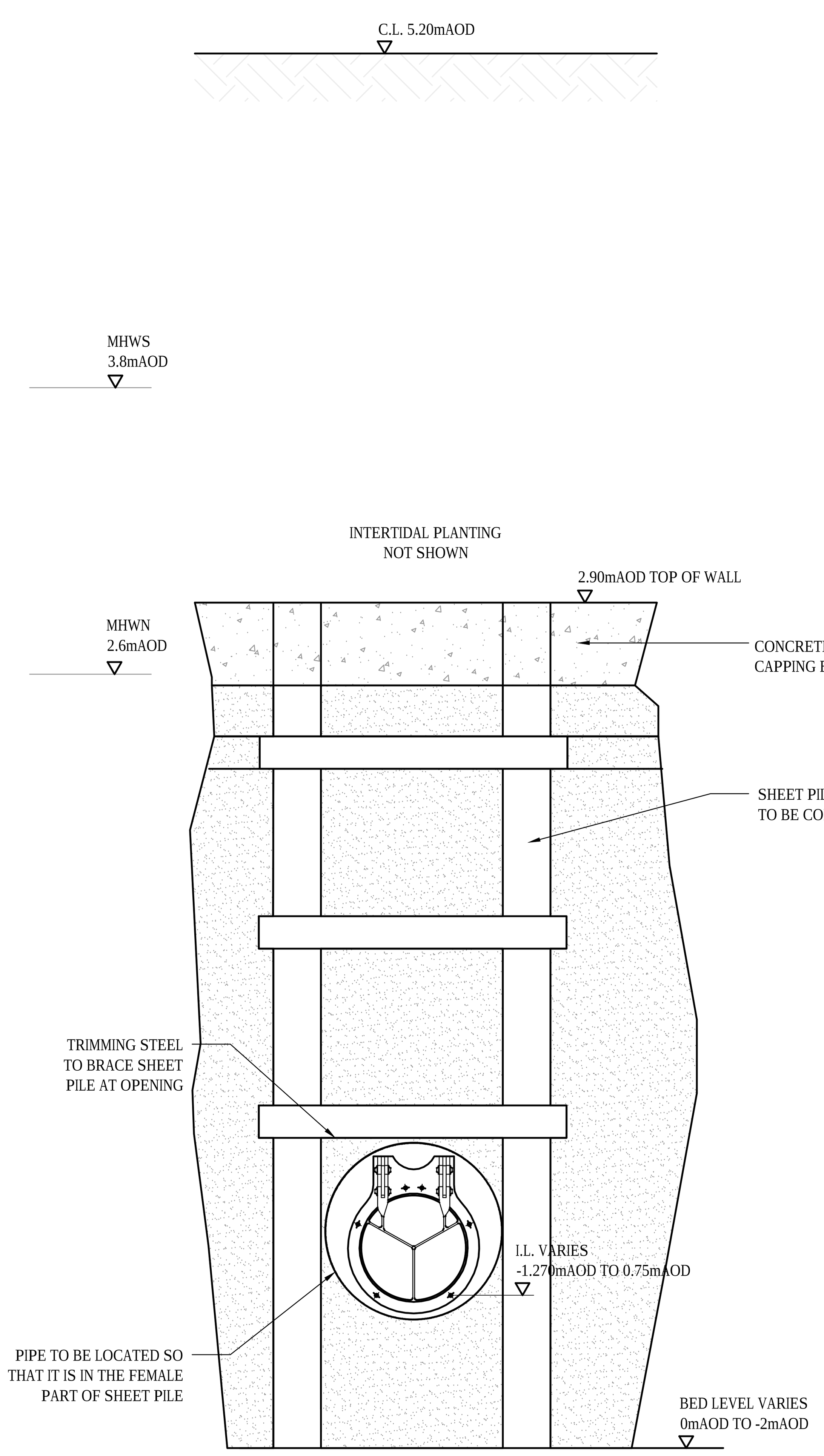
Project **THAMESIDE WEST**

Drg Title PROPOSED SURFACE WATER DRAINAGE PLANS SHEET 4 OF 4

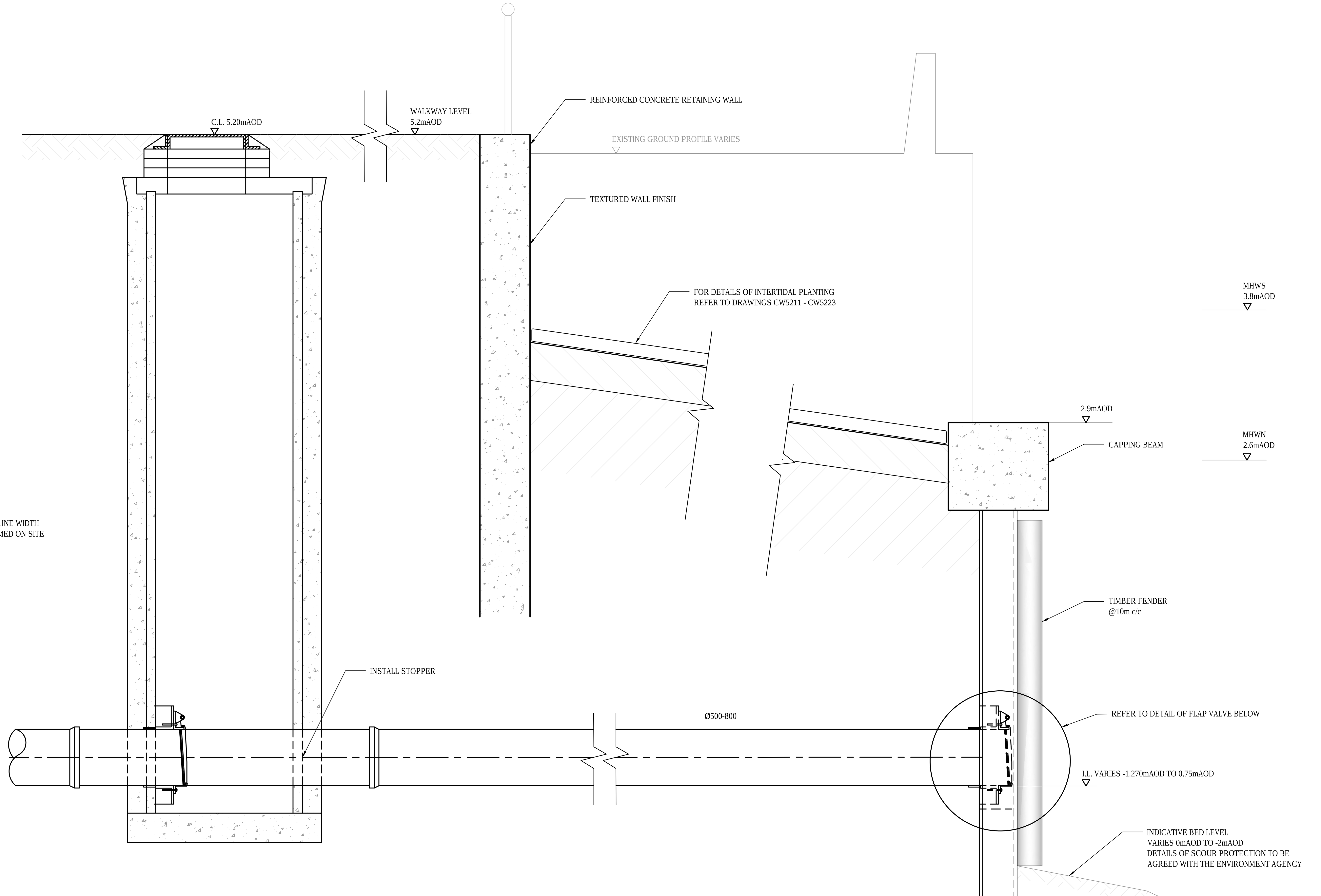
Scales@A1 1:500
Drawn by DJ
Checked by LJ
Date MARCH 2020

Job No. 035668
Drawing No. C3124
Rev D

Data Folder: M:\Models\035668\035668 Thames Side West\F3E Civils - Infrastructure\Sheets\035668-BUR-XX-XX-SKT-C-3121-3124.dwg



ELEVATION OF
RIVER WALL
SCALE 1:20



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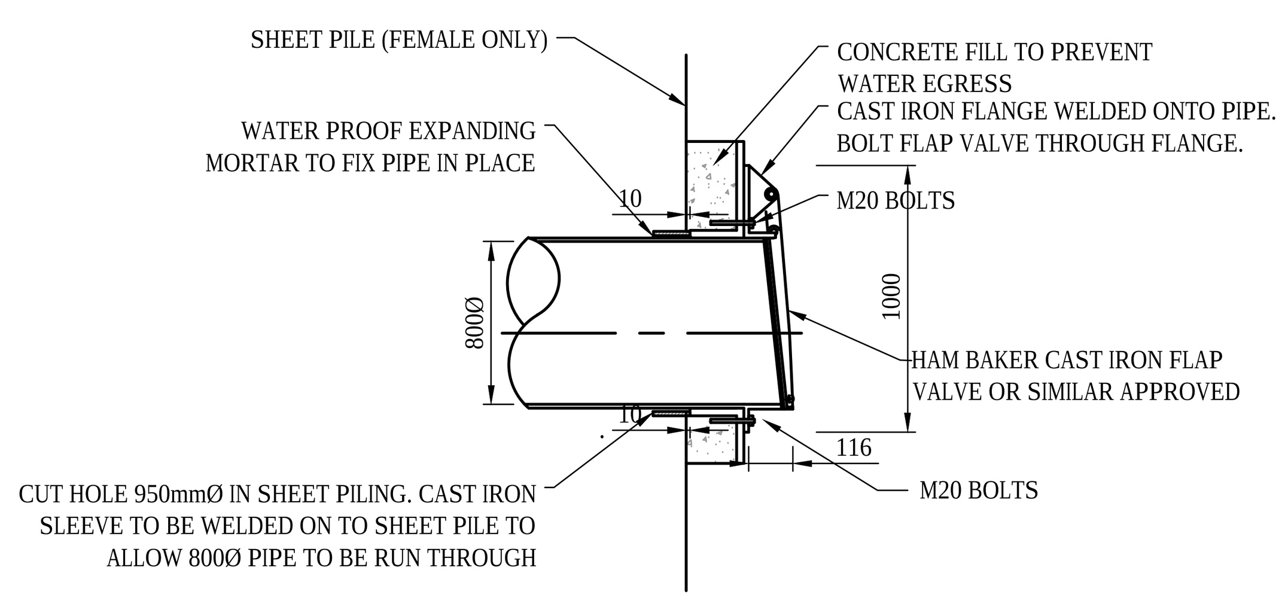

SECTION OF FLAP VALVE FOR 800mm DIA
N.T.S

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NOTES

Rev	Description	Date	Drn	Ch'd
A	FOR INFORMATION	01.11.18	DJ	

INFORMATION

Status of drawing

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Architect

Project: THAMESIDE WEST

Drg Title: PROPOSED DRAINAGE DETAILS SHEET 1

Scales@A1	AS SHOWN	Job No.	035668
Drawn by	DJ	Drawing No.	C3301
Checked by	LJ		
Date	OCTOBER 2018	Rev	A

Appendix D – MicroDrainage Attenuation Calculations

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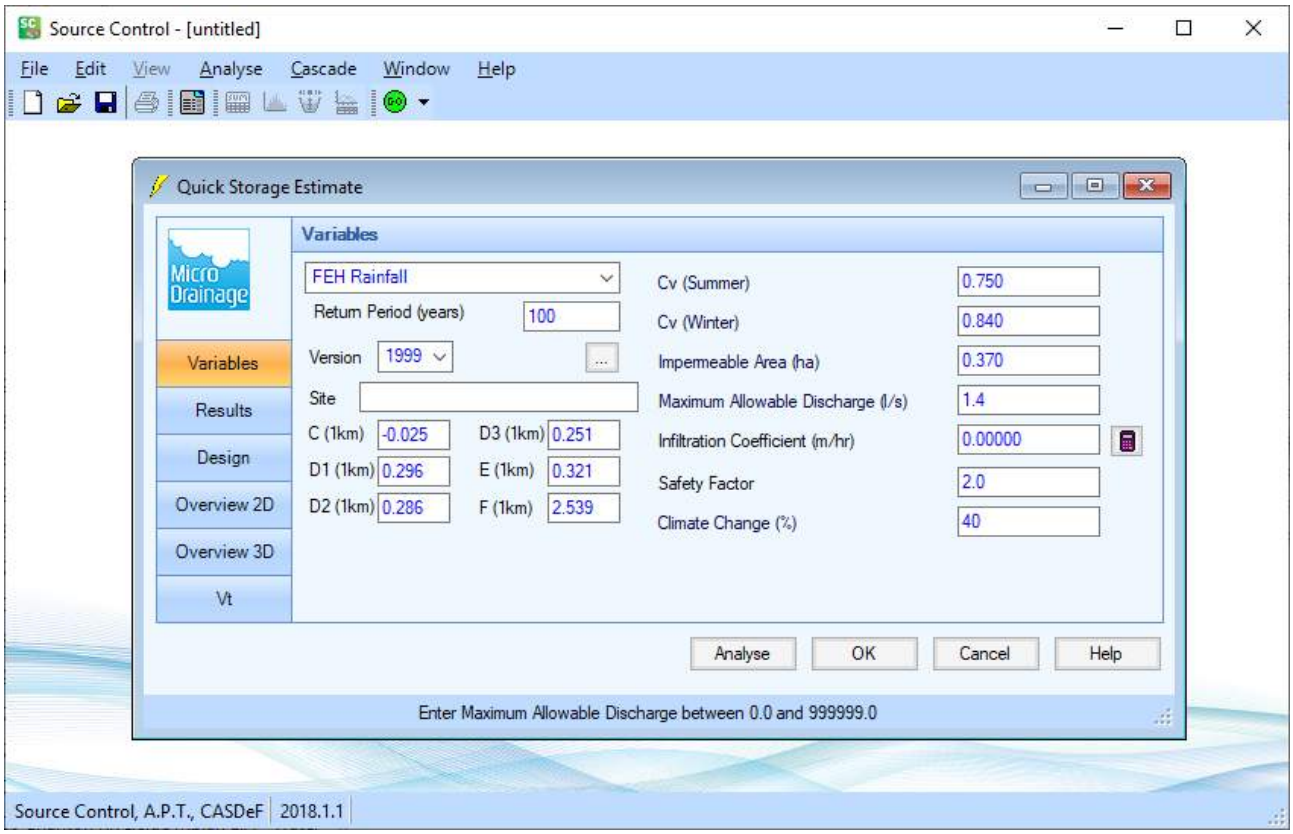
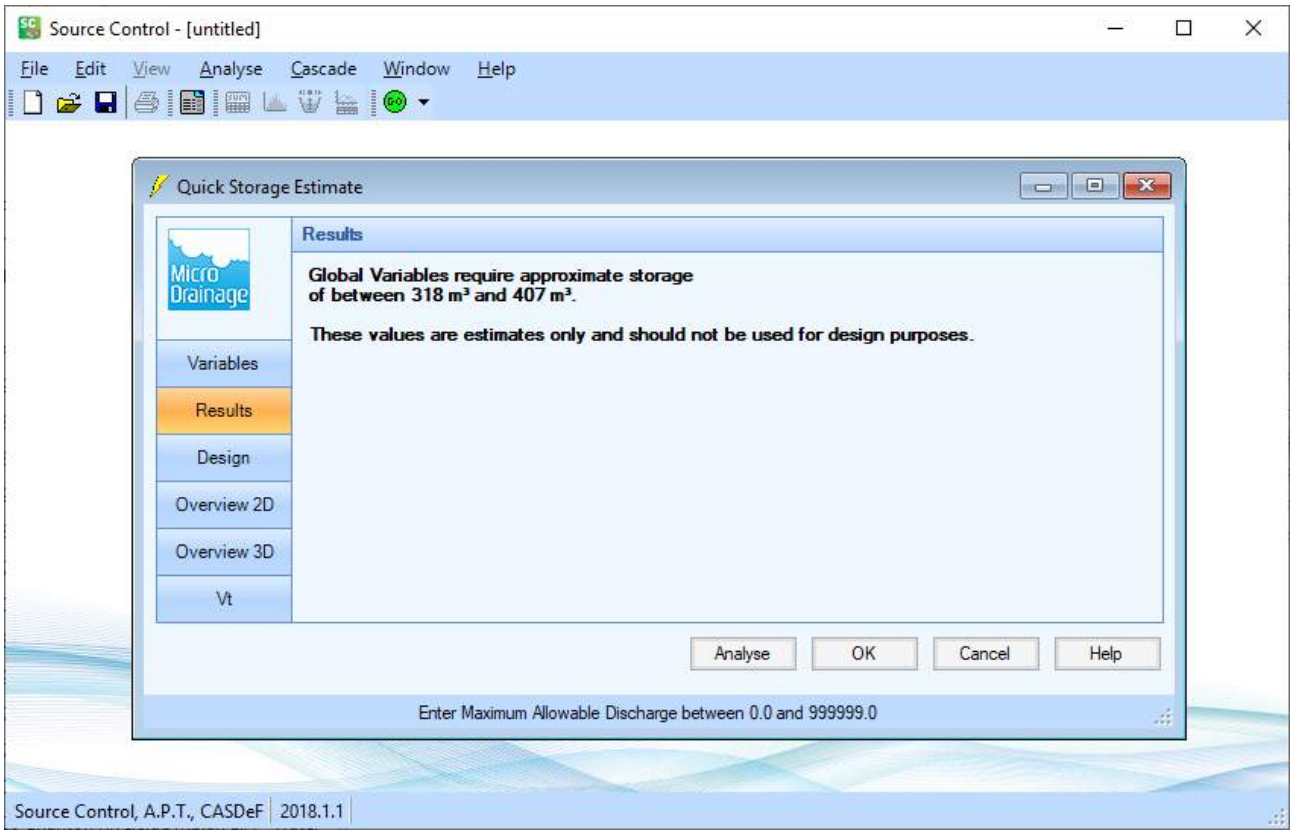
Attenuation A





