

DRAINAGE IMPACT ASSESSMENT

CONDITION DISCHARGE

FOR

PROPOSED ANAEROBIC DIGESTION PLANT

AT

ASHTON KEYNES

ON BEHALF OF



Project ref: GGP-29419-CD-DIA-Three Maids

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Document Revision Box			
Revision	Date	Description	Author
01	9 th September 2024	First issued	WOB

1.0 Introduction

GGP Consult has been instructed by Acorn Bioenergy Ltd to prepare a drainage impact assessment to establish the storage requirements associated with the operation function of the proposed anaerobic digestion plant.

The calculations will detail how surface water from the site will be managed, in compliance with local policy and an environmental for the construction and operation of an Anaerobic Digestion facility, associated infrastructure and landscape planting at land northeast of 'Cotswold Bruderhof Cemetery.

2.0 Description of Existing and Proposed Site

The site has an area of 7.06ha and is entirely greenfield.

A topographical survey has been undertaken within the site and shown the site falling from 102.000mAOD at the southwest corner to 90.000mAOD to the southeast corner.

Refer to Appendix I for the existing topographical survey.

It is proposed to develop an anaerobic digestion plant, consisting of 8nr digestate tank, silage clamps, a digestate lagoon, gas equipment, material storage buildings, cellular storage crates, offices, substrate tanks, parking and additional miscellaneous equipment.

Refer to Appendix II for the general layout.

3.0 Catchment Areas

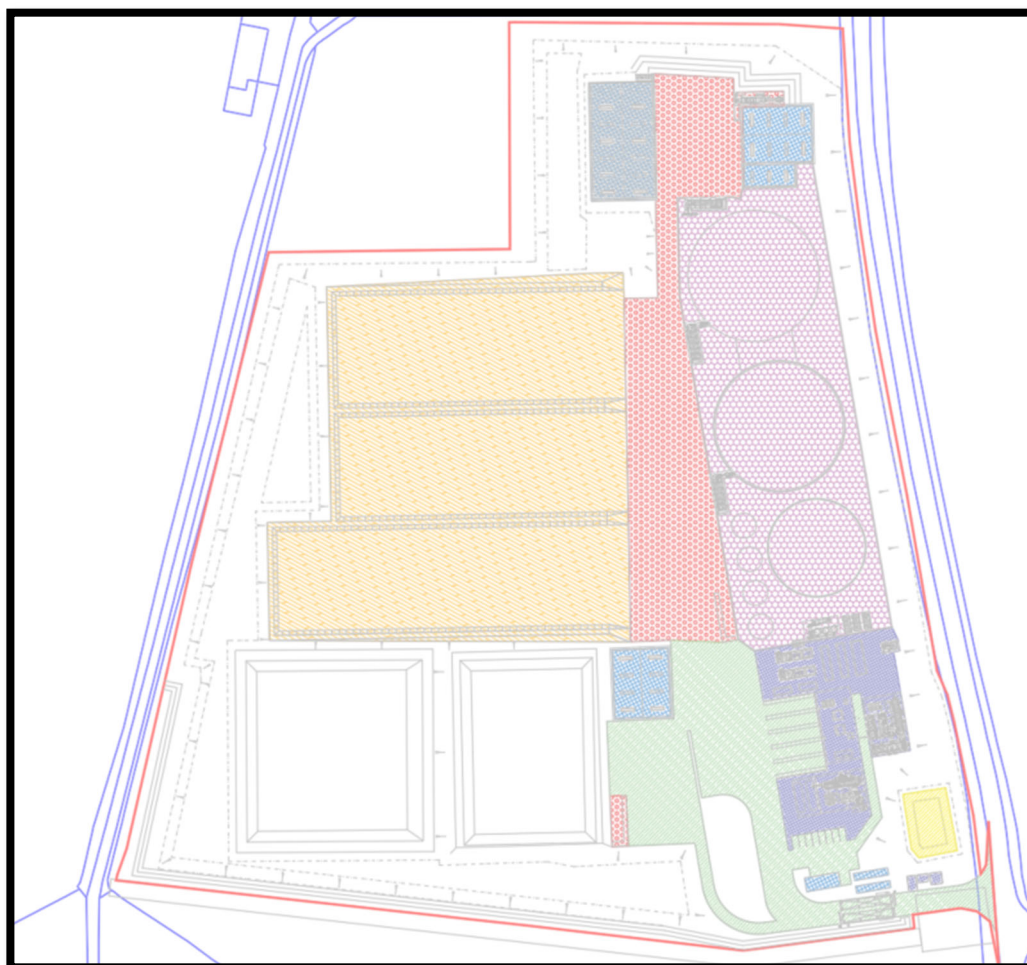
Various areas within the site will be subject to different operation functions, causing some areas being dirty and some clean, such that they require sealed drainage. Therefore, to improve water quality and optimise site efficiency, the site is split into catchments and subject to different drainage philosophies.

These catchments are classified in accordance with the environmental permit.

The site has been split into the following catchments in accordance with the best practice for environmental protection of land and water:

Catchment Area	Area
1 - Clean Surface Water Swale	348m ²
2 - Clean Hardstanding with potential for petrochemical run-off	5,201m ²
3 - Clean Equipment Runoff	2,300m ²
4 – Clean Roof Runoff	2,196m ²
5 - Clean/Contaminated Bund Runoff	8,507m ²
6 - Dirty Silage Clamp Cover Runoff	14,236m ²
7 – Contaminated Hardstanding Runoff	5,198m ²
Total Catchment	37,986m²

Refer to Appendix III for the proposed catchment plan.



4.0 Design Philosophy

As stated within section 3.0, the site has been split into different catchments based on level of potential contamination. These catchments will be split into different drainage systems.

Two primary drainage systems will be adopted: clean and dirty.

In accordance with the approved SLR surface water drainage strategy, the site will be designed to contain all flows up to and including the 1:100-year event plus 40% climate change.

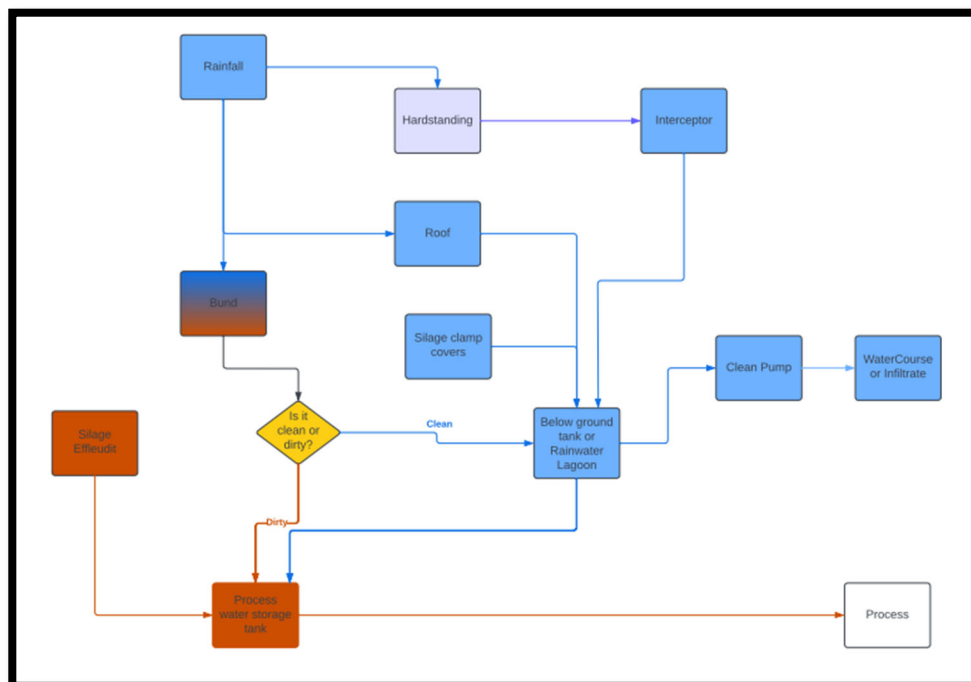
Dirty Water runoff, caused by silage residue, from the silage clamps and sections of hardstanding area will be collected through a series of drainage channels, pipes, and chambers and be brought into a below ground holding tank with a pumping located internally. From this internal pump, runoff will be pumped to 8nr 400m³ holding tanks within the bund where it will be reused within the process. It must be noted that at the 1:100-year event there is a requirement that 3058.5m³ is stored on site. Allowing the total volume from the holding tanks and spare lagoon to be 3,200m³