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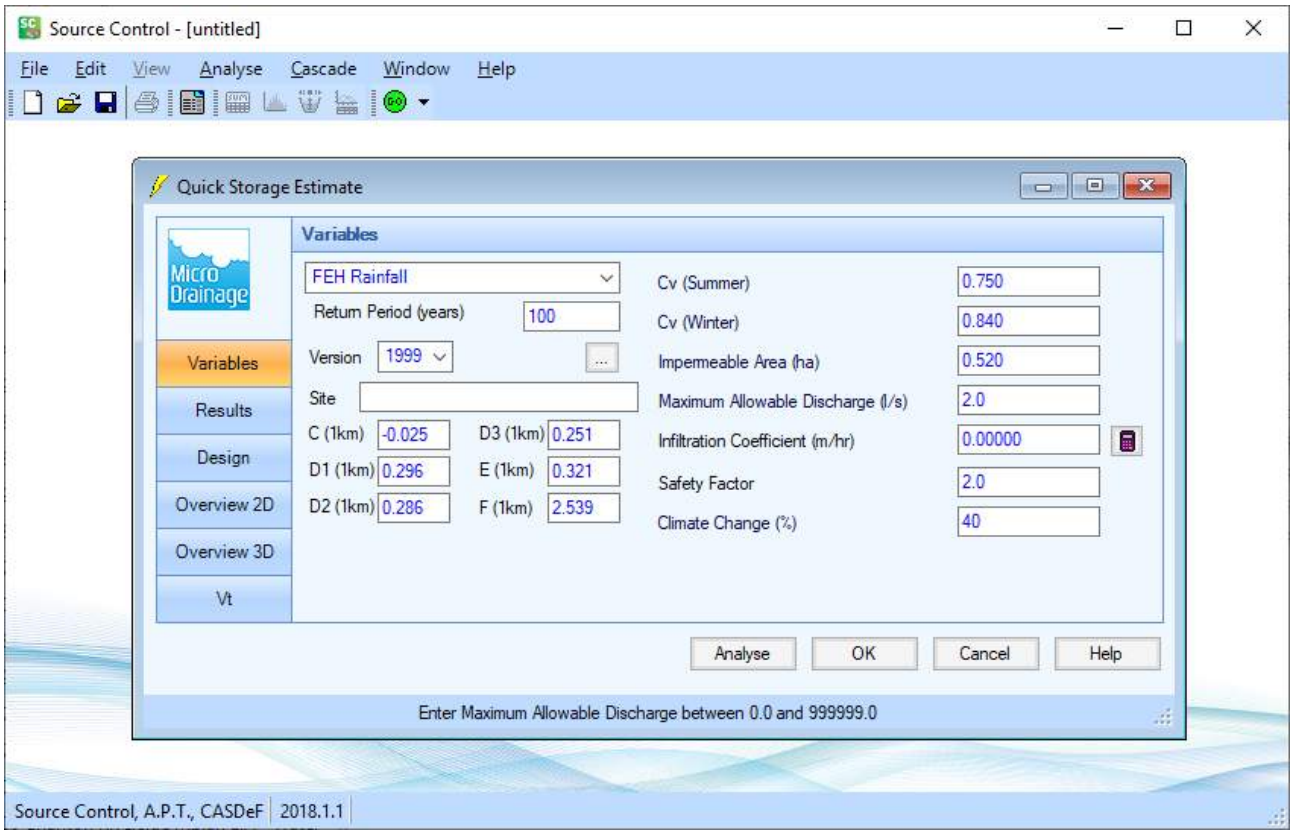

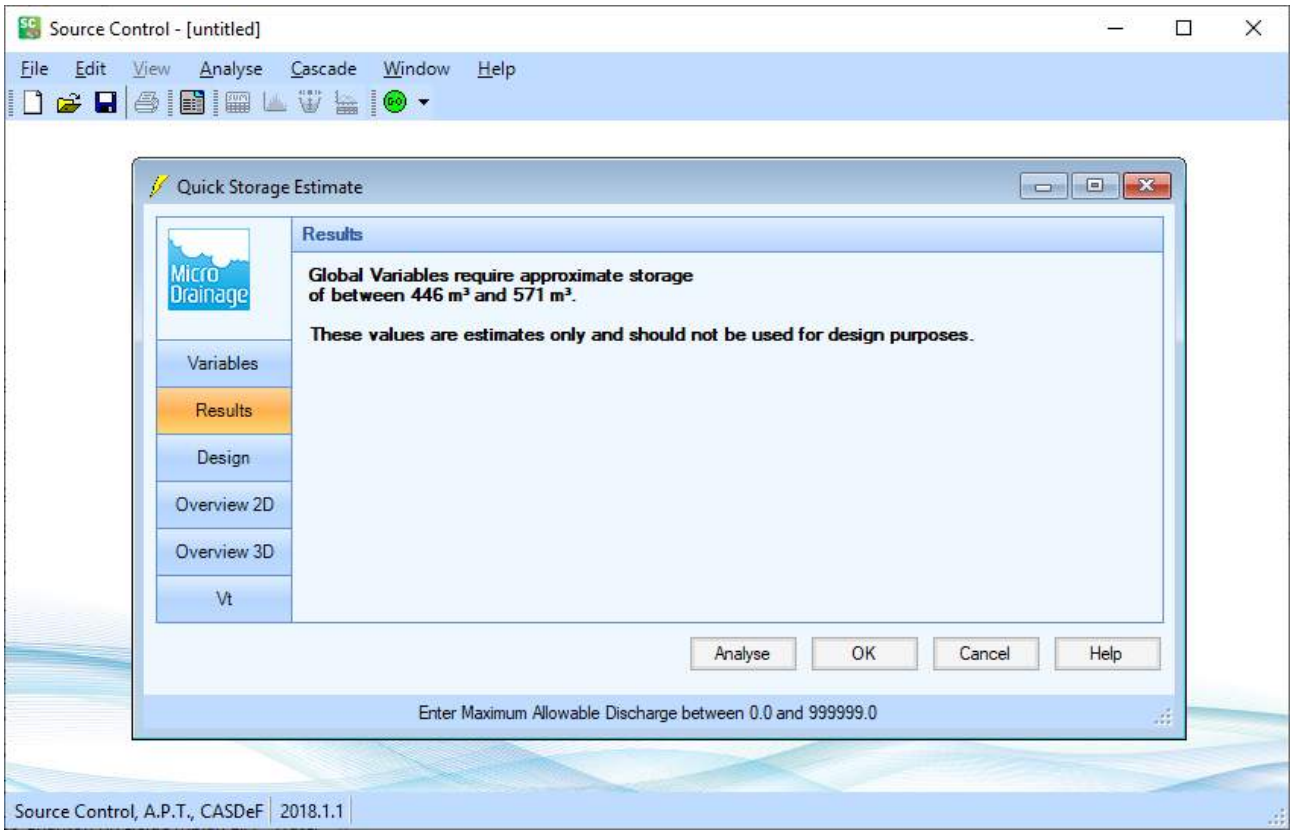

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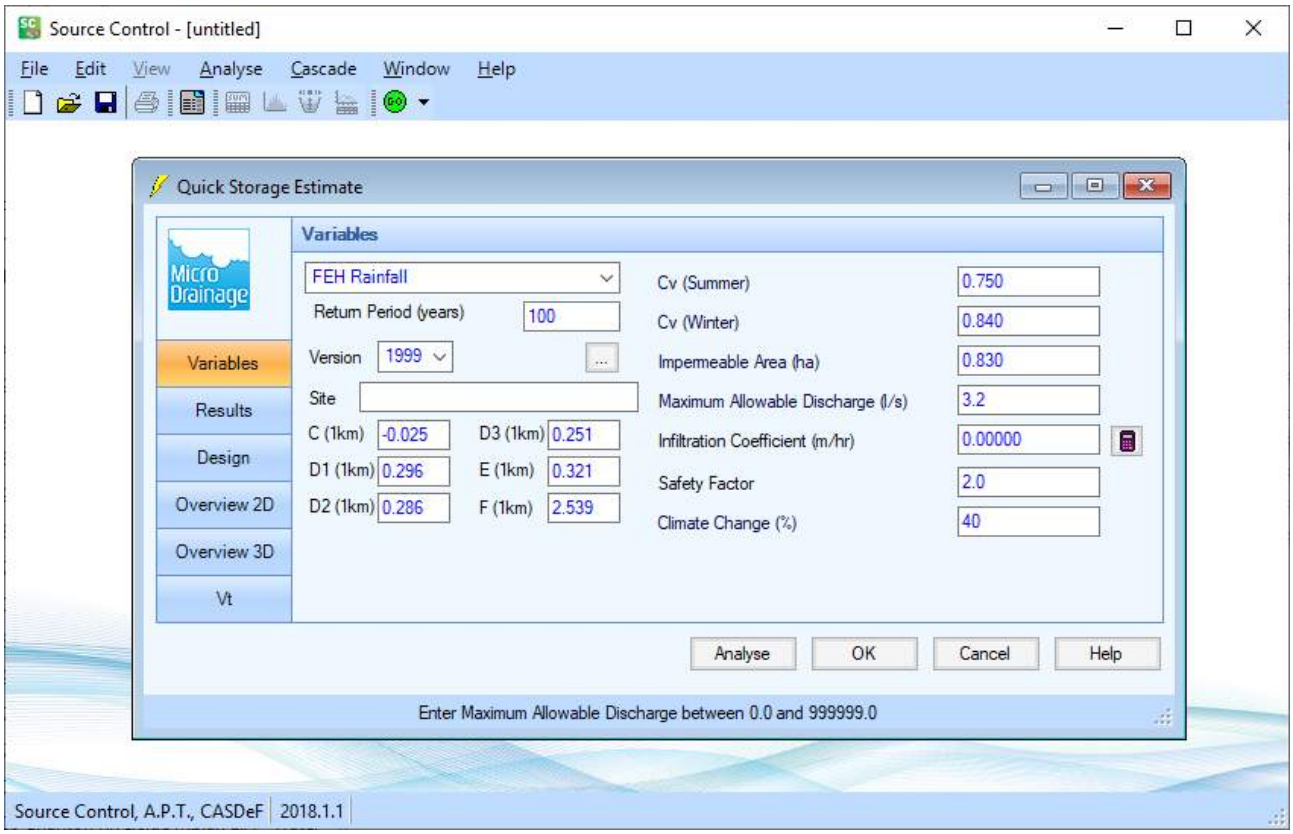

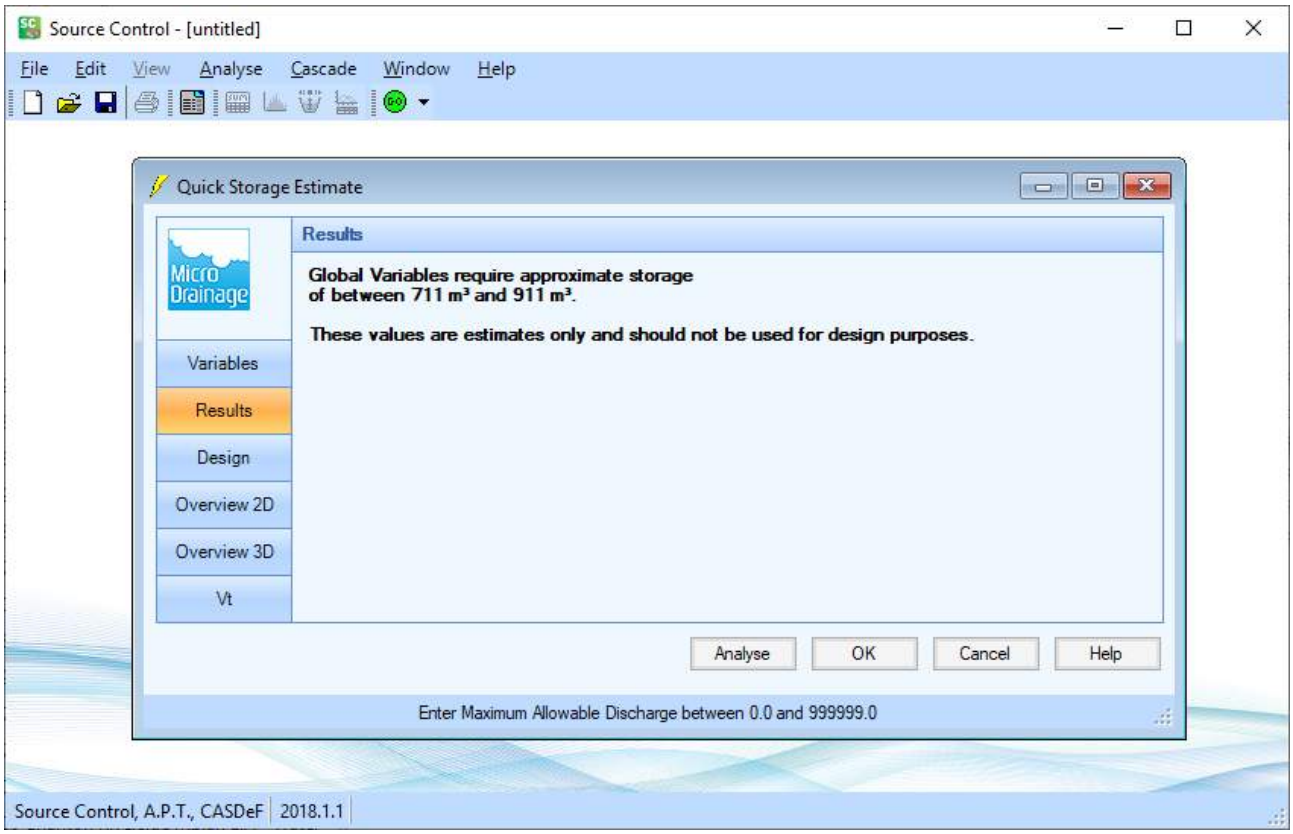

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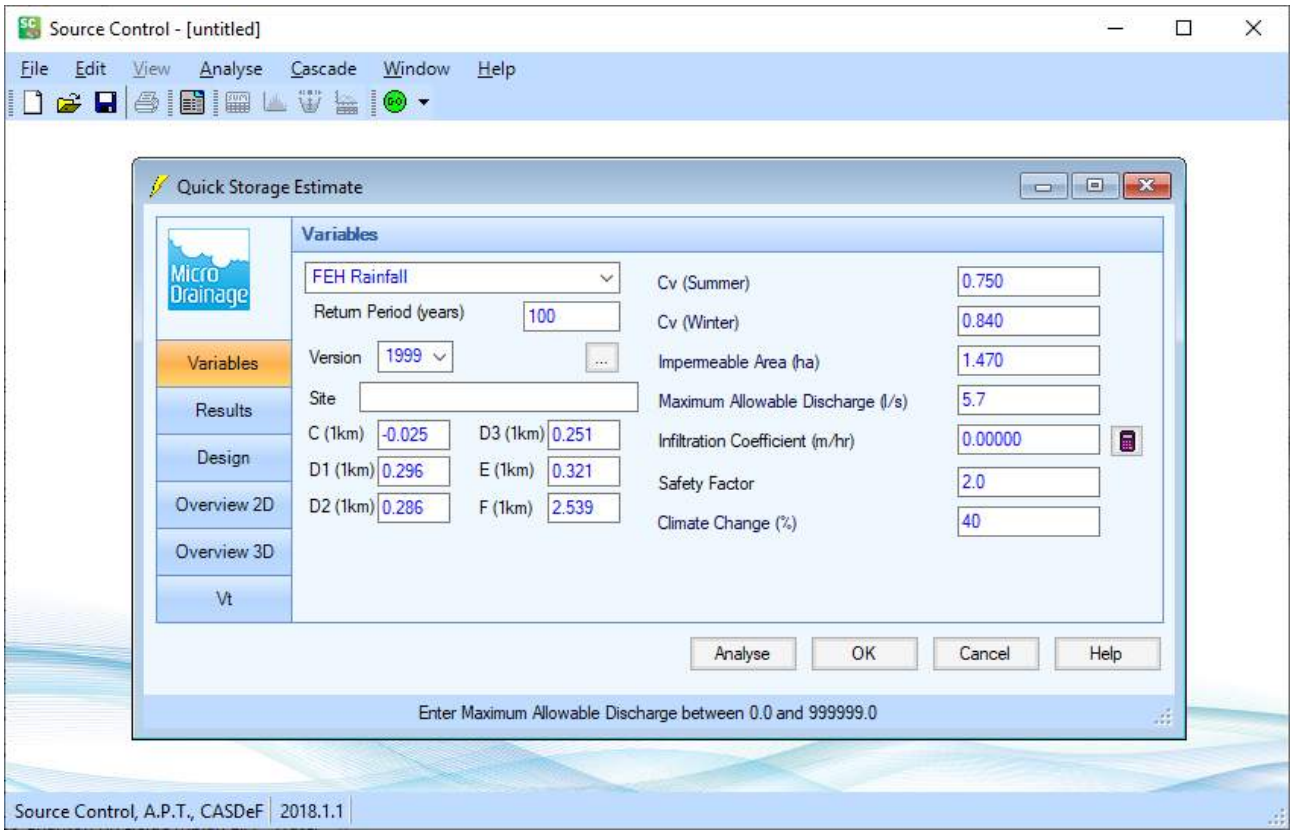

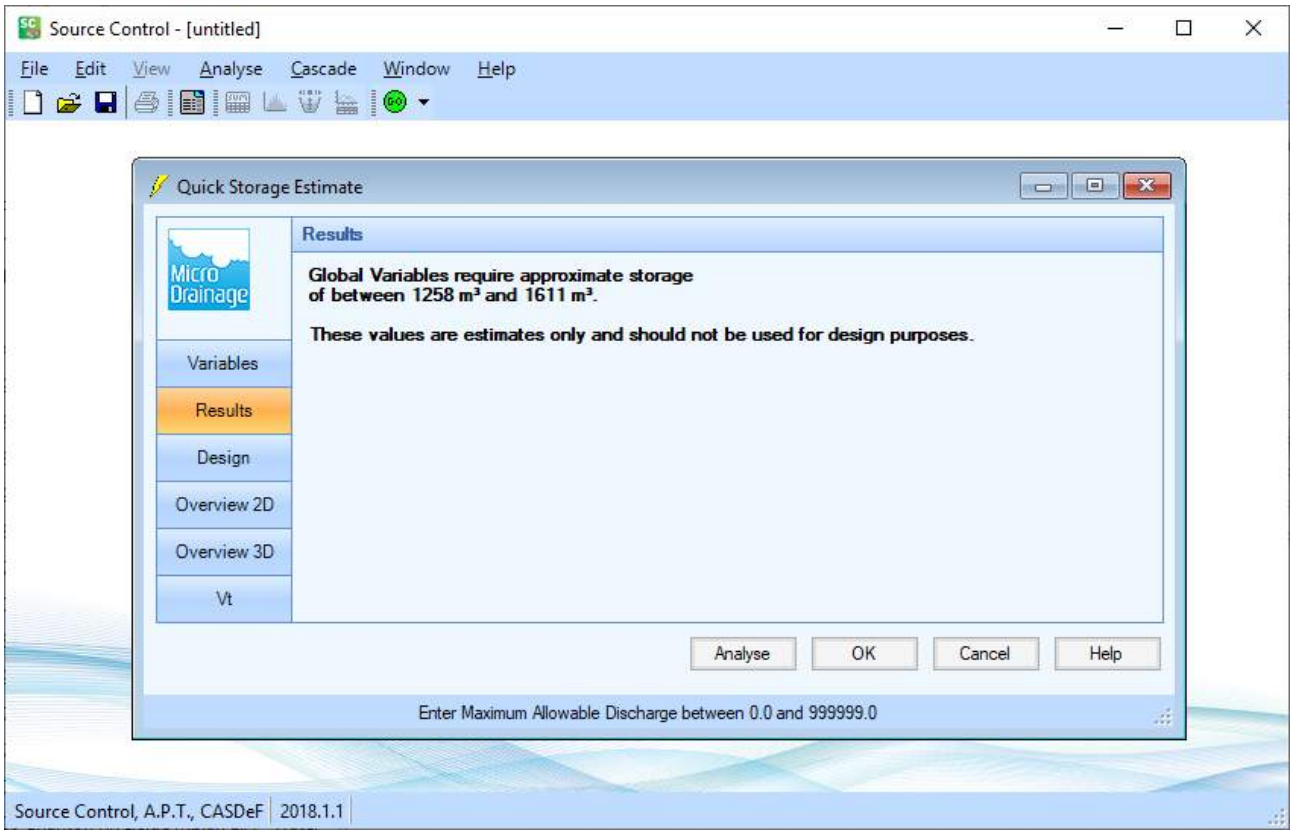

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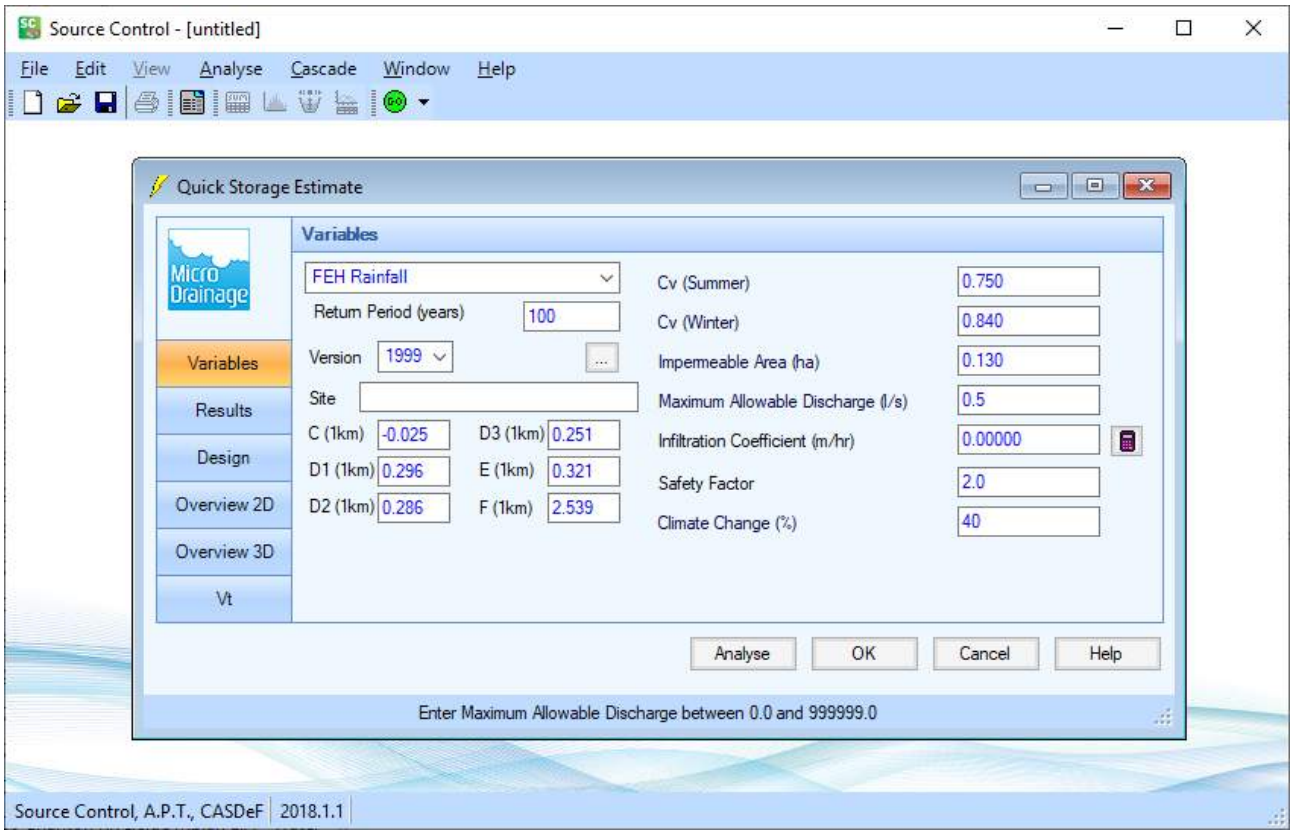

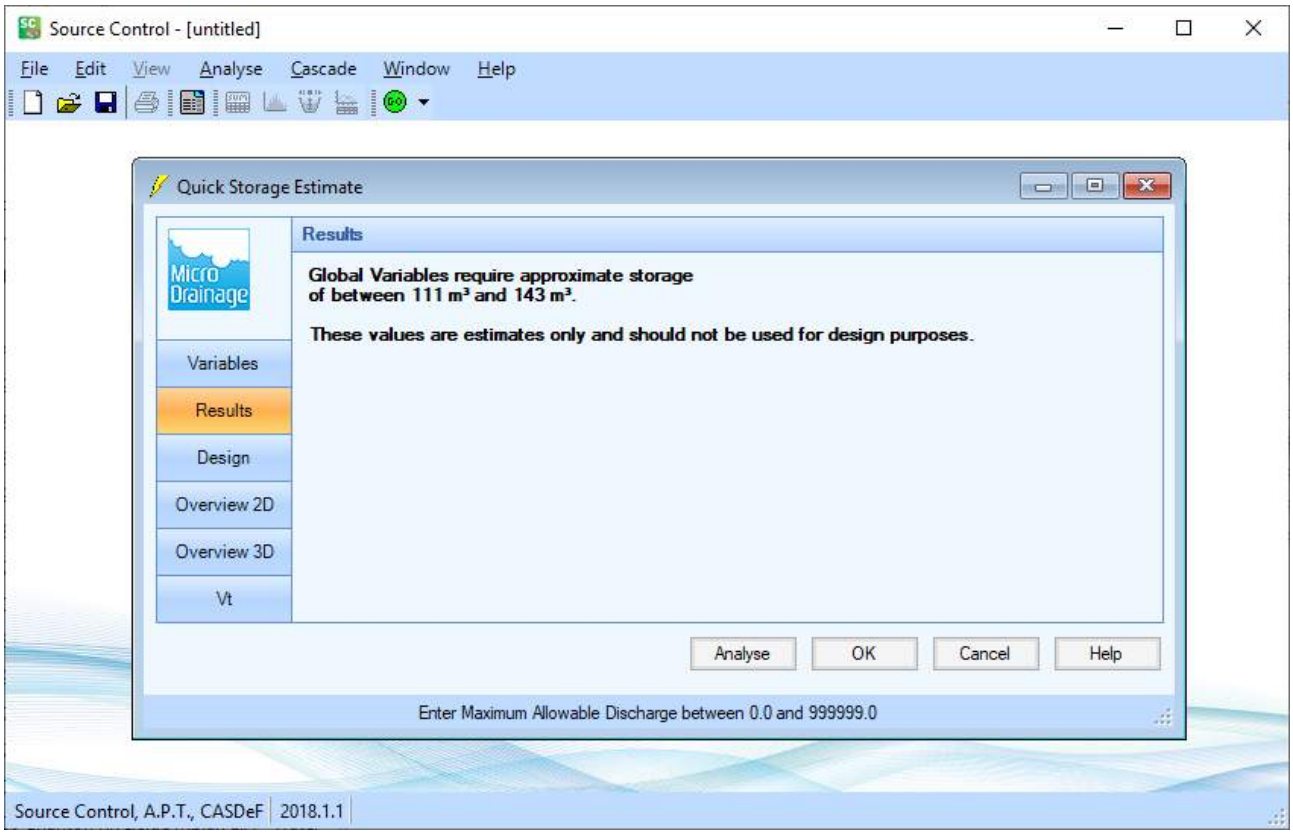

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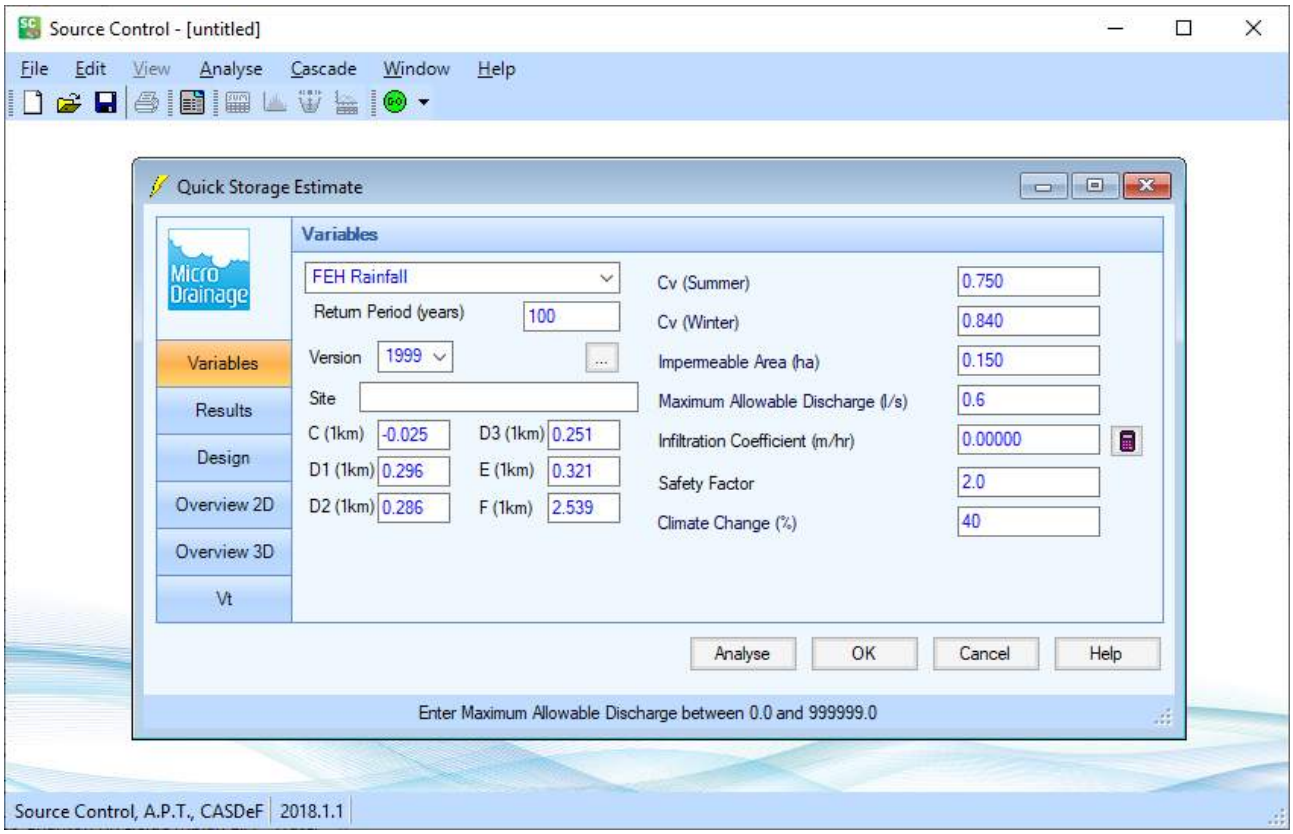