The process has a yearly demand of 42,000m³, equating to 1l/s continuous flow. This offers a sustainable drainage system, compliant with the hierarchy.

Clean runoff will be collected from buildings and sections of hardstanding and discharged into a below ground attenuation tank in the south of the site before falling into an existing watercourse to the southeast corner via a pump chamber. Petrochemicals may be present within the clean hardstanding runoff, which will be mitigated through a full retention petrol interceptor.

Bund runoff has the potential to become contaminated through process residue. This will be collected through a channel drain and discharged into a pump chamber where it will be sampled and pumped to the below ground attenuation tank (if clean) or reused in the process (if contaminated).

To illustrate the principals adopted, the below rainfall / process flow diagram has been provided.



Rainfall / Process Water flow diagram – See Appendix IX

4.1 Water Quality & Maintenance

Due to the likelihood of contamination from the hardstanding and other open areas of the Site, it is recommended that SuDS source control and conveyance features are not adopted on the Site. Consequently, a full retention interceptor & catchpit will be adopted to mitigate runoff contaminants. Additionally, the proposed AD plant will operate under an Environmental Permit, with a strict operational & maintenance procedure in place. These procedures are developed to ensure compliance and protection of the local receptors.

As part of the environmental permit a detailed maintenance schedule will be regulated against. This shall cover the drainage, external surfacing, buildings & concrete containment bund as a minimum.

The drainage maintenance document typically outlines daily, weekly, biweekly, monthly, quarterly & year inspection work to be carried out, along with the necessary actions required. A maintenance schedule shall be worked up with the Environment Agency based on the agree permit conditions. This shall be made available prior to the plant's been operationally.

Therefore, the proposed surface water drainage system shall conform and be regulated to a robust, audited & recorded operational & maintenance plan. This will ensure the performance of the drainage system is maintained throughout the life of the plant.

5.0 Proposed Discharge Rates

As mentioned within section 4.0, it is proposed to discharge clean surface water through a pumping chamber into the existing watercourse to the southeast of the development.

Calculations undertaken by SLR demonstrate a 2l/s per hectare rate with a proposed catchment area defined within section 3.0 as 4.52ha resulting in a peak site discharge rate of 9.05l/s.

Therefore, the amended site plans now reflect a proposed catchment area of 3.57ha. Allowing this to be amended into the new calculations.

The building roof, equipment and clean access roads shall be deemed to be clean and shall drain into a clean water attenuation tank before out falling at the restricted rate of 7.5l/s into the watercourse to the southeastern boundary.

The silage clamp runoff, potential contaminated hardstanding area is deemed to be contaminated and shall be collected and pumped into above ground process storage tanks for re-use within the process.

Refer to Appendix IV for the proposed drainage layout.

6.0 Clean/Contaminated Bund Runoff

Rainfall collected within the bund has the potential to be contaminated through process residue. Therefore, runoff is collected and contained within the bund until it is sampled to determine if contamination is present.

If clean, runoff will be pumped to the cellular storage tanks. If dirty, runoff will be pumped into the AD process for reuse.

Runoff must be sampled prior to discharge, therefore, when the site is unmanned, the bund will store runoff until sampling can be undertaken. The longest period the site will be unmanned is over a 12hr night period.

Therefore, the bund will be modelled within no outfall with the 12hr storm events will be taken as the critical event.

The bund has a slab level of between 92.500m – 92.000m AOD with the lowest top wall level of 93.500m AOD.

The bund has an area of 8,507m², 4,532m² of which is taken by the tanks, resulting in an available bund area of 3,975m².

These parameters have been used to model the bund within MicroDrainage 'Source Control'. An extract of the structure can be seen below.

Pump Outflow Control

Invert Level (m)

Depth (m)	Outflow (l/s)
0.100	7.5000
0.200	7.5000
0.300	7.5000
0.400	7.5000
0.500	7.5000
0.600	7.5000
0.700	7.5000
0.800	7.5000
0.900	7.5000
1.000	7.5000
1.100	7.5000
1.200	7.5000

Buttons: 0.1m, 0.2m, Default, Repeat, Clear

Buttons: OK, Cancel, Help, Default

Enter Invert Level between -9999.999 and 9999.999

MicroDrainage 'Source Control' Flow Control

The model has been run over a variety of storm events with the resultant volumes and depths detailed below.

Storm Event	Volume	Depth	Discharge Rate
1:1 Yr 240min + 40%CC	176.5m ³	249mm	7.5l/s
1:2 Yr 240min+ 40%CC	232.9m ³	328mm	7.5l/s
1:10 Yr 360min + 40%CC	373.6m ³	526mm	7.5l/s
1:30 Yr 360min + 40%CC	506.7m ³	714mm	7.5l/s
1:100 Yr 480min + 40%CC	700.9m ³	987mm	7.5l/s

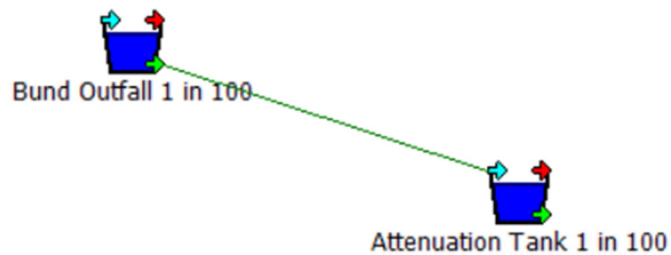
As shown above, all storm events are contained within the attenuation system to the 1:100 year event +40% CC.

Refer to Appendix VI for the full Clean Attenuation storage calculations.

8.0 Clean Northern Surface Water Runoff - Option 2

If the collected bund runoff is clean, it is proposed to pump the collected runoff at a rate of 1.5l/s into the clean water attenuation system. The 'cascade' function within Source Control has been used to model the flow from the bund into the attenuation crates.

An extract of the cascade is shown below.



MicroDrainage 'Source Control' Cascade

The 1:100 Yr +40%CC has been used to calculate the highest occurring volumes and discharge rates within the attenuation crates.

Storm Event	Volume	Depth	Discharge Rate
1:1 Yr 360min + 40%CC (Summer)	194.8m ³	274mm	7.5l/s
1:30 Yr 480min + 40%CC	542.1m ³	764mm	7.5l/s
1:100 Yr 600min + 40%CC	744.8m ³	1049mm	7.5l/s

As shown above, the attenuation tank contains all flows from the bund when pumped at a rate of 1.5l/s.