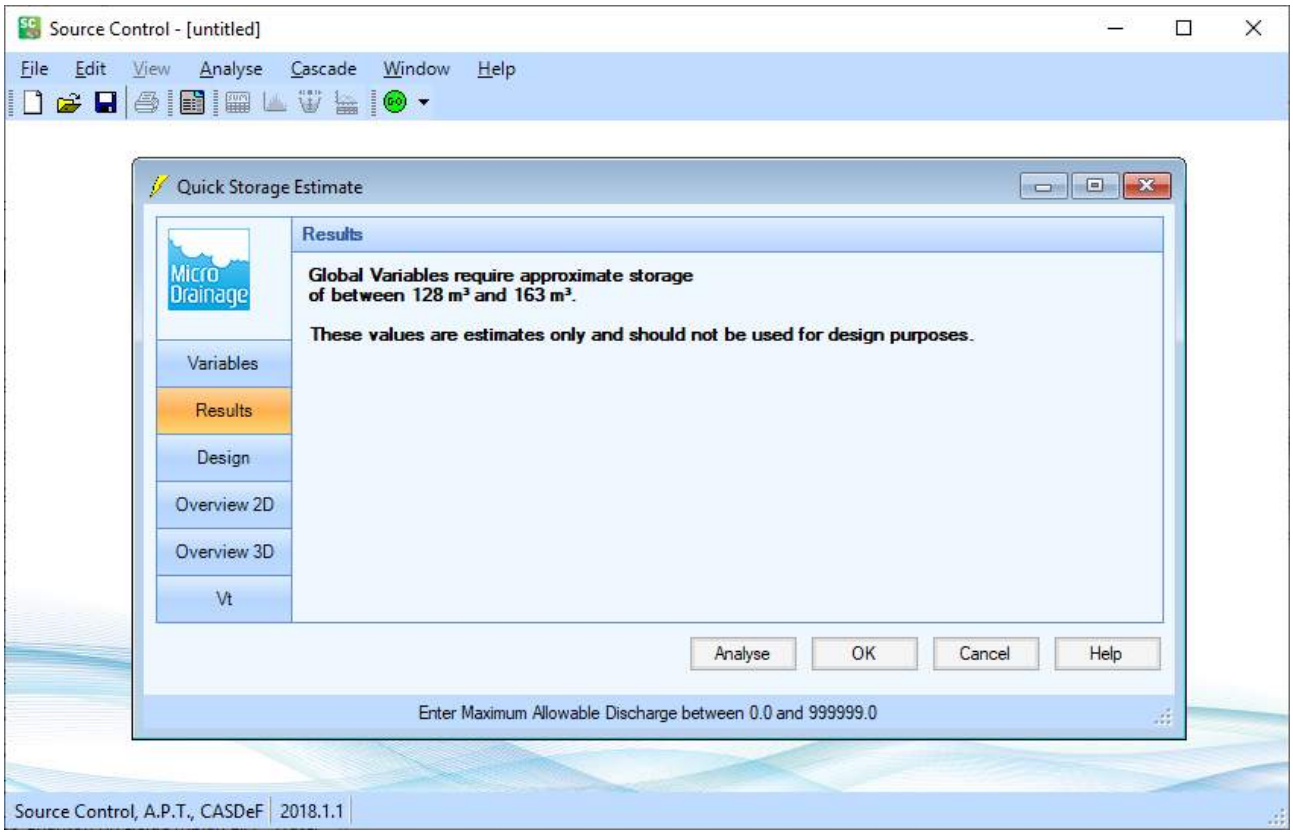

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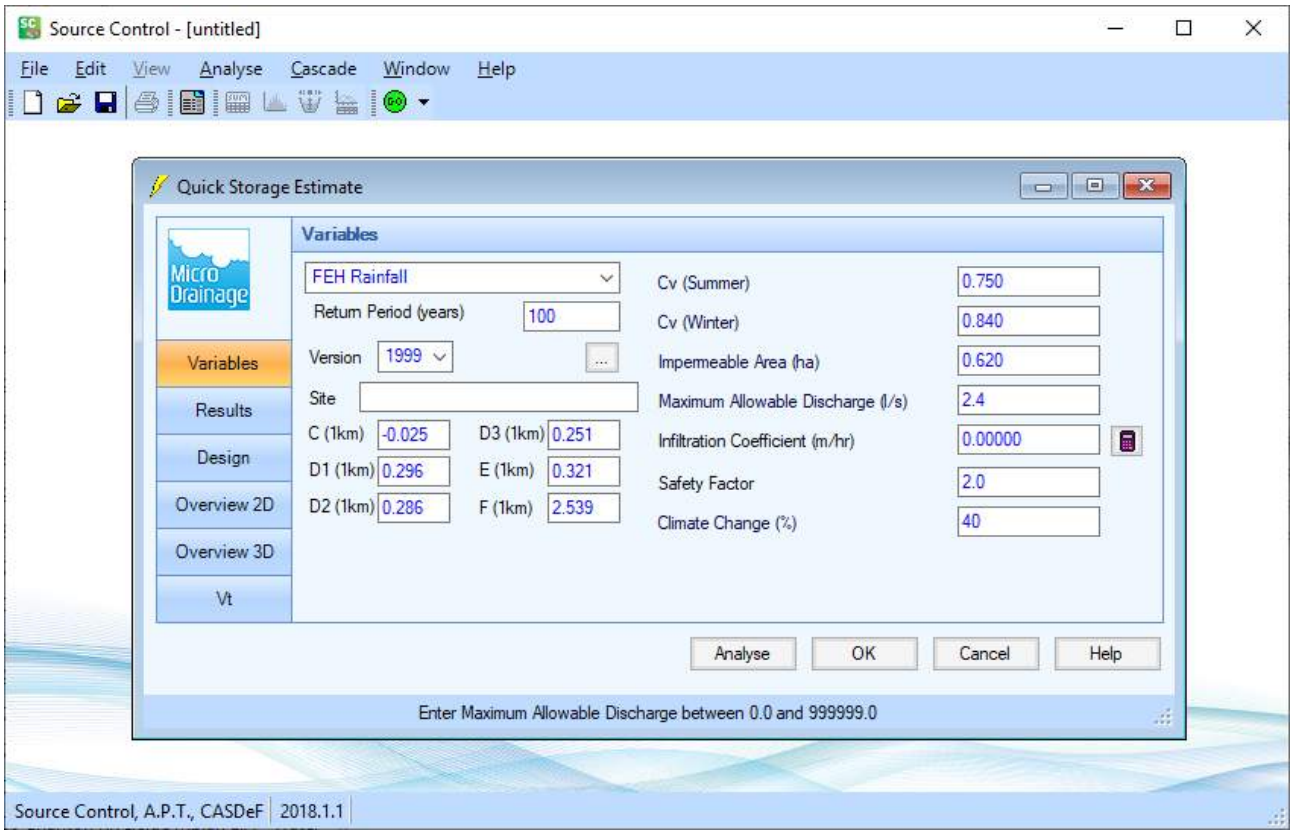

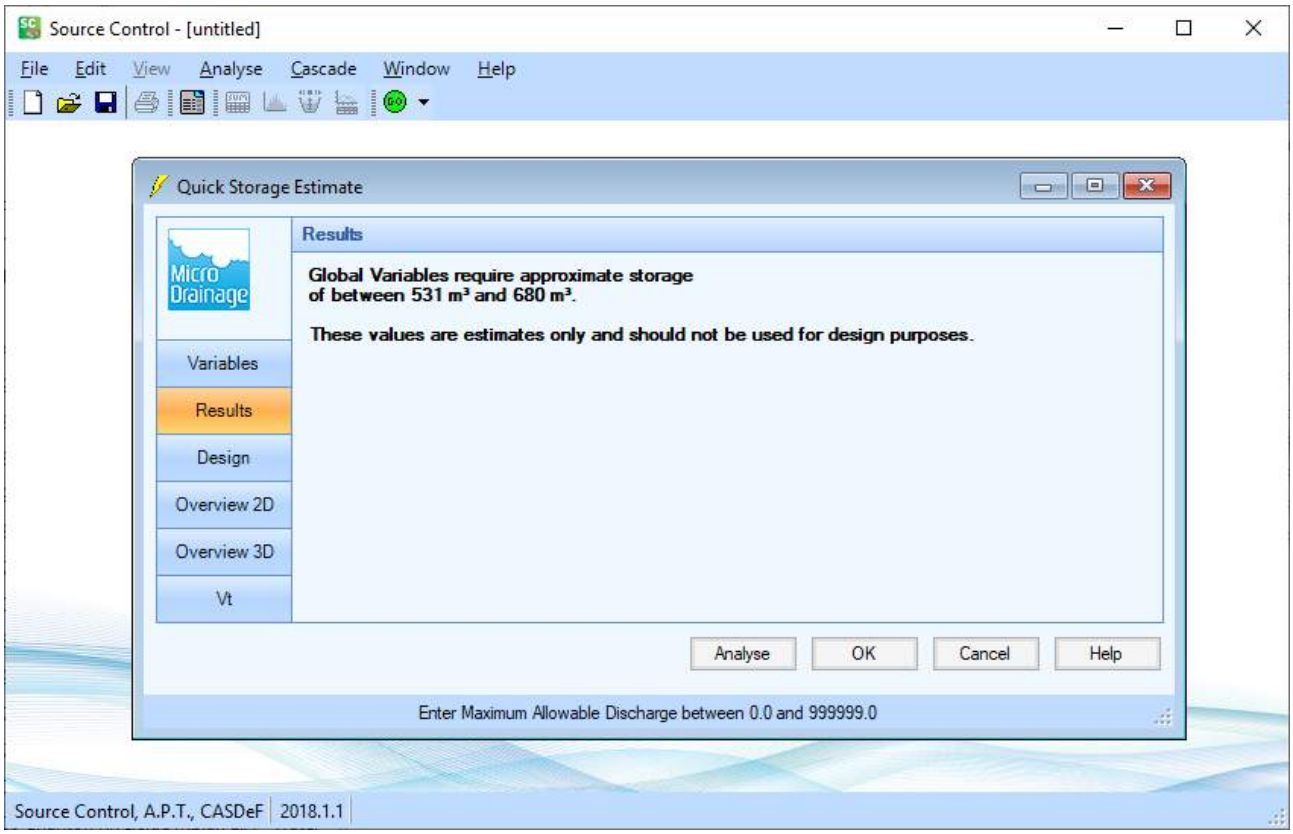

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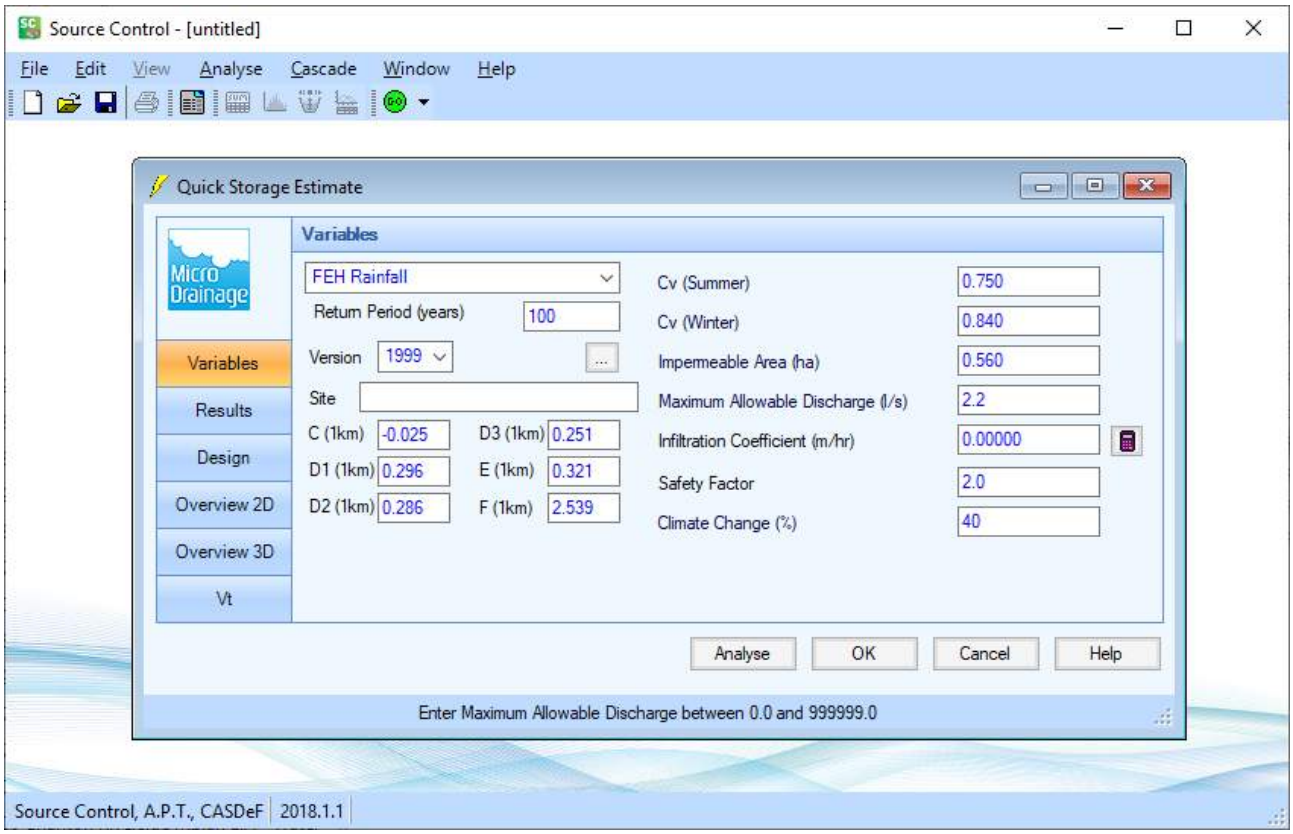

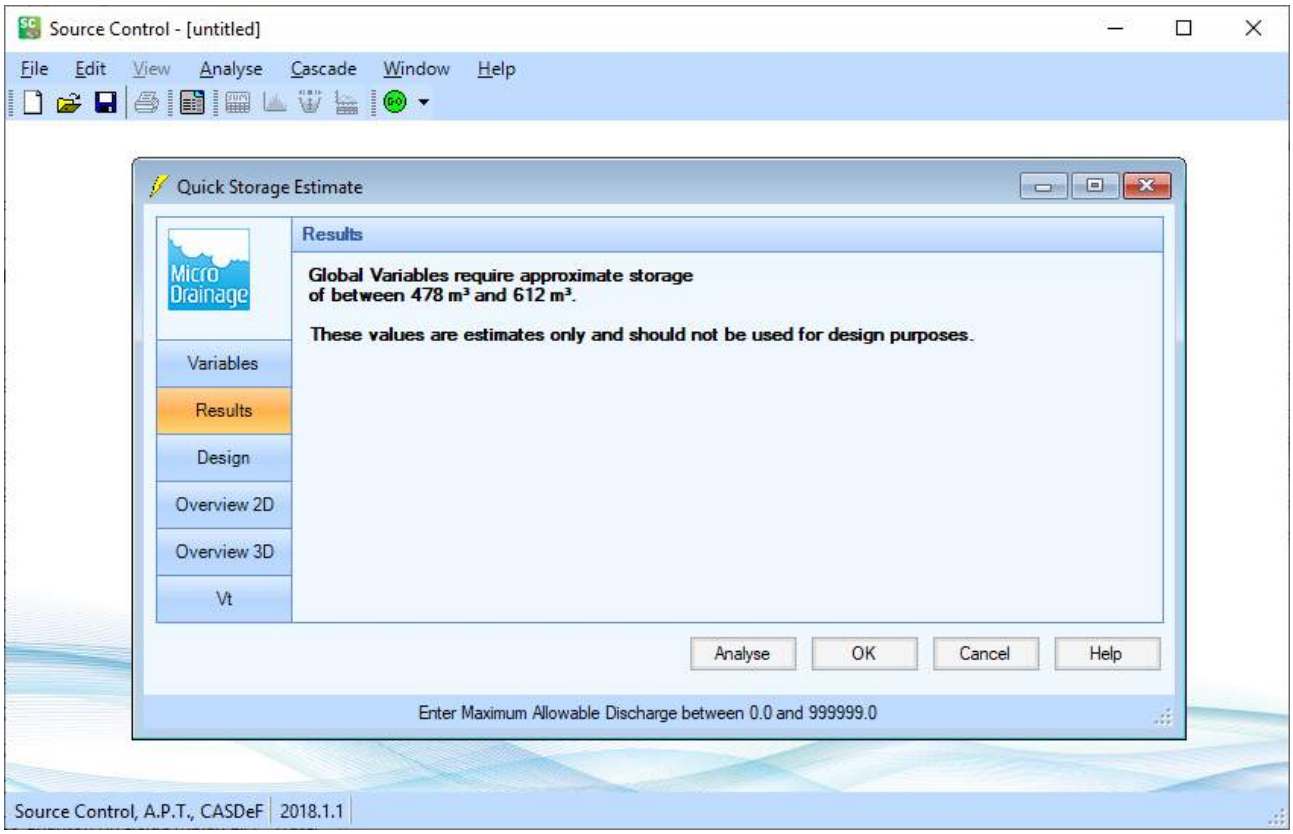

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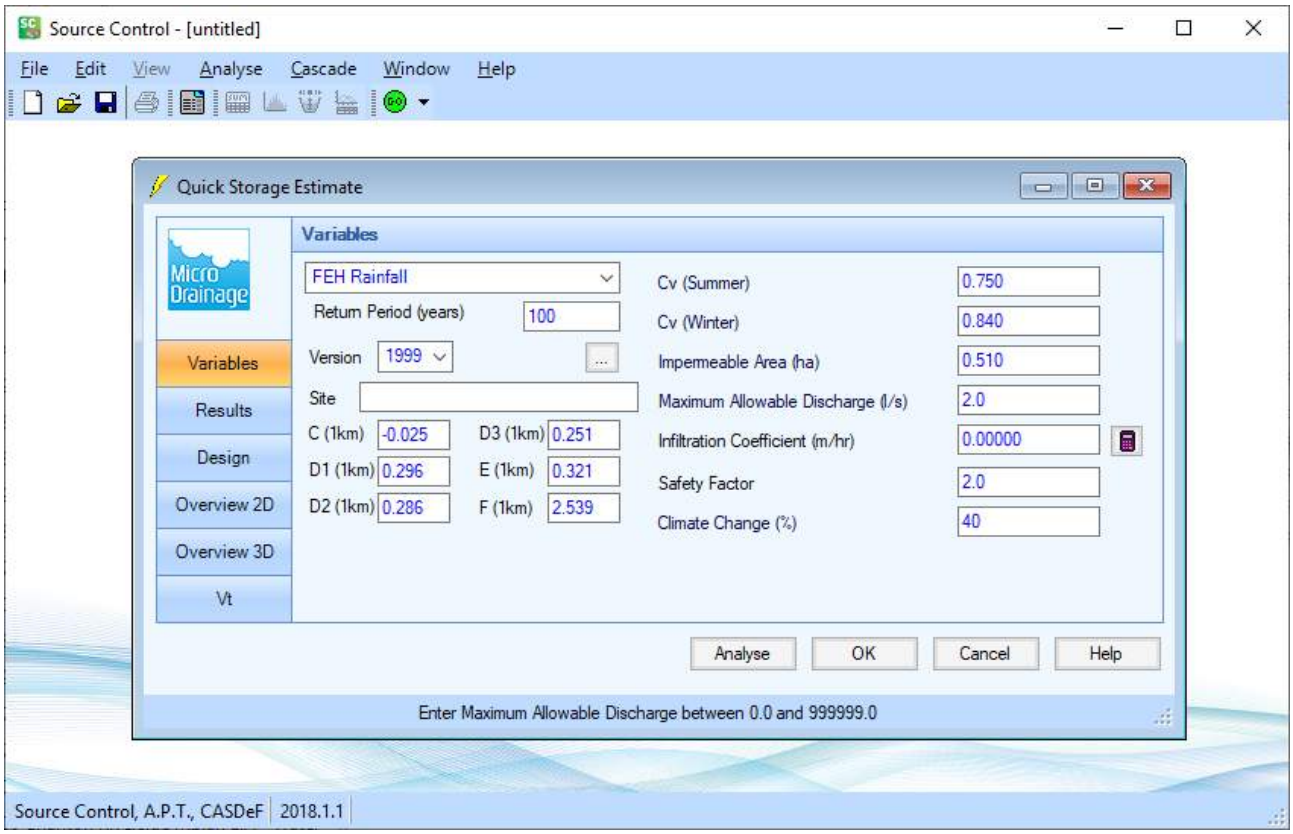