Refer to Appendix VII for full Attenuation/Bund cascade calculations.

9.0 Contaminated Silage Clamp/Hardstanding Runoff

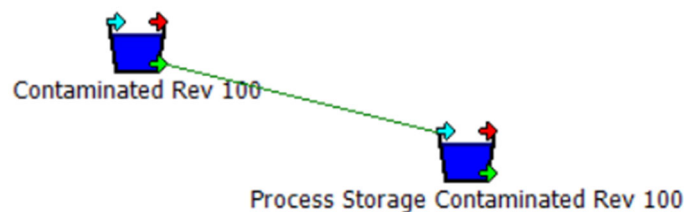
The runoff from the silage clamps and the surrounding hardstanding will be contaminated with leachate from the crop. As the contaminated runoff contains leachate, it has value to be reused within the process. Therefore, the site will use contaminated runoff as a main source of water.

Runoff will be collected through channel drains running along the front of the clamps where it will be discharged into an underground holding tank of 54m³. The area to the north of the clamp may flood during storm event and been contained within the impermeable surface / kerbs / wall & buildings to the perimeter.

This will then be pumped into 8nr 400m³ holding tanks, holding 3200m³ where it will be used within the process at an increase rate of 1.0l/s.

The 'cascade' function within Source Control has been used to model the flow from the Yard into the Process Water Tanks.

An extract of the cascade is shown below.



MicroDrainage 'Source Control' Cascade

The model has been run over a variety of storm events with the resultant volumes and depths detailed overleaf.

As the site for a maximum unsupervised period of 12hrs, the peak and 12hr event will be analysed.

12hr

Storm Event	Volume (Yard)	Volume (Process Tanks)
1:1 Yr 12hr + 40%CC	50.3m ³	595.9m ³
1:10 Yr 12hr + 40%CC	50.3m ³	1048.9m ³
1:30 Yr 12hr + 40%CC	50.3m ³	1271.3m ³
1:100 Yr 12hr + 40%CC	50.3m ³	1731.7m ³

The below also shows the peak storm for the yard with the volume in the process tank. Which would allow additional water to be pumped into the process tanks if required.

The yard area will suffer from above ground flooding; however, this area is designed to contain water without it flowing off site or affecting over areas on site.

Peak Yard

Storm Event	Volume (Yard)	Volume (Process Tanks)
1:1 Yr 60min + 40%CC	50.3m ³	329.5m ³
1:10 Yr 60min + 40%CC	52.1m ³	628.6m ³
1:30 Yr 30min + 40%CC	129.2m ³	656.7m ³
1:100 Yr 30min + 40%CC	252.2m ³	832.8m ³

Peak Tanks

Storm Event	Volume (Yard)	Volume (Process Tanks)
1:1 Yr 8640min + 40%CC	10.7m ³	1172.2m ³
1:10 Yr 10080min + 40%CC	11.3m ³	1987m ³
1:30 Yr 8640min + 40%CC	11.6m ³	2051.5m ³
1:100 Yr 10080min + 40%CC	12.3m ³	3058.5m ³

The above shows in the event of exceptional high intensity rainfall events, the volume the capacity of the pump resulting in above ground flooding as permitted and full contained within the designed area. The process tank will have spare capacity for the pump rates to be increased to aid the yard emptying quicker. Typically, the yard would be dry within 1hour after the storm event.

Refer to Appendix VIII for silage clamp 1.0l/s calculations.

10.0 Plant Water Demand Against Average Annual Rainfall

The site has been designed to contain all flows up to and including the 1:100 year +40% CC.

An assessment has been undertaken to compare the average annual rainfall (AAR) against the process' water demand to determine if the process demand is greater than the harvested water.

From reviewing the process, it is expected the process has a yearly operation demand of 42,000m³, equating to a continuous flow of 1l/s.

Dirty water runoff will be isolated, retained and reused within the process. The clean areas will not encounter any potential contamination, this catchment will be deducted through the analysis.

AAR = 0.773

Area (Potential Contamination) = 27,941m²

CC = 40%

Total annual rainfall (including climate change) = 30,238m³

As shown above, the plant has a significantly higher demand than the yearly rainfall within the potential dirty water system with the addition of climate change.

Therefore, the collected runoff is recycled within the process, satisfying sustainability and drainage hierarchy requirements. Where possible the shortfall in water demand based on the average annual rainfall shall be collected from any clean water system and used within the AD process.

The expected final discharge volume to the watercourse via the clean system shall be less than the calculated within the report, based on the shortfall in water from the process area.

Taking the full runoff area of 37,634m², Total annual rainfall (including climate change) = 40,731m³. This demonstrate the site yearly demand is greater than the runoff from the site.

11.0 Foul Water - Welfare

The proposed development will consist of site welfare office for up to 6 people per day.

The welfare shall contain, Toilets, shower, changing facilities and laundry facilities.

Calculations will be based on the British Water – Flows and Loads tables.

The following should be used;

Office = Office / Factory with canteen
Showers = Per Use

Table 1 – Total load

Use	Unit (No.)	People / Unit (No.)	Total People (No.)	Flows (L)	Total (L)
Office	1	6	6	50	300
Shower	1	3	3	40	120
Washing Machine	1	2	2	42	82
Total					502

The above demonstrate a minimum flow of 502L per day or 0.502m³.

This volume shall now for sizing a various foul disposal option.

Technical Specification

BioAir	Model	BioAir 2	BioAir 3	BioAir 4	BioAir 5	BioAir 6	BioAir 7	BioAir 8
Population Equivalent	Unit	6	9	12	15	20	25	35
Daily Flow	m ³ /d	0.9	1.35	1.8	2.25	3	3.75	5.25
Daily Load	kg BOD ₅ /d	0.36	0.54	0.72	0.9	1.2	1.5	2.1
Measurements								
Inlet Invert	mm	455-755	575-875	500-2000	645-945	500-2000	500-2000	500-2000
Discharge Option		Gravity / IPS	Gravity / IPS	Gravity / IPS	Gravity / IPS	Gravity	Gravity	Gravity
Outlet Invert	mm	555-845 / 400-700	675-975 / 350-650	600-2100	745-1045 / 415-715	600-2100	600-2100	600-2100
Diameter	mm	1540	1690	1920	2010	1920	1920	1920
Length	mm	2500	2480	3238	3190	4400	5550	7400
Installation Depth	mm	1805-2105	2075-2375	2245-3745	2485-2785	2245-3745	2245-3745	2245-3745
Inlet Pipework	mm	Ø110	Ø110	Ø110	Ø110	Ø110	Ø110	Ø160
Outlet Pipework (Gravity / IPS)	mm	Ø110 / Ø50	Ø110 / Ø50	Ø110 / Ø50	Ø110 / Ø50	Ø110	Ø110	Ø160
Material Construction	MDPE / GRP	MDPE	MDPE	GRP	MDPE	GRP	GRP	GRP
Unit Weight	kg	170	200	500**	650	800**	1250**	1450**

**Tank weight based on 500mm invert

From the above table a Klargest BioAir '2' will be of a sufficient sized to treat the expected daily flow. Maximum flow = 0.502m³

12.1 Treatment Plant Sizing

It is proposed to use a cesspit, the use of a cesspit has been selected based on the requirement of the onsite welfare facilities.

These will have toilets, showers and onsite washing machines and lab equipment / testing in order to comply with the testing requirements under the EA permit the site will operate under.

The use of washing machines is required to wash operator clothes daily which poses a risk to the biological treatment process of a treatment plant. This could result in the bacteria being killed off and allowing untreated effluent discharging to ground or watercourse.

The use of lab equipment would require washing with material entering the treatment plant, which could not be designed to cater for the waste material.

In summary a cesspit has been proposed to remove any potential risk of failed water quality from a treatment plant due to the washing machine and lab loadings on the system which would have a detrimental effect of the treatment plant water quality compliance.

12.0 Summary

Following a site wide attenuation assessment, it has been clearly demonstrated that the proposed drainage system can provide more than sufficient attenuation capacity to avoid any exceedance of the permitted discharge rate.

The proposed clean runoff will be collected and attenuated within a clean water attenuation tank and discharge at peak rate of 7.5l/s. This will contain the 1:100 year +40%CC below ground.

The plant will harvest dirty water runoff to be reused within the process at a constant rate of 1l/s. This will be contained in an underground 50m³ holding tank and 8nr 400m³ holding tanks.

All runoff within the bund will be collected and sampled prior to discharge. Clean runoff will discharge into the southern cellular storage crates while dirty runoff will be used within the process.

Systems and pumps will be monitored, and data logged via a computer system with alarms to alert operators on or off site.

The site will operate under an environment permit with strict recording, sampling, and maintenance under full review.

The drainage system within the site will be under full ownership of the plant owners/operators operating under an Environmental Permit, with a robust, audited and recorded operation and maintenance plan. This will ensure the performance of the drainage system is maintained throughout the life of the plant.

From GGP CONSULT

Report Checked by:-

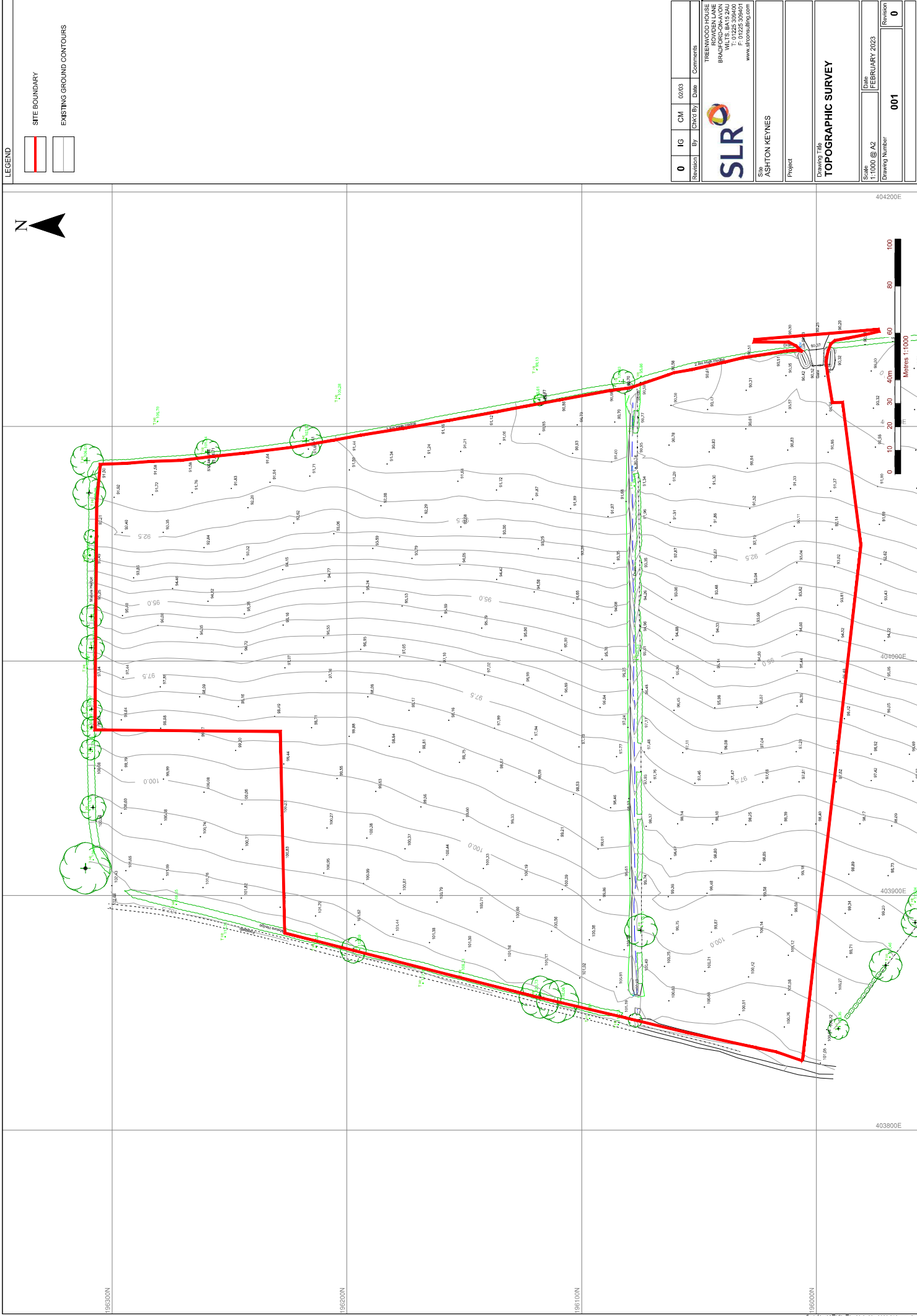


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Associate Director - Drainage & Infrastructure