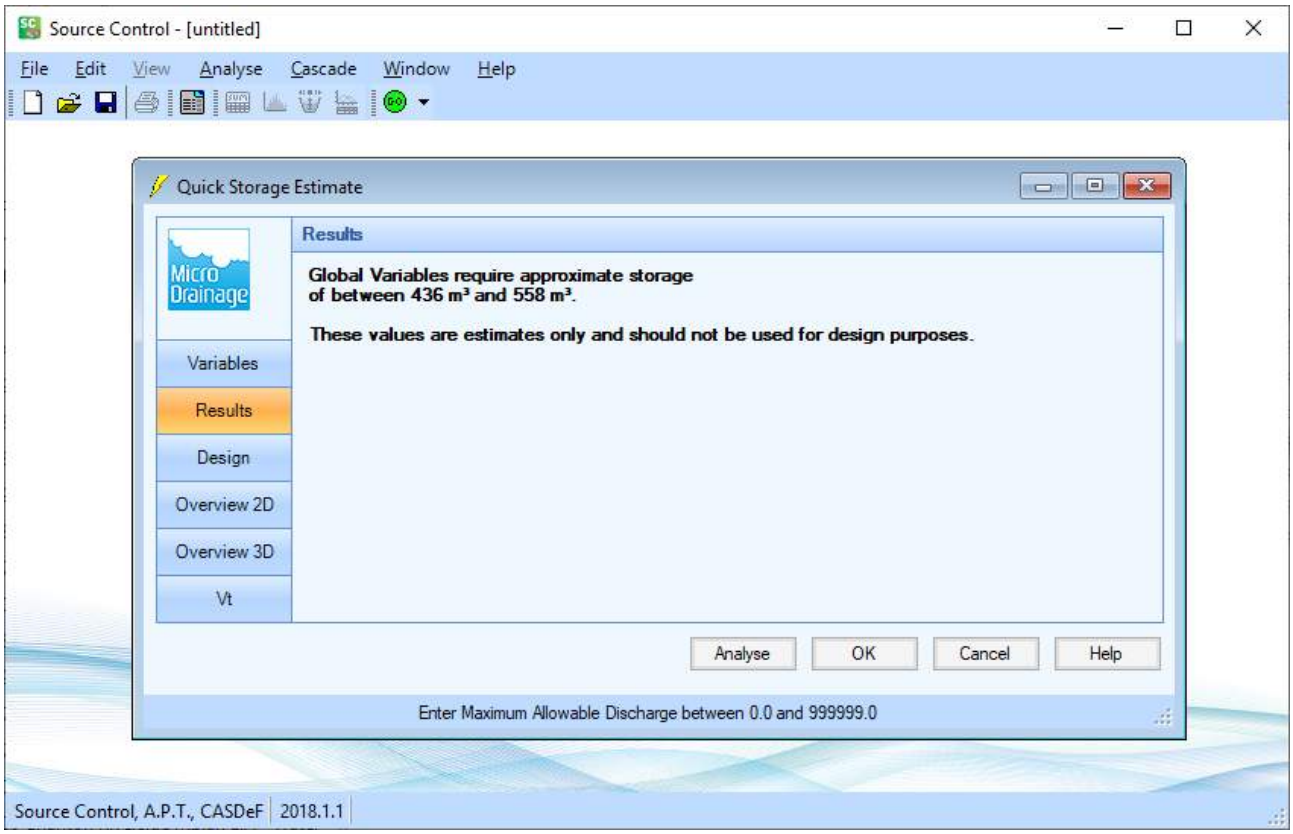

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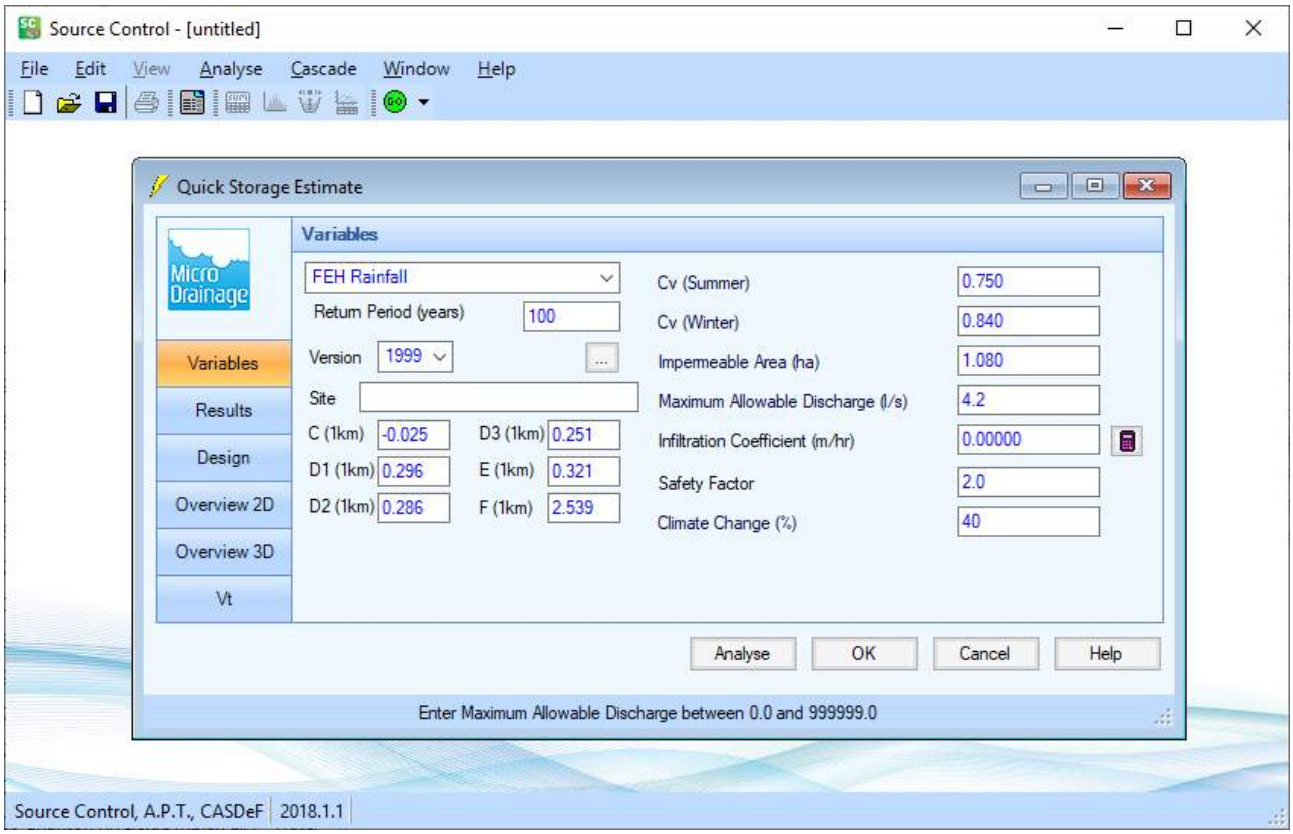

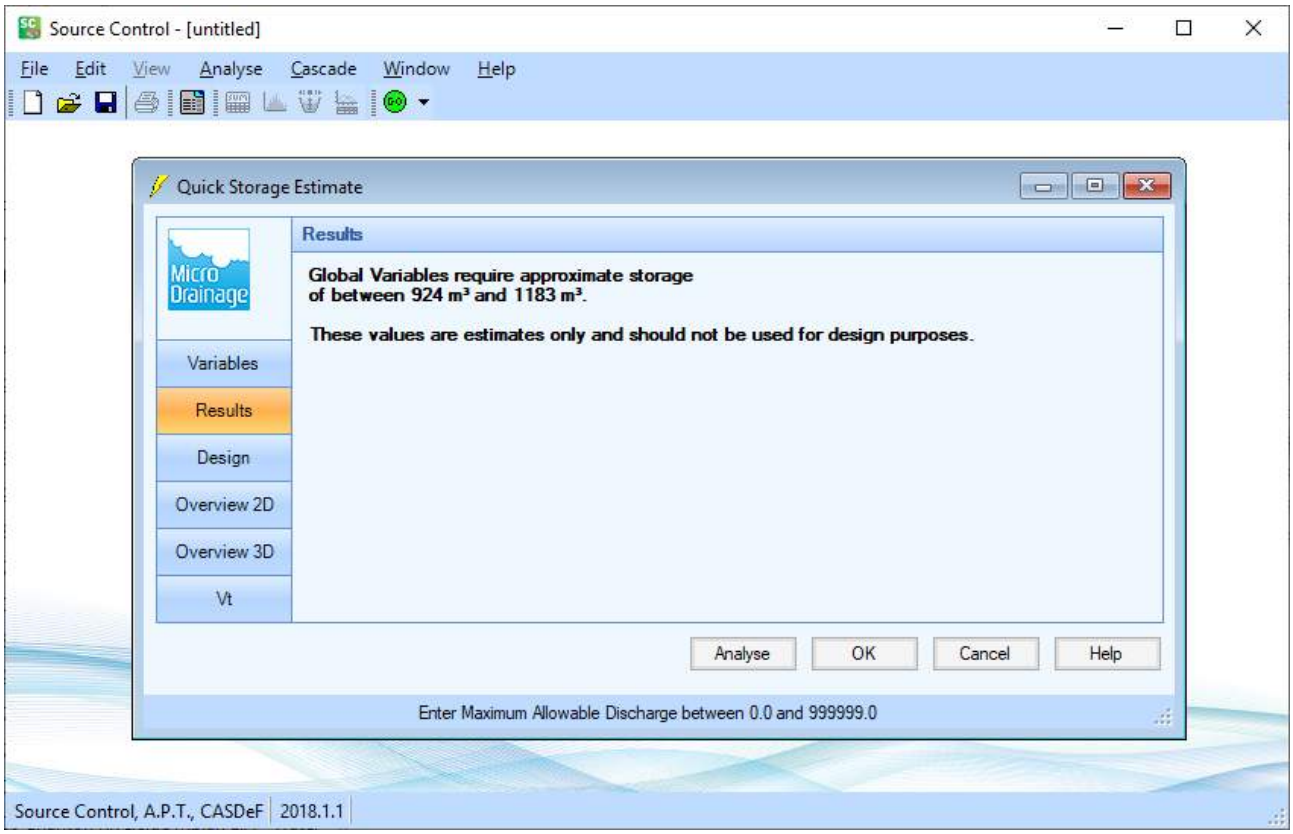

Appendix E – Surface Water Catchment Calculations

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BUROHAPPOLD ENGINEERING

Project	Number	PAGE 1 OF 1	00
THAMESIDE WEST	035668		
SURFACE WATER DRAINAGE			
CATCHMENT AREA SUMMARY		Made by/ Date JF 01/11/2018	
		Checked/ Date LJ 01/11/2018	

Surface Type	Runoff Coefficient
Impermeable Paving	0.95
Soft Landscaping	0.35
Roof	0.95
Green Roof	0.70

Notes

[1] For simplicity, Roof areas have not been measured separately and are included in the Impermeable Paving area

Outfall Ref.	Catchment Area (m^2)					Contributing Catchment (m^2)	Contributing Catchment (ha)
	Total Catchment	Impermeable Paving	Soft Landscaping	Roof [1]	Green Roof		
S8	16,808	**7,612**	8,832	-	364	**10,577**	**1.06**
S20	15,690	**15,151**	-	-	539	**14,771**	**1.48**
S32	13,826	**12,361**	-	-	1,465	**12,768**	**1.28**
S51	27,725	**23,478**	2,210	-	2,037	**24,504**	**2.45**
TW 7701	57,908	**37,162**	20,746	-	-	**42,565**	**4.26**
TW 0403	26,344	**17,745**	8,599	-	-	**19,867**	**1.99**

Appendix F – Foul Water Discharge Calculations

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Building	Residential		Non-Residential [2]																Total Peak Foul Water Flow Rate (l/s)
			Retail				Office[1]				Light Industrial						Total		
	Units*	Peak Residential Foul Water Flow Rate (l/s)	Area (m2)	Area (ha)	Average Design Flow (l/s)	Peak Design Flow (l/s)	Area (m2)	Area (ha)	Average Design Flow (l/s)	Peak Design Flow (l/s)	Area (m2)	Area (ha)	Domestic Flow (l/s)	Trade Effluent Flow (l/s)	Average Design Flow (l/s)	Peak Design Flow (l/s)	Average Design Flow (l/s)	Peak Non-Residential Foul Water Flow Rate (l/s)	
A	195	9.0	-	-	-	-	-	-	-	-	1,789	0.18	0.11	0.18	0.29	1.72	0.29	1.72	10.7
B	206	9.5	198	0.02	0.01	0.06	-	-	-	-	1,561	0.16	0.09	0.16	0.25	1.50	0.26	1.55	11.1
C	145	6.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7
D	206	9.5	-	-	-	-	-	-	-	-	791	0.08	0.05	0.08	0.13	0.76	0.13	0.76	10.3
E	267	12.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.4
F	326	15.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.1
G	320	14.8	1,185	0.12	0.05	0.33	-	-	-	-	-	-	-	-	-	-	0.05	0.33	15.1
J	218	10.1	393	0.04	0.02	0.11	-	-	-	-	-	-	-	-	-	-	0.02	0.11	10.2
M	205	9.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.5
N	313	14.5	434	0.04	0.02	0.12	-	-	-	-	-	-	-	-	-	-	0.02	0.12	14.6
H	143	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.6
K	207	9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.6
L	211	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.8
P	83	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.8
Q	218	10.1	500	0.05	0.02	0.14	1,700	0.17	0.15	0.89	-	-	-	-	-	-	0.02	1.02	11.1
R	542	25.1	1,030	0.10	0.05	0.29	-	-	-	-	-	-	-	-	-	-	0.05	0.29	25.4
S	575	26.6	2,057	0.21	0.10	0.57	-	-	-	-	-	-	-	-	-	-	0.10	0.57	27.2
T	423	19.6	474	0.05	0.02	0.13	-	-	-	-	-	-	-	-	-	-	0.02	0.13	19.7
U	197	9.1	708	0.07	0.03	0.20	-	-	-	-	-	-	-	-	-	-	0.03	0.20	9.3
INDUSTRIAL SITE	-	-	-	-	-	-	-	-	-	-	14,250	1.43	0.86	1.43	2.28	13.68	2.28	13.68	13.7
NURSERY	-	-	-	-	-	-	943	0.09	0.08	0.49	-	-	-	-	-	-	-	0.49	0.5
SCHOOL	-	-	-	-	-	-	4,058	0.41	0.35	2.11	-	-	-	-	-	-	-	2.11	2.1
Total (excl. phase 1)	4,599	212.9	6,781	0.68	0.31	1.88	6,701	0.67	0.58	3.49	15,041	1.50	0.90	1.50	2.41	14.44	2.72	19.81	232.7

Notes

* From F+P Accommodation Schedule Rev 21, dated 27/02/2020

1 School and nursery assumed as office space for the purpose of foul load calculations

2 From F+P Non Residential Accommodation Schedule, dated 27/02/2020

BUROHAPPOLD ENGINEERING

Project
THAMESIDE WEST

Number
035668

FOUL WATER DRAINAGE

FOUL WATER FLOW RATE CALCULATIONS

UPDATED FOR MARCH 2020 AMENDMENTS TO MASTERPLAN

Made by/ Date
JF 10/03/2020

Checked/ Date
LJ 10/03/2020

Appendix G – Newham LLFA Drainage Pro Forma

Note: Items marked 'Undetermined' are values for the proposed SuDS features that have not been determined for the Masterplan Drainage Strategy as it is being submitted for Outline planning only. It is proposed that these values are confirmed as the design progresses to a more detailed stage.