APPENDIX I

Existing Topographical Survey



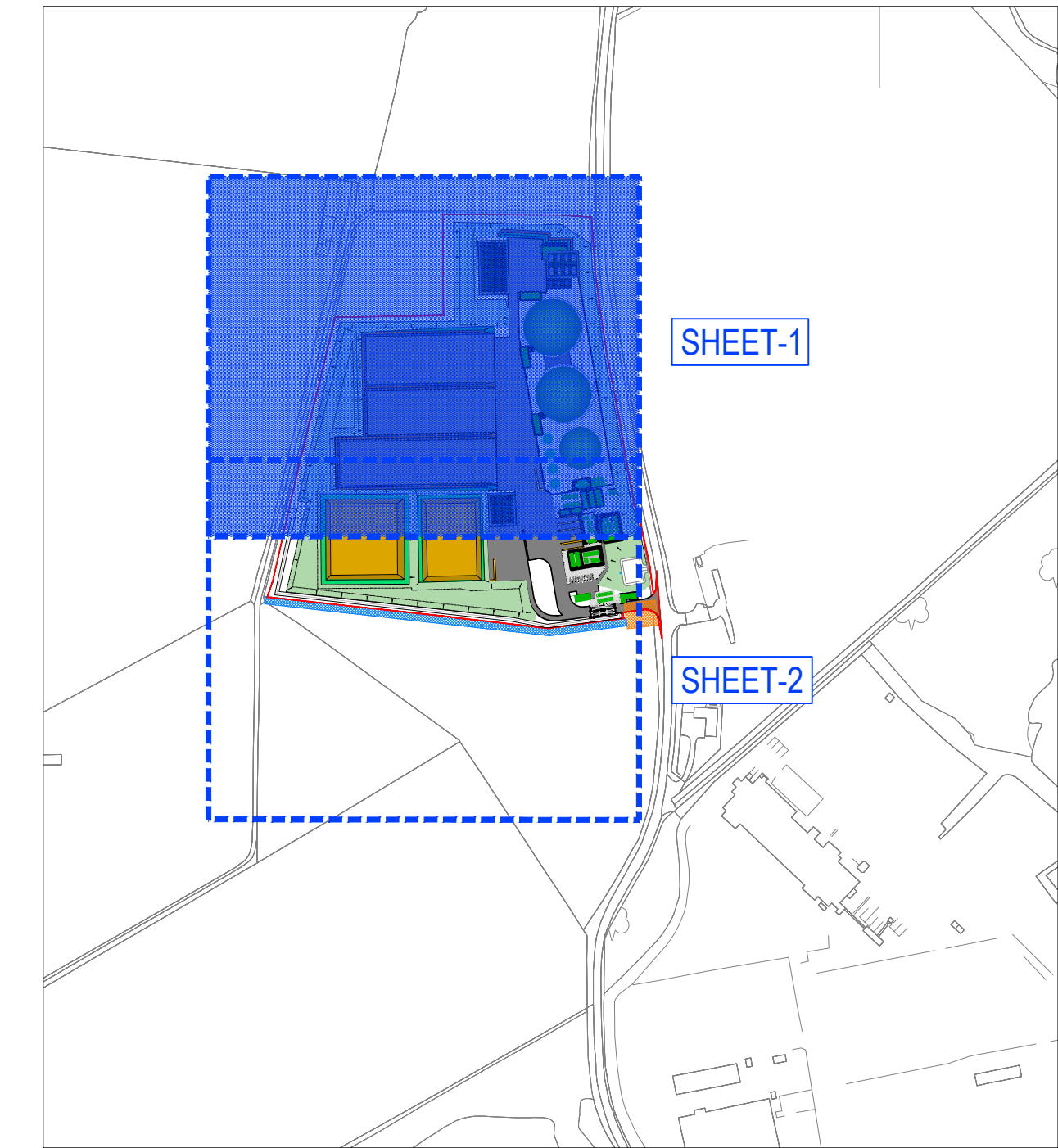
LEGEND	
	SITE BOUNDARY
	EXISTING GROUND CONTOURS

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Revision	By	Chkd By	Date	
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Project				
Drawing Title TOPOGRAPHIC SURVEY				
Scale 1:1000 @ A2	Date FEBRUARY 2023	Revision		
Drawing Number 001	0			

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APPENDIX II

General Layout



SITE LOCATION PLAN
Scale: 1:5000 @ A1



SITE PLAN
Scale: 1:500 @ A1

NOT FOR CONSTRUCTION

- NOTES:-
1. All dimensions must be checked on site and not scaled from this drawing.
 2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
 3. All levels shown on this drawing are relative to Agreed Topographic survey
 4. This drawing is to be read in conjunction with 29419/100 Series Drawings.
 5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

Site Red Line Boundary (7.06Ha)

0 5m 10m 15m 20m 25m
Scale 1:500 @ A1

0 50m 100m 150m 200m 250m
Scale 1:5000 @ A1

P02	10/09/24	ISSUED FOR APPROVAL	JPC	JPC
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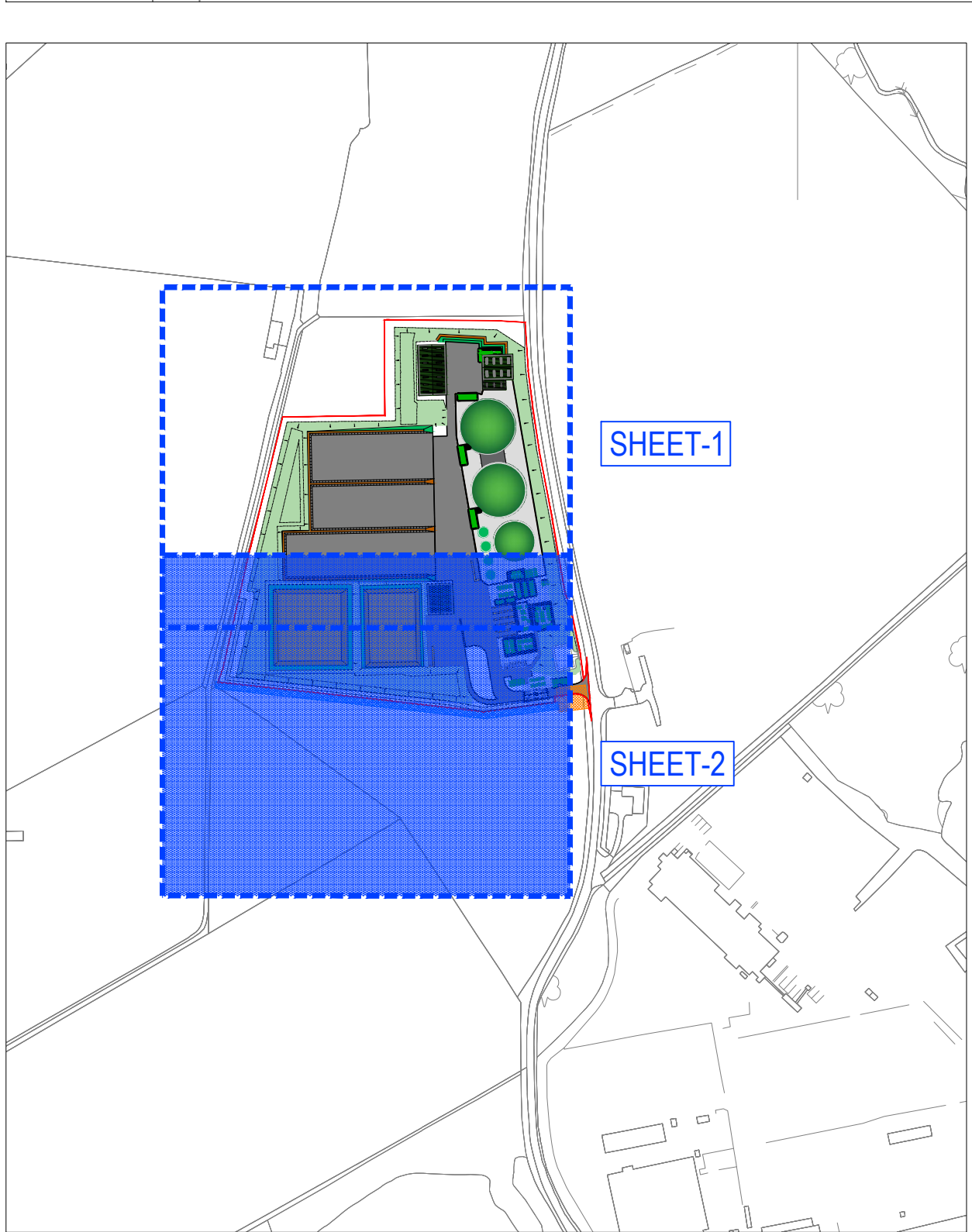
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Job Title
AD Plant.
Ashton Keynes

Drawing Title
Site Layout Plan
Sheet 1 of 2

Status	Planning		
Scale	As Noted @ A1	Date	July '24
Drawn By	J. Collins	Checked	JHC
Approved	JHC		
Drw. No.	29419/P2/101		Rev
		P02	



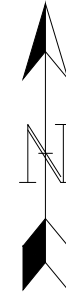
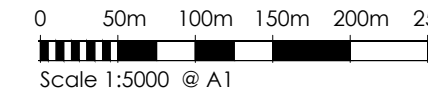
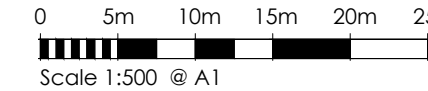
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Site Red Line Boundary (7.06Ha)



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P01	07/08/24	ISSUED FOR APPROVAL	JPC	JPC
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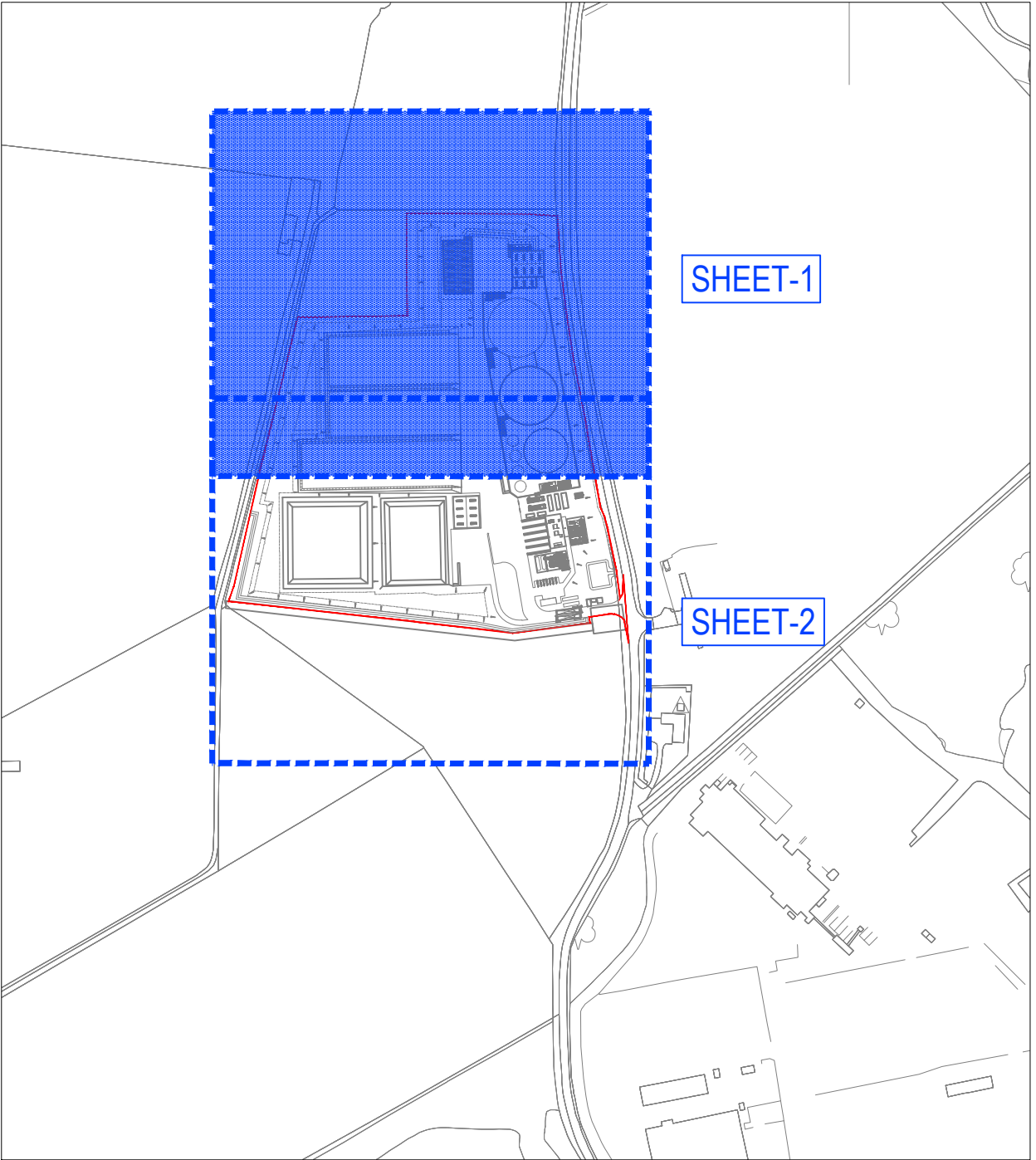
Job Title
AD Plant.
Ashton Keynes

Drawing Title
Site Layout Plan
Sheet 2 of 2

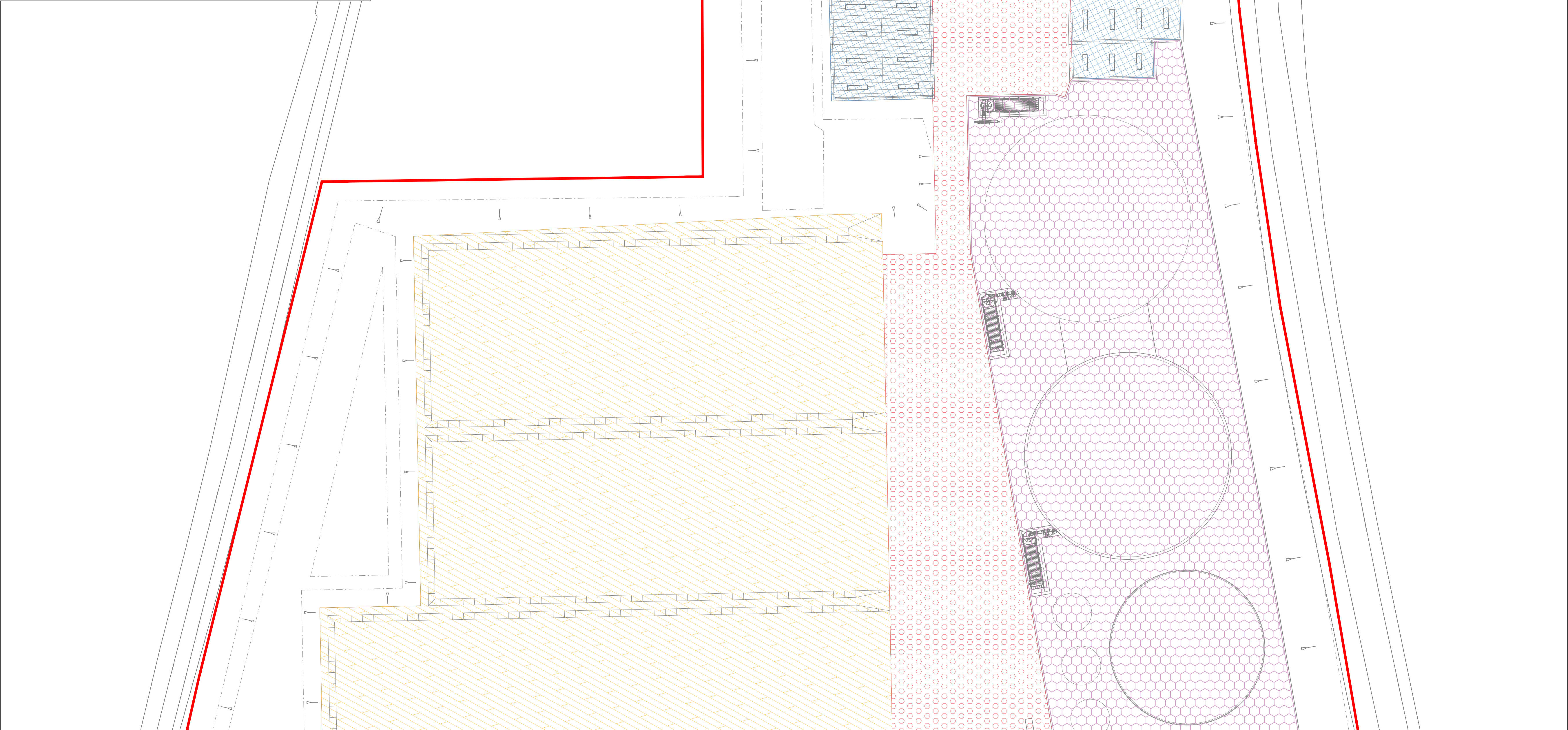
Status	Planning			
Scale	As Noted @ A1	Date	July '24	
Drawn By	J. Collins	Checked	JHC	Approved JHC
Dwg. No.	29419/P2/101			Rev P02