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Newham London

GREATER**LONDON**AUTHORITY

LoDEG

1. Project & Site Details		
	Project / Site Name (including sub-catchment / stage / phase where appropriate)	Thameside West Masterplan (Excluding Phase 1)
	Address & post code	Dock Road London E16 1DF
	OS Grid ref. (Easting, Northing)	E 539749
		N 180527
	LPA reference (if applicable)	18/03557/OUT
	Brief description of proposed work	Phased construction of a major mixed use development on land at Thameside West, Dock Road, London E16
	Total site Area	188,000 m^2
	Total existing impervious area	158,000 m^2
	Total proposed impervious area	113,500 m^2
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No
	Existing drainage connection type and location	To the Thames via outfalls in the river wall, and to existing sewers in Dock Rd
	Designer Name	Jack Foster
	Designer Position	Senior Engineer
	Designer Company	BuroHappold Engineering

2. Proposed Discharge Arrangements			
	2a. Infiltration Feasibility		
	Superficial geology classification	Alluvium - Clay, Silt, Sand and Peat	
	Bedrock geology classification	London Clay Formation - Clay, Silt and Sand	
	Site infiltration rate	N/A m/s	
	Depth to groundwater level	1.45m bgl (min.) m below ground level	
	Is infiltration feasible?	No	
	2b. Drainage Hierarchy		
		Feasible (Y/N)	*Proposed (Y/N)*
	1 store rainwater for later use	Y	Y
	2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
	3 attenuate rainwater in ponds or open water features for gradual release	Y	Y
	4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
	5 discharge rainwater direct to a watercourse	Y	Y
	6 discharge rainwater to a surface water sewer/drain	Y	Y
	7 discharge rainwater to the combined sewer.	Y	Y
	2c. Proposed Discharge Details		
	Proposed discharge location	New outfalls to the River Thames and Thames Water chamber ref. 7701 & 0403	
	Has the owner/regulator of the discharge location been consulted?	Yes, Thames Water and the Environment Agency	

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	72.4			
1 in 1	61.5	Not calculated	Not calculated	72.4
1 in 30	166.4	712	Not calculated	72.4
1 in 100	230.8	951.3	Not calculated	72.4
1 in 100 + CC				72.4
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Not specified - to be determined during detailed design stage		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	N/A	4,400	0
Blue roofs	0	0	0
Filter strips	Undertermined	Undertermined	0
Filter drains	Undertermined	Undertermined	0
Bioretention / tree pits	Undertermined	Undertermined	0
Pervious pavements	0	0	0
Swales	Undertermined	Undertermined	0
Basins/ponds	15,800	Undertermined	1185 (max)
Attenuation tanks	68,500		5660 (max)
Total	**84300**	**4400**	**0**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Table 5-1 of Drainage Strategy
Drainage hierarchy (2b)	Table 5-1 of Drainage Strategy
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 7, and Appendix B and C of Drainage Strategy
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5.3.2 and 5.3.4, and Appendix D and E of Drainage Strat
Proposed SuDS measures & specifications (3b)	Section 5.4 of Drainage Strategy
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix A of Drainage Strategy
Detailed drainage design drawings, including exceedance flow routes	Appendix C of Drainage Strategy
Detailed landscaping plans	Appendix A of Drainage Strategy
Maintenance strategy	
Demonstration of how the proposed SuDS measures improve:	-
a) water quality of the runoff?	Section 5.5 of Drainage Strategy
b) biodiversity?	Section 5.6 of Drainage Strategy
c) amenity?	Section 5.6 of Drainage Strategy

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8-B: FLOOD RISK ASSESSMENT (FRA) STATEMENT OF CONFORMITY

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APPENDIX 8-B FLOOD RISK ASSESSMENT STATEMENT OF CONFORMITY

9.1 INTRODUCTION

9.1.1 This statement of conformity provides a commentary on the validity of the Flood Risk Assessment (FRA) in light the amendments to the proposed development. The assessment includes a review of any relevant changes in legislation since the previous FRA in May 2019 (revision 02); a review of the baseline conditions in order to ensure the assessment is based on up-to-date site and surrounding area conditions; and a review of any further supplementary mitigation measures required.

9.2 METHODOLOGY

Assessment approach

9.2.1 The methodology for the assessment remains unchanged from the methodology stated in the 2018 ES and re-stated in the 2019 ES Addendum.

9.3 REVIEW OF PLANNING POLICY CONTEXT (CHANGES SINCE MAY 2019 ADDENDUM)

9.3.1 The planning policy context remains unchanged from the May 2019 ES Addendum.

9.4 CURRENT BASELINE CONDITIONS 2020

9.4.1 The baseline conditions for the assessment remain unchanged from the May 2019 ES Addendum. Therefore the risk of flooding from fluvial, tidal, surface water, sewer, groundwater and artificial sources remains as stated in the May 2019 ES Addendum.

9.5 SCHEME AMENDMENTS RELEVANT TO THE ASSESSMENT

9.5.1 The Applicants propose to make amendments to the proposed development and supporting planning application material, which comprise:

- Significant reduction in the massing of Building A;
- Decreasing the overall height of Building B;
- Internal and external amendments to the Buildings A and B;
- Amendments to the landscape proposals and reduction in amount of car and cycle parking proposed for Buildings A & B;
- Decreasing the overall height of Building C;
- Reducing the massing of Building D (focusing on the wings adjacent to the Allnex site) to form a stepping down in massing and the massing redistributed to Buildings N, M and J;
- Adjusting the heights of Buildings E & F and the position of the lower podium to improve proximity between the buildings and to improve the outlook of residential units;
- Increased separation distances in Buildings H, K, L and P (Thameside Crescent) to ensure separation distances between habitable rooms for single aspect units achieve a minimum of 18m;
- Buildings S and T have increased in height;
- Increased separation distances between Buildings Q and U to improve views and access from the Station Square to the riverside walkway; and
- Reduction in height of lower parts of Buildings Q & U to increase separation distances.

9.6 SUMMARY AND CONCLUSION

9.6.1 The amendments to the proposed development will not have an impact on the risk associated with flooding from any of the sources of flooding assessed within May 2019 FRA. The conclusions of the May 2019 FRA therefore remain unchanged and valid.

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8-C: REVISED PHASE 1 BELOW GROUND DRAINAGE STRATEGY

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Phase 1 – Thameside West, London

Below Ground Drainage Strategy

Issued for Planning Approval

Issue P06 – 27th April 2020

MEINHARDT

PHASE 1 – THAMESIDE WEST, LONDON

BELOW GROUND DRAINAGE STRATEGY

ISSUED FOR INFORMATION

Quality Assurance Page

Issue	Date	Prepared By	Checked By	Approved By	Remarks
DRAFT	30/10/18	Ms. E. Hatter	Miss E. Peek/Mr. N. Gregory	Mr. P. Hayes	Original Issue
P01	29/11/18	Mr. P. McGowan	Mr. N. Gregory	Mr. P. Hayes	Planning Issue
P02	03/04/19	Mr. B. Veitch	Mr. N. Gregory	Mr. P. Hayes	Revised Planning Issue to address GLA comments
P03	28/06/19	Mr. J. Stokes	Miss E. Peek	Mr. P. Hayes	Revised to suit planning comments
P04	09/03/2020	Miss E. Peek	Miss E. Peek	Mr. P. Hayes	Revised Planning Issue
P05	09/04/2020	Miss E. Peek	Mr. N. Gregory	Mr. P. Hayes	Updated Applicant Name
P06	27/04/2020	Mr. N. Jones	Miss E. Peek	Mr. P. Hayes	Updated Appendix A

Table of Contents

Executive Summary

Meinhardt UK Ltd has been appointed by Silvertown Homes Limited and GLA Land and Property (the Applicant) to undertake the foul and surface water below ground drainage design for Phase 1 of the proposed development known as Thameside West. This report outlines the proposed drainage strategy to date.

The site is located on the corner of North Woolwich Road and Bell Lane, E16 1YZ. The site area totals 1.24 hectares (ha) of which 0.750 ha is contributed as part of the permanent Phase 1 drainage area with the remainder of the site forming part of the temporary development and will be constructed in line with the masterplan works; the existing site is currently occupied by industrial units. It is proposed to develop the site into residential accommodation across two buildings, with an industrial unit at the ground floor of each building. A total of 401 residential units are proposed across the two buildings.

BuroHappold have been appointed to undertake the foul and surface water below ground drainage design for the masterplan which is being submitted for outline planning concurrently with the detailed planning application for Phase 1. To ensure consistency across the scheme Meinhardt UK have liaised with BuroHappold to agree a series of design parameters including the proposed surface water discharge rate and the disposal strategy.

Accordingly, the proposed surface water drainage strategy for the site has been developed to utilise sustainable drainage techniques (SuDS) to attenuate surface water at source and reduce the risk of downstream flooding of the Thames Water sewer network in the local area. The scheme that has been developed utilises podium attenuation and below ground cellular attenuation to reduce the peak surface water run-off rates from the site. It is proposed that surface water run-off will drain to the internal drainage network before discharging via gravity to the Thames Water combined water sewer in North Woolwich Road.

The proposed foul water drainage strategy for the site involves the MEP engineer's coordination of the superstructure drainage up until it exits the building and enters the below ground drainage network. A below ground drainage network of pipes and manholes will collect the foul water discharge from the property before discharging via gravity to the Thames Water combined water sewer in North Woolwich Road.

Based on Thames Water Asset records for the site and surrounding area, it is assumed that there is an existing connection from the site to the Thames Water combined water sewer in North Woolwich Road. If possible, it is proposed to reuse this existing connection, subject to confirmation of the line, level and condition of the connection which will be confirmed through a CCTV survey at the next design stage.

Refer to drainage drawings 2303-C-SK009, 2303-C-SK010, 2303-C-SK045 and 2303-C-SK052 in Appendix A for further details of the existing drainage and proposed strategy.

1 Existing Drainage

1.1 Existing Site

The existing site is located on the corner of North Woolwich Road and Bell Lane, London, E16 1YZ. The site is bound by North Woolwich Road to the North and Bell Lane to the East (Refer to Figure 1). The application site totals 1.24 hectares (ha), of which 0.93 ha forms part of detailed planning application and 0.31 ha as part of the outline application. This drainage strategy focuses on 0.75 ha of the detailed application site which incorporates the permanent site catchment area that contributes to the Phase 1 drainage strategy. The remainder of the site is part of the temporary works and will be constructed in line with the masterplan and highways drainage works which will discharge unrestricted into the site wide drainage networks.

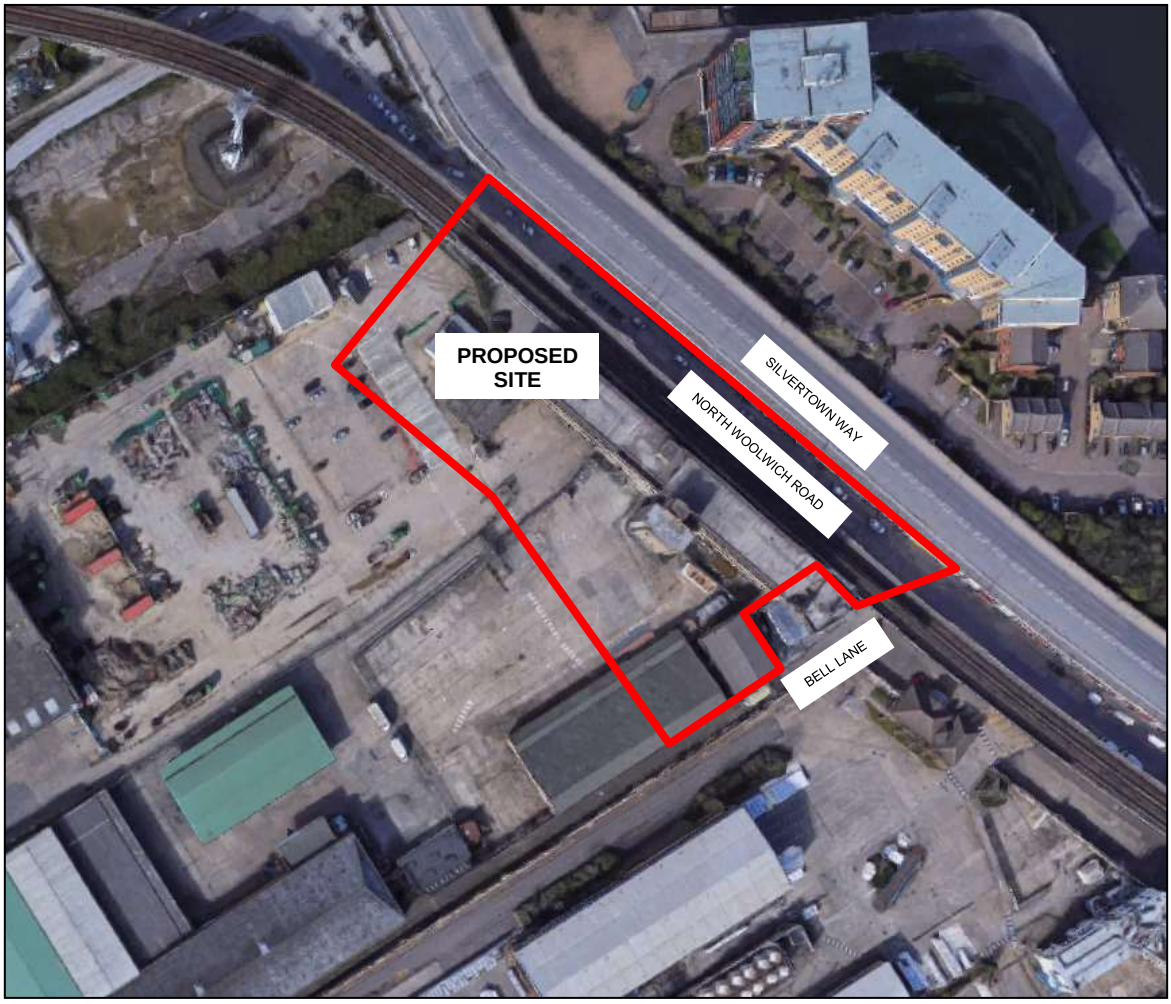


Figure 1: The Existing Site

1.2 Existing Drainage

The existing Thames Water public sewer network is outlined in Figure 2. The arrangement of the network is summarised below:

Combined Water:

- There is an existing public sewer run to the north of the site within North Woolwich Road (from TWMH0403 to TWMH1301. The diameter of this sewer varies between 375mm and 450mm.
- Another existing public sewer runs within North Woolwich Road to the north of the site (from TWMH1307 to TWMH1304). The diameter of this sewer is 600mm.

It is assumed that the existing buildings on site connect to the 600mm diameter sewer in North Woolwich Road via the connection shown to manhole TWMH1307. A CCTV survey will be undertaken at the next design stage to confirm the exact line, level and condition of this assumed connection, as well as to identify any existing private drainage located on site that is required to be retained.

Refer to Appendix B for a copy of the Thames Water Asset records for the site and surrounding area.

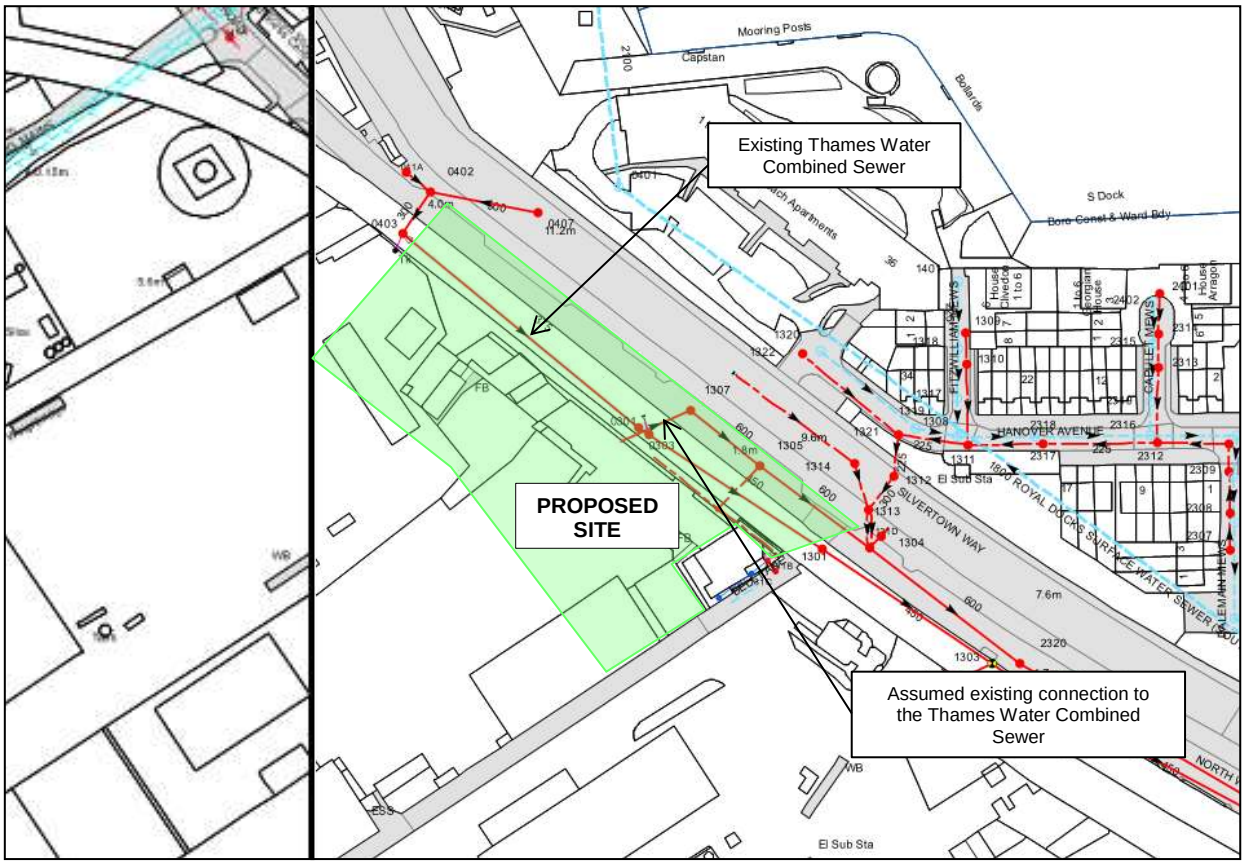


Figure 2: Existing Drainage Layout

1.3 Existing Surface Water Discharge Rate

The existing site has a total area of 0.750 hectares and is entirely hard standing.

It is assumed that the existing development discharges unrestricted into the Thames Water combined public sewer located within North Woolwich Road.

The existing total site discharge rate has been calculated using the hydraulic modelling software MicroDrainage. The existing site was modelled to obtain discharge rates from the site for a series of storm events. A summary of results is provided in Table 1.1 below. For full existing surface water drainage calculations, refer to Appendix C.

Storm Event	Contributing Area	Existing Discharge Rate
1 in 1 year	7,500m^2	92.8 l/s
1 in 20 year	7,500m^2	208.7 l/s
1 in 30 year	7,500m^2	225.4 l/s
1 in 100 year	7,500m^2	279.6 l/s

Table 1.1: Existing Site Discharge Rates

1.4 Existing Foul Water Discharge Rate

The existing foul water discharge rate from the site has been calculated to be 0.45l/s based on the methodology outlined in Sewers for Adoption 7th Edition (using a design flow rate of 0.6l/s per hectare).

It is assumed that the existing development discharges unrestricted into the Thames Water combined public sewer located within North Woolwich Road.

1.5 Existing Combined Discharge Rate

The existing total combined water discharge rate has been calculated as outlined in Table 1.2.

Contributing Area	Existing Surface Water Discharge Rate [1 in 100 year storm] (l/s)	Existing Peak Foul Water Discharge Rate (l/s)	Existing Combined Discharge Rate (l/s)
0.750 ha	279.60	0.45	280.05

Table 1.2: Proposed Combined Discharge Rate

It is assumed that the existing development discharges unrestricted into the Thames Water combined public sewer located within North Woolwich Road.

2 Proposed Drainage Strategy

2.1 Surface Water Drainage

2.1.1 Design Parameters

The industry standards along with the Environment Agency and Sewers for Adoption 7th Edition dictate for below ground surface water drainage that:

- There will be no surcharging of the drainage system for a 1 in 2 year storm;
- The drainage can be surcharged with no flooding for a 1 in 30 year storm; and
- The drainage can flood on-site for a 1 in 100 year storm with a 40% climate change allowance provided the flood water remains on site and does not flood habitable areas or affect safe ingress and egress to the site for occupiers.

All surface water drainage options outlined in this report adhere to these principles.

2.1.2 Initial Consultations

2.1.2.1 Local Authority/Planning Authority – London Borough of Newham

BuroHappold have undertaken consultations with the London Borough of Newham regarding the proposed surface water discharge rates from the site during preparation of the masterplan drainage strategy.

In line with comments received from London Borough of Newham following submission of the P02 revision of this report, Meinhardt have revised the drainage strategy to restrict the surface water discharge rate from the site to the greenfield Qbar discharge rate which is 2.9 l/s for all design storms (1 in 1 year, 1 in 30 year and 1 in 100 year + 40% climate change). This has been calculated in line with the requirements of the London Plan as well as the London Borough of Newham Surface Water Management Plan.

2.1.2.2 Thames Water

A predevelopment enquiry was submitted to Thames Water on the 24th of August 2018 to confirm that there would be sufficient capacity for the development within the surrounding public sewers as well as to gain their approval in principle of the proposed discharge rate.

Meinhardt received a response from Thames Water on the 24th of September 2018 outlining:

"We're pleased to confirm that there will be sufficient foul and surface water capacity in our sewerage network to serve your development, so long as your phasing follows the timescale you've suggested.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years."

2.1.2.3 BuroHappold Engineering (Masterplan Drainage Engineers)

Based on correspondence received from BuroHappold dated 18.06.19, the greenfield Qbar runoff rate for the site was calculated to be 3.85l/s per ha using the IH124 methodology.

2.1.3 Proposed Surface Water Drainage Strategy

It is proposed to restrict surface water discharge from the site to 2.9 l/s (the existing greenfield Qbar run off rate) for all storm events. This represents a 99% reduction in the surface water discharge rate for a 1 in 100 year + 40% climate change storm event, as per the NPPF.

The SuDS heirarchy dictates that the preferred discharge locations for surface water run-off are:

1. Infiltration into the ground;
2. To an adjacent watercourse; or
3. A surface water sewer if other forms of outlet are not suitable.

As the development is located in Central London, infiltration into the ground will not be suitable as a means of surface water disposal due to the underlying London Clay, which is known to have a very low infiltration rate. Additionally, as a minimum distance of 5m would be required between a building and an infiltration device (in line with Building Regulations) it would not be possible to house an infiltration device on site as the building occupies the majority of the site footprint. As such, infiltration into the ground is not a viable option for this development.

Due to site constraints and the lack of available space, open SuDS are not appropriate for the proposed development. The development instead proposes green/brown roofs as well as podium landscaping to maximise the quantity of available green space. The extent of the green/brown roofs are shown within Appendix A.

The closest watercourse is the River Thames, which is located approximately 200m to the west of the site. Due to the proposed site levels Phase 1 is located at a low point on the site (approximately 2.4m AOD at ground level). As a result Meinhardt understand that it would not be possible to discharge to the River Thames without introducing a surface water pump station. As such discharge of surface water to an adjacent water course is not a feasible option for the development site.

The existing Thames Water sewer network adjacent to the site comprises of combined water sewers only, therefore discharge of surface water to a surface water sewer is not possible for the development.

Based on the above, the only feasible discharge location for surface water runoff from the site is to the Thames Water combined sewer network.

As such the proposed surface water strategy for the site has been developed to utilise sustainable drainages systems (SuDS) to attenuate surface water at source and reduce the risk of downstream flooding. The scheme will attenuate surface water using podium attenuation and a below ground attenuation tank, before discharging via gravity to the Thames Water combined sewer adjacent to the site within North Woolwich Road.

In an exceedance event, falls away from the building will prevent the egress of water into the development. High level outfalls through the podium parapet will also be provided to discharge any additional rainfall away from the building at 1st floor level during an exceedance event.

2.1.4 Allowable Discharge Rates

The proposed surface water drainage design will incorporate a 40% allowance for climate change. Refer to Table 2.1 for the proposed surface water calculations.

Storm Event	Contributing Area	Proposed Discharge Rate
1 in 100 year + 40% climate change	0.75 ha	2.9 l/s

Table 2.1: Proposed Surface Water Discharge Rate

Based on hydraulic calculations the attenuation volume required on site for a 1 in 100 year + 40 % climate change storm event and the above discharge rate is 840m^3.

Refer to drainage drawings 2303-C-SK009, 2303-C-SK010, 2303-C-SK045 and 2303-C-SK052 in Appendix A for further details of the existing drainage and proposed strategy.

2.2 Foul Water Drainage

2.2.1 Design Parameters

The below ground foul drainage system will be designed to Sewers for Adoption 7th Edition, BS EN 752 Parts 3 and 4, and the Building Regulations Document H where appropriate.

2.2.2 Proposed Foul Water Drainage Strategy

The proposed foul water drainage strategy for the site involves the MEP engineer's coordination of the superstructure drainage up until it enters the below ground drainage network.

A below ground drainage network of pipes and manholes will collect the foul water discharge from the buildings and convey to a demarcation chamber, before discharging via gravity to the Thames Water combined public sewer located in North Woolwich Road (through the existing connection). The reuse of the existing connection to the sewer is subject to the line, level and condition, which will be confirmed through a CCTV survey at the next design stage.

It has been estimated that the peak foul water discharge rate for the site will be approximately 8l/s in accordance with Table 2 of the Plumbing Engineering Services Design Guide (2002). This is based on a water usage of 210 litres per day per per bedroom for a studio and one bedroom flat, 130 litres per day per bedroom for a two bedroom flat and 100 litres per day per bedroom for a three bedroom flat and the penthouses. NB - this figure is indicative only and is to be confirmed by the MEP engineer.

Refer to drainage drawings 2303-C-SK009, 2303-C-SK010, 2303-C-SK045 and 2303-C-SK052 in Appendix A for further details of the existing drainage and proposed strategy.

2.3 Combined Drainage

2.3.1 Proposed Discharge Rate

The proposed total combined water discharge rate has been calculated as outlined in Table 2.2.

Contributing Area	Proposed Surface Water Discharge Rate [1 in 100 year storm] (l/s)	Proposed Peak Foul Water Discharge Rate (l/s)	Proposed Combined Discharge Rate (l/s)
0.75 ha	2.9	8	10.9

Table 2.2: Proposed Combined Discharge Rate

Based on the proposed combined discharge rate from the site the scheme will provide a 96% reduction on the pre-development flow rates from the site.

If possible the existing onsite drainage and connections to the Thames Water combined water sewer in North Woolwich Road will be reused. This will be confirmed by CCTV survey at the next design stage.

3 Sustainable Urban Drainage Solutions

Sustainable Urban drainage systems (SuDS) range from landscaping features to roof build ups and below ground attenuation. In urban areas, generally there are a large amount of site restrictions and space is constrained therefore the SuDS techniques applicable in these situations are limited. Outlined in Section 3.1 are the proposed options for this site.

3.1 Proposed Options

3.1.1 Podium Drainage System

A podium drainage system comprises a multi-layered system that covers the podium deck of a structure or basement with a deep layer of attenuation along with various layers of insulation, water proofing and finishing material. These systems are designed to retain surface water and reducing the volume of runoff by attenuating peak flows.

The system is designed to attenuate surface water discharge from a site or building and to allow the surface water to build up on the podium deck for a period of time while slowly releasing the water down the below ground drainage system via a flow control device.

These systems vary in specification and can be designed to accommodate any type of porous finishing material.

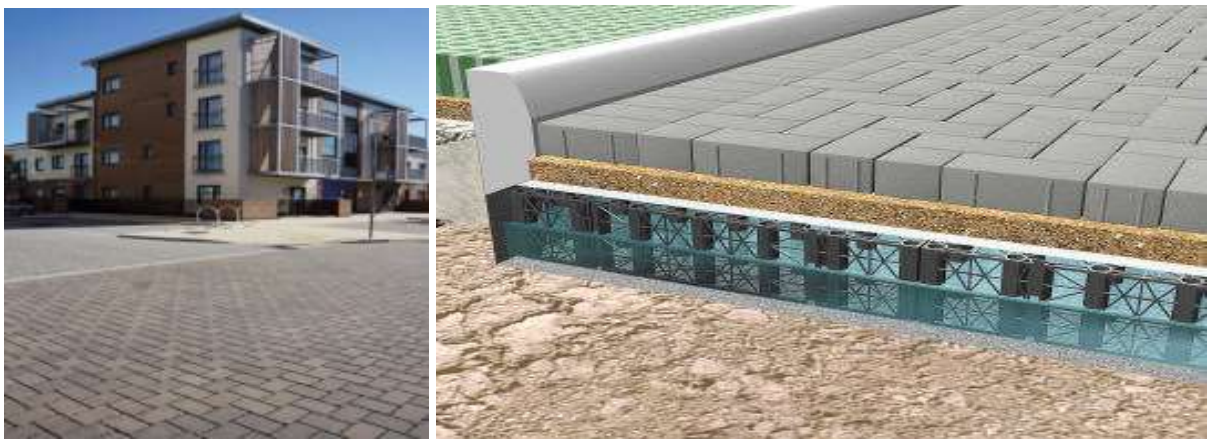


Figure 3: Typical podium attenuation details

Advantages: Eliminates the requirement for below ground drainage attenuation and the excavation for it; with the use of planting within the landscaping water quality can be improved; with systems of 85mm attenuation or lower, the structure is generally unaffected.

Disadvantages Cost of the system itself may be more than the saving of excavation , with systems greater than 85mm there may be an implication to the structure, landscape build up is increased slightly, design and exposure may preclude use.

Maintenance:

- Brushing and vacuuming
- Removal of weeds etc
- Inspection and repair to any depressions, damaged blocks, jointing etc
- Ongoing review of operational efficiency

3.1.2 Below Ground Cellular Attenuation

Cellular attenuation involves storing surface water within pipework or underground tanks prior to controlled discharge into the public sewer. Typically the cellular attenuation is formed with plastic "egg-crates" wrapped in impermeable geotextiles as indicated in Figure 3.1 below.

Figure 4: Typical Cellular Attenuation Tank

Some advantages and disadvantages of the use of attenuation tanks are outlined below.

Advantages:	Effective storage of surface water can be used below trafficked areas, can be used below public open areas, minimum maintenance.
Disadvantages:	Cost of excavation, sometimes complicated integration with foundations, no water quality treatment.
Maintenance:	• Check inlets, outlets, control structures and overflows • Jetting and suctions as required

3.1.3 Green Roof

A green roof comprises a multi-layered system that covers the roof of a building or podium structure with vegetation cover/landscaping over a drainage layer. These systems are designed to intercept and retain precipitation, increasing the time of concentration and reducing the volume of runoff and attenuation peak flows. Green roofs can be anything from a thin growing layer of sedums and mosses to grass, plants, shrubs and large trees.

These roofs vary in specification and can be designed to attract bird and invertebrate species. Green and brown roofs can also participate in attenuating rain water and increasing time of concentration. This may reduce the requirement for below ground storage attenuation on the site.

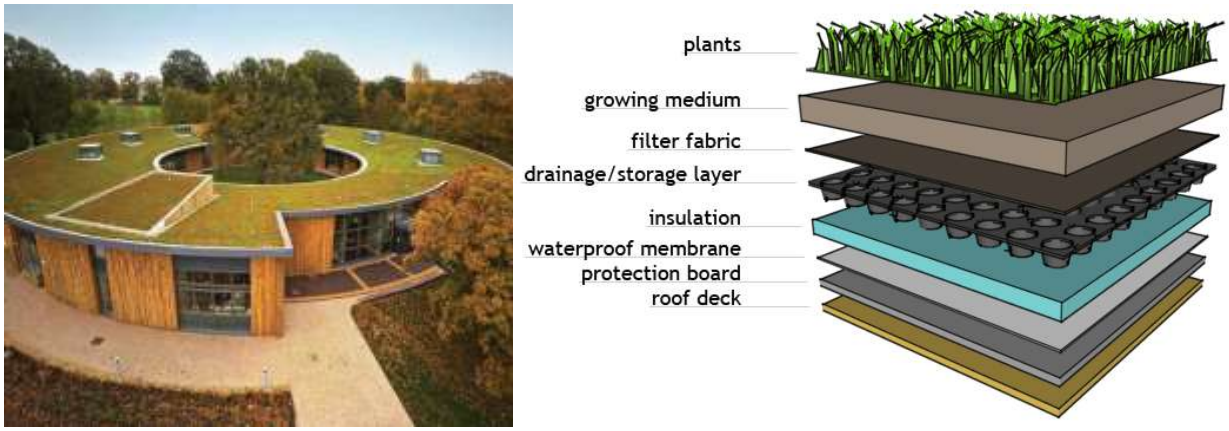


Figure 5: Typical green roof details

Advantages: Mimic greenfield state of building footprint, good removal of pollutants, ecological and amenity benefits, improve air quality, insulates building.

Disadvantages Cost, possible increase in structural loading, roof height, design and exposure may preclude use

Maintenance:

- Check inlets, outlets, control structures and overflows
- Litter and debris removal
- Irrigation during establishment
- Weeding and plant replacement
- Silt removal
- Repair erosion
- Replacement of topsoil
- Surface treatment to encourage infiltration

3.2 Proposed Maintenance Strategy

The proposed maintenance strategy is in line with the SuDS Manual as well as manufacturer's guidance. An inspection checklist should be generated based on the maintenance strategy to facilitate consistent inspection of the condition of the system and as a method for recording inspections. Inspections should also be accompanied by photographic records to assist with the monitoring of the system.

The full maintenance regime is to be outlined in the Operation and Maintenance Manual and overseen by the Building Management team. The manufacturer's maintenance guidance shall be placed in the Operation and Maintenance Manual and it is recommended that an annual maintenance report should be prepared and retained within the Operation and Maintenance Manual.

Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit the specific requirements of the site.

All inspections of the SuDS system should comply with relevant health and safety legislation.

3.2.1 Podium Drainage and Below Ground Cellular Attenuation

Surface water will be collected and temporarily stored in cellular storage tanks prior to controlled discharge to the Thames Water surface water sewers at the approved discharge rate. These tanks can be located at ground floor or on podium decks.

Catchpits will be located to trap sediment and prevent entry of any silt and pollutants into the downstream system. These catchpits should be cleaned out regularly and most suppliers/manufacturers recommend that cleaning should take place every 6 months.

A guideline maintenance regime is outlined in Table 3.1 below.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action. Monthly for 3 months	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Rainfall infiltrates into blocks from above, check the surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows, and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

Table 3.1: Operation and maintenance requirements for attenuation tanks

3.2.2 Green Roof

Intensive green roofs are likely to require inspections and maintenance. Grassed areas may require mowing weekly or fortnightly, plant beds may require weeding on a weekly or fortnightly basis during the growing season, and wildflower meadows may require annual mowing with the cuttings removed. Extensive green roofs should normally only require biannual or annual visits to remove litter, check fire breaks and drains; in some cases, weeding of unwanted plants may be required.

All maintenance actions carried out at roof level must be in full compliance with the appropriate health and safety regulations, and particularly those specifically dealing with working at height. Safety fastenings should be required for all personnel working on the roof.

A guideline maintenance regime has been outlined in Table 3.2 below.

Maintenance Schedule	Required Action	Recommended Frequency
Regular Inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, the integrity of waterproofing and structural stability.	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect the underside of the roof for evidence of leakage	Annually and after severe storms
Regular Maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (i.e. year one), Replace dead plants as required	Monthly (but usually the responsibility of manufacturer)
	Post-establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grass, prune shrubs and manage another planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial Actions	If erosion channels are evident, these should be stabilized with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlets have settled, cracked or moved, investigate and repair as appropriate	As required

Table 3.2: Operation and maintenance requirements for green roofs

3.2.3 Flow Controls

A flow control device will be located within the demarcation chamber to restrict discharge from the site to the Thames Water sewer in accordance with the drainage strategy.