APPENDIX III

Drainage Catchment Plan



SITE LOCATION PLAN
Scale: 1:5000 @ A1



SITE PLAN
Scale: 1:500 @ A1

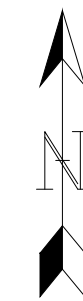
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- Site Red Line Boundary (7.06Ha)
- Denotes Clean w/Petrochemicals Hardstanding Runoff Area — 5,201m²
- Denotes Clean Equipment Runoff Area — 2,300m²
- Denotes Clean/Contaminated Bund Runoff Area — 8,507m²
- Denotes Dirty Silage Clamp Runoff Area — 14,236m²
- Denotes Contaminated Hardstanding Runoff Area — 5,198m²
- Denotes Clean Roof Runoff Area — 2,196m²

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Scale 1:500 @ A1

0 50m 100m 150m 200m 250m
Scale 1:5000 @ A1



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Client



Job Title

AD Plant.
Ashton Keynes

Drawing Title

Site Drainage Catchment
Plan 1 of 2

Status

Planning

Scale

As Noted @ A1

Date

July '24

Drawn By

W. Brown

Checked

JHC

Approved

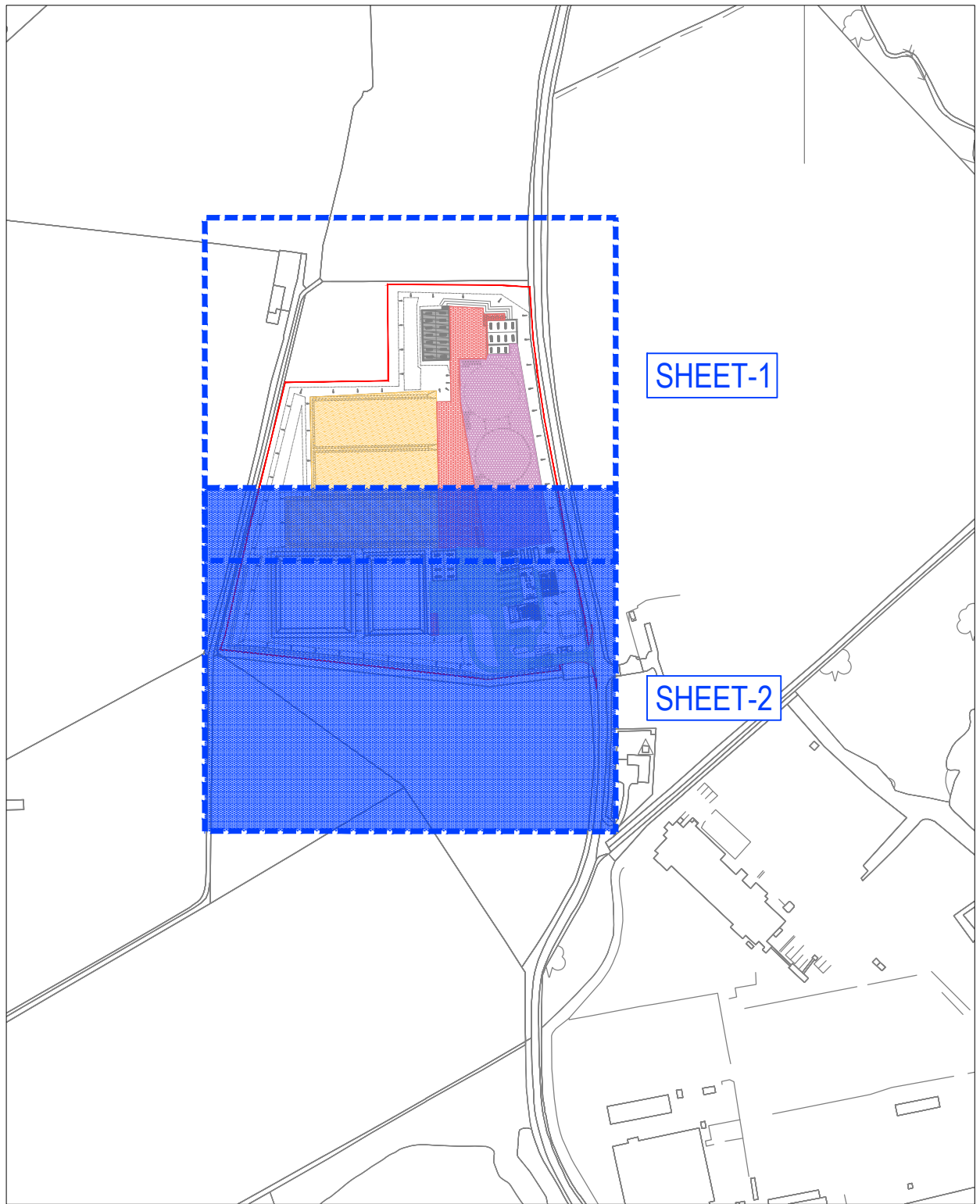
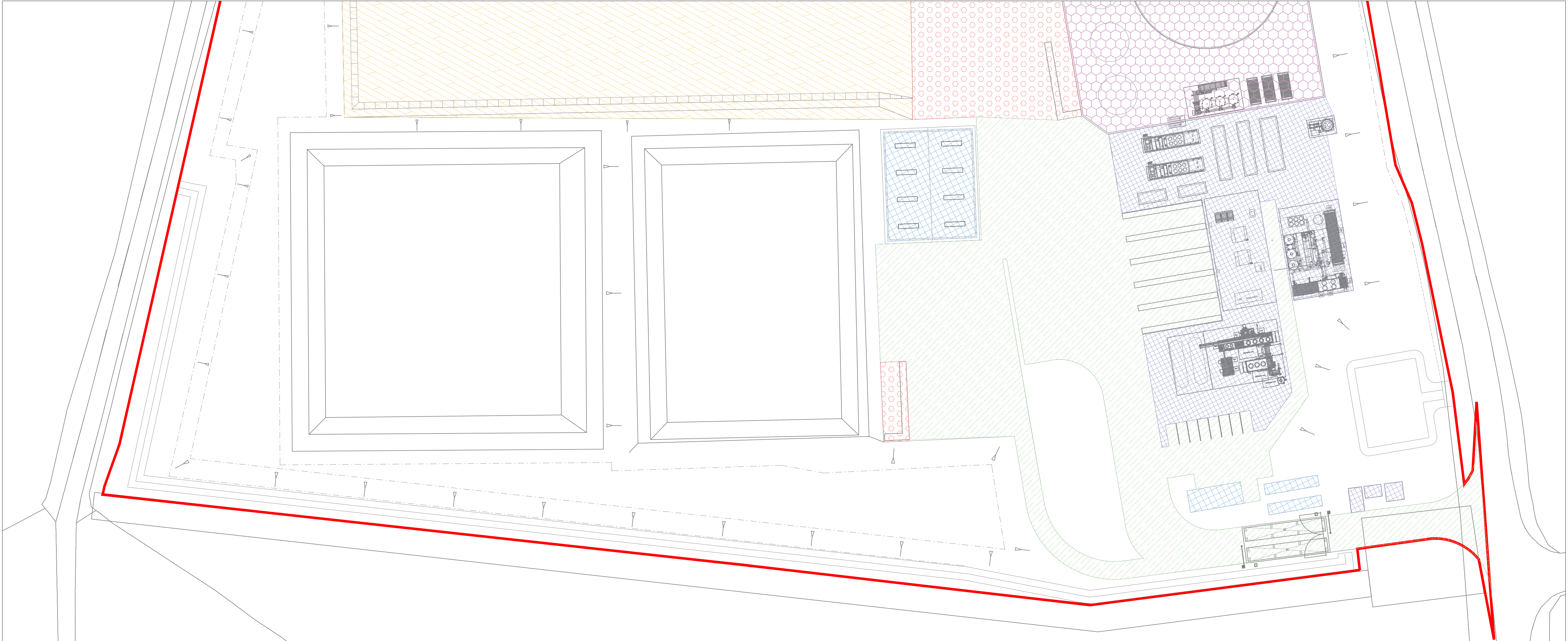
JHC