A guideline maintenance regime is outlined in Table 3.3 below.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Removal of any debris or sediment with potential to obstruct flow control	Monthly for 3 months, then six monthly or as required
Remedial actions	Repair/replacement of flow control device	As required
	Where a blockage has resulted in a flooded manhole, drain down and unblock as required	As required

Monitoring	Inspect/check flow control is in good condition and operating as designed, hose down as required	Monthly for 3 months, then six monthly

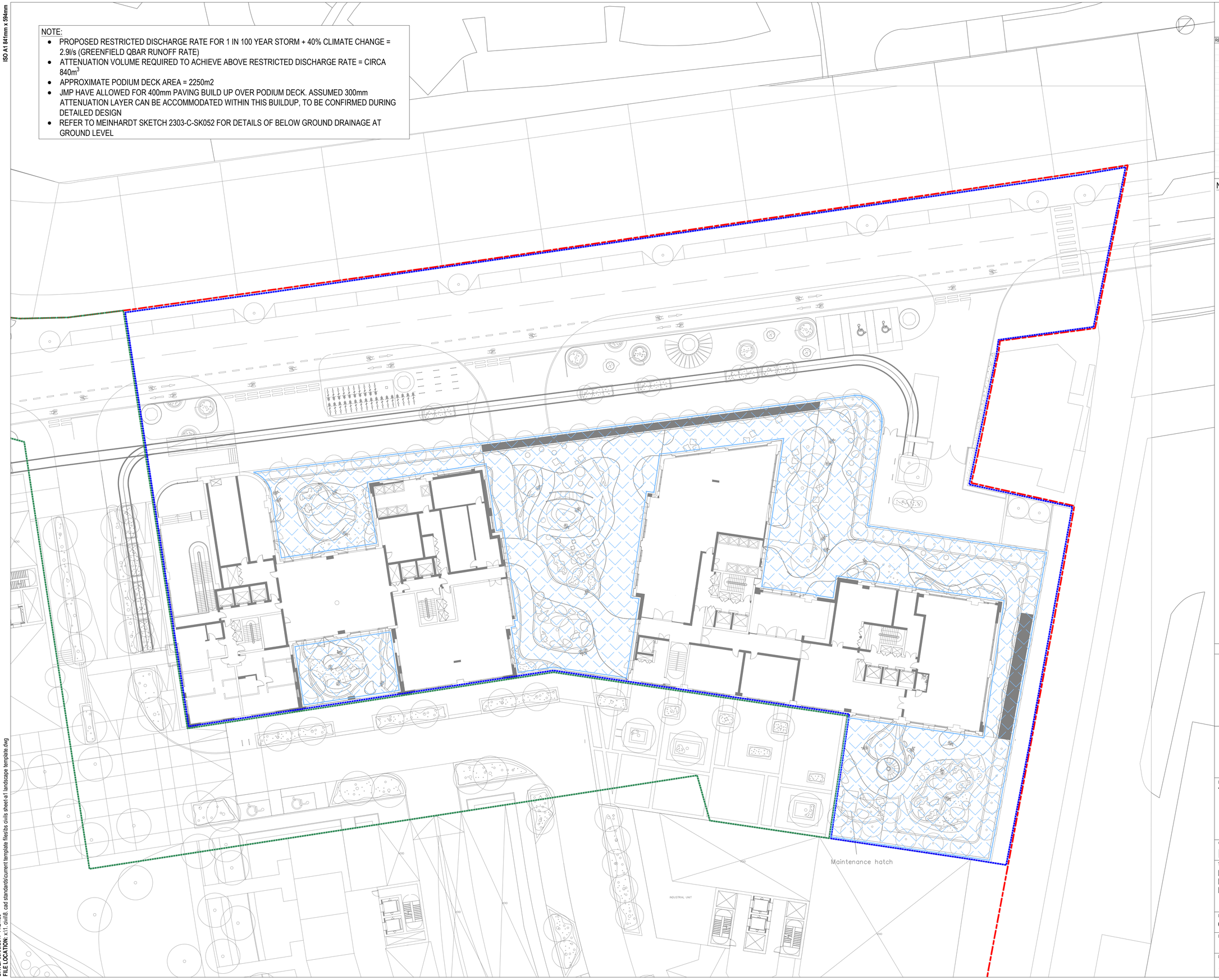
Table 3.3: Operation and maintenance requirements for flow controls

Appendix A – Proposed Drainage Strategy Drawings

ISO A1 841mm x 594mm

NOTE:

- PROPOSED RESTRICTED DISCHARGE RATE FOR 1 IN 100 YEAR STORM + 40% CLIMATE CHANGE = 2.9l/s (GREENFIELD QBAR RUNOFF RATE)
- ATTENUATION VOLUME REQUIRED TO ACHIEVE ABOVE RESTRICTED DISCHARGE RATE = CIRCA 840m^3
- APPROXIMATE PODIUM DECK AREA = 2250m2
- JMP HAVE ALLOWED FOR 400mm PAVING BUILD UP OVER PODIUM DECK. ASSUMED 300mm ATTENUATION LAYER CAN BE ACCOMMODATED WITHIN THIS BUILDUP, TO BE CONFIRMED DURING DETAILED DESIGN
- REFER TO MEINHARDT SKETCH 2303-C-SK052 FOR DETAILS OF BELOW GROUND DRAINAGE AT GROUND LEVEL



FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	14.08.18
I02	FOR INFORMATION	EP	30.10.18
I03	FOR INFORMATION	PMG	29.11.18
I04	REVISED FOLLOWING PLANNING COMMENTS	BV	02.04.19
I05	STORAGE SIZES AMENDED TO SUIT REVISED DISCHARGE RATE	JS	27.06.19
I06	REVISED TO SUIT UPDATED ARC/LANDSCAPE ARC LAYOUTS	EP	09.03.2020
I07	REVISED TO SUIT UPDATED LANDSCAPE ARC LAYOUTS	NJ	27.04.20

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR DRAWING 522-PT-MP-TYP-DR-L-PL-1016 _S02-P09 RECEIVED 20.04.2020

KEY:

- SITE BOUNDARY
- DETAILED APPLICATION BOUNDARY
- OUTLINE APPLICATION BOUNDARY
- PROPOSED PODIUM ATTENUATION

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
PHASE 1A
PROPOSED SURFACE WATER ATTENUATION PODIUM DECK

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	AOR	PH
DRAWING No			ISSUE
2303-C-SK009			I07

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ISO A1 841mm x 594mm

TWMH0401
CL: 5.58
IL: -14.48

TWMH1322
CL: N/A
IL: N/A

TWMH1312
CL: N/A
IL: 1.36

TWMH1314
CL: N/A
IL: 1.29

TWMH1304
CL: 1.86
IL: 0.14

TWMH1313
CL: N/A
IL: 0.56

TWMH1305
CL: 1.97
IL: 0.17

TWMH1307
CL: 2.05
IL: 0.25

TWMH131D
CL: N/A
IL: N/A

TWMH1301
CL: 1.77
IL: 0.05

TWMH0407
CL: 4.03
IL: 1.47

TWMH041A
CL: N/A
IL: N/A

TWMH0402
CL: 3.97
IL: 1.37

TWMH0301
CL: 2.14
IL: 0.06

TWMH0303
CL: 2.12
IL: 0.04

TWMH131A
CL: N/A
IL: N/A

TWMH131B
CL: N/A
IL: N/A

TWMH131C
CL: N/A
IL: N/A

TWMH0403
CL: 3.12
IL: 0.1

ASSUMED EXISTING CONNECTION FROM EXISTING INDUSTRIAL BUILDINGS

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	14.08.18
I02	FOR INFORMATION	EP	30.10.18
I03	FOR INFORMATION	PMG	30.11.18

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. THIS DRAWING IS BASED ON:
   - THAMES WATER ASSET RECORDS RECEIVED 19.07.18

KEY:

- SITE BOUNDARY
- DETAILED APPLICATION BOUNDARY
- OUTLINE APPLICATION BOUNDARY
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL WATER SEWER
- EXISTING COMBINED DRAINAGE
- EXISTING SURFACE WATER MANHOLE
- EXISTING SURFACE WATER MANHOLE
- EXISTING FOUL WATER MANHOLE

CDM RESIDUAL CIVIL / STRUCTURAL DESIGN RISKS

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www.meinhardt.co.uk

PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
PHASE 1A
EXISTING DRAINAGE

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	AOR	PH
DRAWING No			ISSUE
2303-C-SK010			I03

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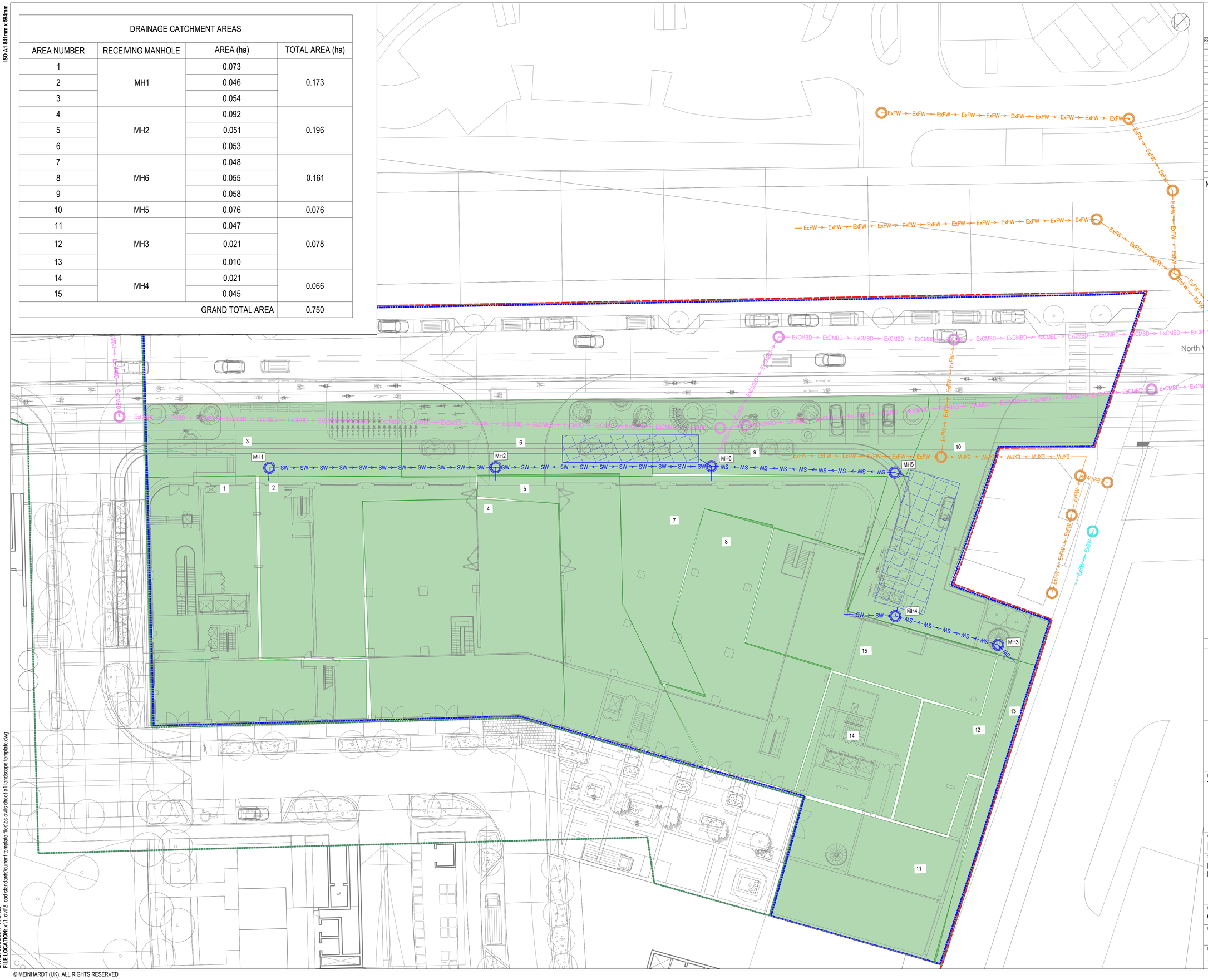
ISO A1 841mm x 594mm

DRAINAGE CATCHMENT AREAS

AREA NUMBER	RECEIVING MANHOLE	AREA (ha)	TOTAL AREA (ha)
1	MH1	0.073	0.173
2		0.046	
3		0.054	
4	MH2	0.092	0.196
5		0.051	
6		0.053	
7	MH6	0.048	0.161
8		0.055	
9		0.058	
10	MH5	0.076	0.076
11	MH3	0.047	0.078
12		0.021	
13		0.010	
14	MH4	0.021	0.066
15		0.045	
		GRAND TOTAL AREA	0.750



FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	27.06.19
I02	REVISED TO SUIT UPDATED ARC/LANDSCAPE ARC LAYOUTS	EP	09.03.2020
I03	REVISED TO SUIT UPDATED LANDSCAPE ARC LAYOUTS	NJ	27.04.20

NOTES:

1. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR DRAWING 522-PT-MP-TYP-DR-L-PL-1013 _S02-P09 RECEIVED 20.04.2020

KEY:

- SITE BOUNDARY
- DETAILED APPLICATION BOUNDARY
- OUTLINE APPLICATION BOUNDARY
- PROPOSED SURFACE WATER SEWER
- EXISTING SURFACE WATER SEWER
- EXISTING FOUL WATER SEWER
- EXISTING COMBINED DRAINAGE
- PROPOSED SURFACE WATER CHAMBER
- EXISTING SURFACE WATER CHAMBER
- EXISTING FOUL WATER CHAMBER
- EXISTING COMBINED WATER CHAMBER
- PROPOSED BELOW GROUND CELLULAR ATTENUATION TANK
- PROPOSED DRAINAGE CATCHMENT AREAS

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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
PHASE 1
DRAINAGE CATCHMENT AREAS

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	-	-
DRAWING No			ISSUE
2303-C-SK045			I03

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ISO A1 841mm x 594mm

NOTE:

- PROPOSED RESTRICTED DISCHARGE RATE FOR 1 IN 100 YEAR STORM + 40% CLIMATE CHANGE = 2.9l/s (GREENFIELD QBAR RUNOFF RATE)
- ATTENUATION VOLUME REQUIRED TO ACHIEVE ABOVE RESTRICTED DISCHARGE RATE = CIRCA 840m^3
- GEOCELLULAR STORAGE AT GROUND LEVEL CIRCA 184m3, TO BE CONFIRMED DURING DETAILED DESIGN
- EXISTING SEWER LEVELS BASED ON THAMES WATER ASSET RECORDS, TO BE CONFIRMED VIA SURVEY PRIOR TO COMMENCEMENT OF DETAILED DESIGN
- REFER TO MEINHARDT SKETCH 2303-C-SK009 FOR DETAILS OF PODIUM LEVEL ATTENUATION

TWMH1322
CL: N/A
IL: N/A

TWMH1312
CL: N/A
IL: 1.36

TWMH1314
CL: N/A
IL: 1.29

TWMH1304
CL: 1.86
IL: 0.14

TWMH1313
CL: N/A
IL: 0.56

TWMH1305
CL: 1.97
IL: 0.17

TWMH131D
CL: N/A
IL: N/A

TWMH1307
CL: 2.05
IL: 0.25

TWMH1301
CL: 1.77
IL: 0.05

TWMH0407
CL: 4.03
IL: 1.47

TWMH0402
CL: 3.97
IL: 1.37

TWMH041A
CL: N/A
IL: N/A

TWMH0301
CL: 2.14
IL: 0.06

TWMH0303
CL: 2.12
IL: 0.04

TWMH131A
CL: N/A
IL: N/A

TWMH131B
CL: N/A
IL: N/A

TWMH131C
CL: N/A
IL: N/A

TWMH0403
CL: 3.12
IL: 0.1

WASTE STORE

INDUSTRIAL UNIT

FOR INFORMATION

REV.	DESCRIPTION	BY	DATE
I01	FOR INFORMATION	EP	09.03.2020
I02	REVISED TO SUIT UPDATED LANDSCAPE ARC LAYOUTS	NJ	27.04.20

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. THIS DRAWING IS BASED ON:
   - PATEL TAYLOR DRAWING 522-PT-MP-TYP-DR-L-PL-1013 _S02-P09 RECEIVED 20.04.2020

KEY:

- SITE BOUNDARY
- DETAILED APPLICATION BOUNDARY
- OUTLINE APPLICATION BOUNDARY
- PROPOSED BELOW GROUND CELLULAR ATTENUATION
- PROPOSED AREA TO BE ADOPTED BY THE LONDON BOROUGH OF NEWHAM
- SW → SW → PROPOSED SURFACE WATER SEWER
- ExSW → ExSW → EXISTING SURFACE WATER SEWER
- ExFW → ExFW → EXISTING FOUL WATER SEWER
- ExCMBD → EXISTING COMBINED DRAINAGE
- PROPOSED SURFACE WATER CHAMBER
- EXISTING SURFACE WATER CHAMBER
- EXISTING FOUL WATER CHAMBER
- EXISTING COMBINED WATER CHAMBER

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PROJECT
THAMESIDE WEST

CLIENT
KEYSTONE PARTNERSHIP

TITLE
PHASE 1A
PROPOSED SURFACE WATER DRAINAGE
GROUND FLOOR

DISCIPLINE			SCALE @ A1
CIVILS DRAWING			1:250
DRAWN	DESIGNED	CHECKED	APPROVED
EP	EP	CR	PH
DRAWING No			ISSUE
2303-C-SK052			I02

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