Dwg. No.

29419/P2/105

Rev

P01



SITE LOCATION PLAN
Scale: 1:5000 @ A1

SITE PLAN
Scale: 1:500 @ A1

NOT FOR CONSTRUCTION

- NOTES:-
1. All dimensions must be checked on site and not scaled from this drawing.
 2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
 3. All levels shown on this drawing are relative to Agreed Topographic survey
 4. This drawing is to be read in conjunction with 29419/100 Series Drawings.
 5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

- Site Red Line Boundary (7.06Ha)
- Denotes Clean w/Petrochemicals
Hardstanding Runoff Area — 5,201m²
- Denotes Clean Equipment Runoff
Area — 2,300m²
- Denotes Clean/Contaminated Bund Runoff
Area — 8,507m²
- Denotes Dirty Silage Clamp Runoff
Area — 14,236m²
- Denotes Contaminated Hardstanding Runoff
Area — 5,198m²
- Denotes Clean Roof Runoff
Area — 2,196m²

0 5m 10m 15m 20m 25m
Scale 1:500 @ A1

0 50m 100m 150m 200m 250m
Scale 1:5000 @ A1



P01	10/09/24	ISSUED FOR APPROVAL	WP	JHC
Rev	Date	Description	DR	CH

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GGP CONSULT

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Email info@ggpconsult.co.uk



Client
Job Title
AD Plant.
Ashton Keynes

Drawing Title
Site Drainage Catchment
Plan 2 of 2

Status	Planning		
Scale	As Noted @ A1	Date	July '24
Drawn By	W. Brown	Checked	JHC
		Approved	JHC

Dwg. No.	Rev
29419/P2/105	P01

APPENDIX IV

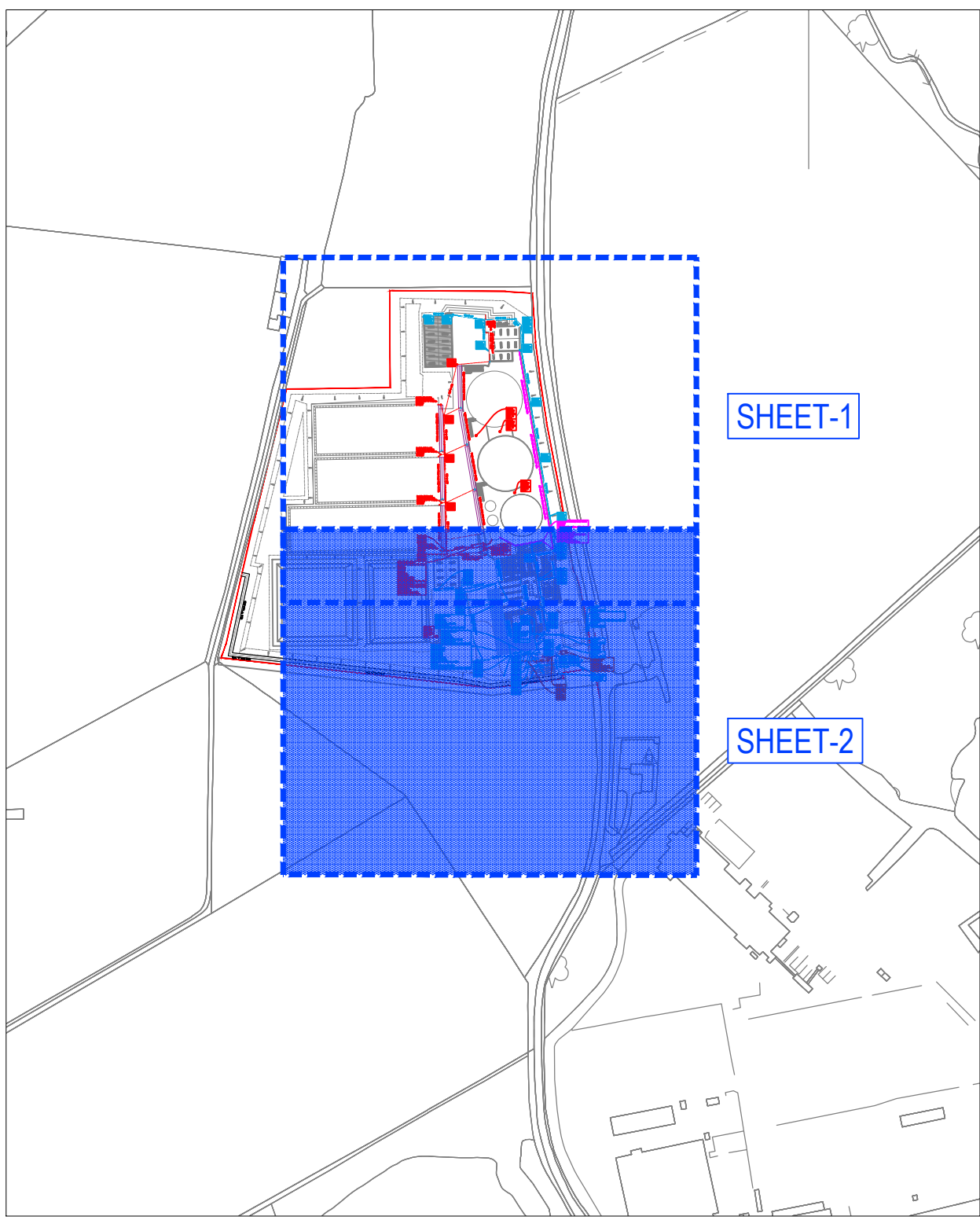
Proposed Drainage Layout



NOT FOR CONSTRUCTION

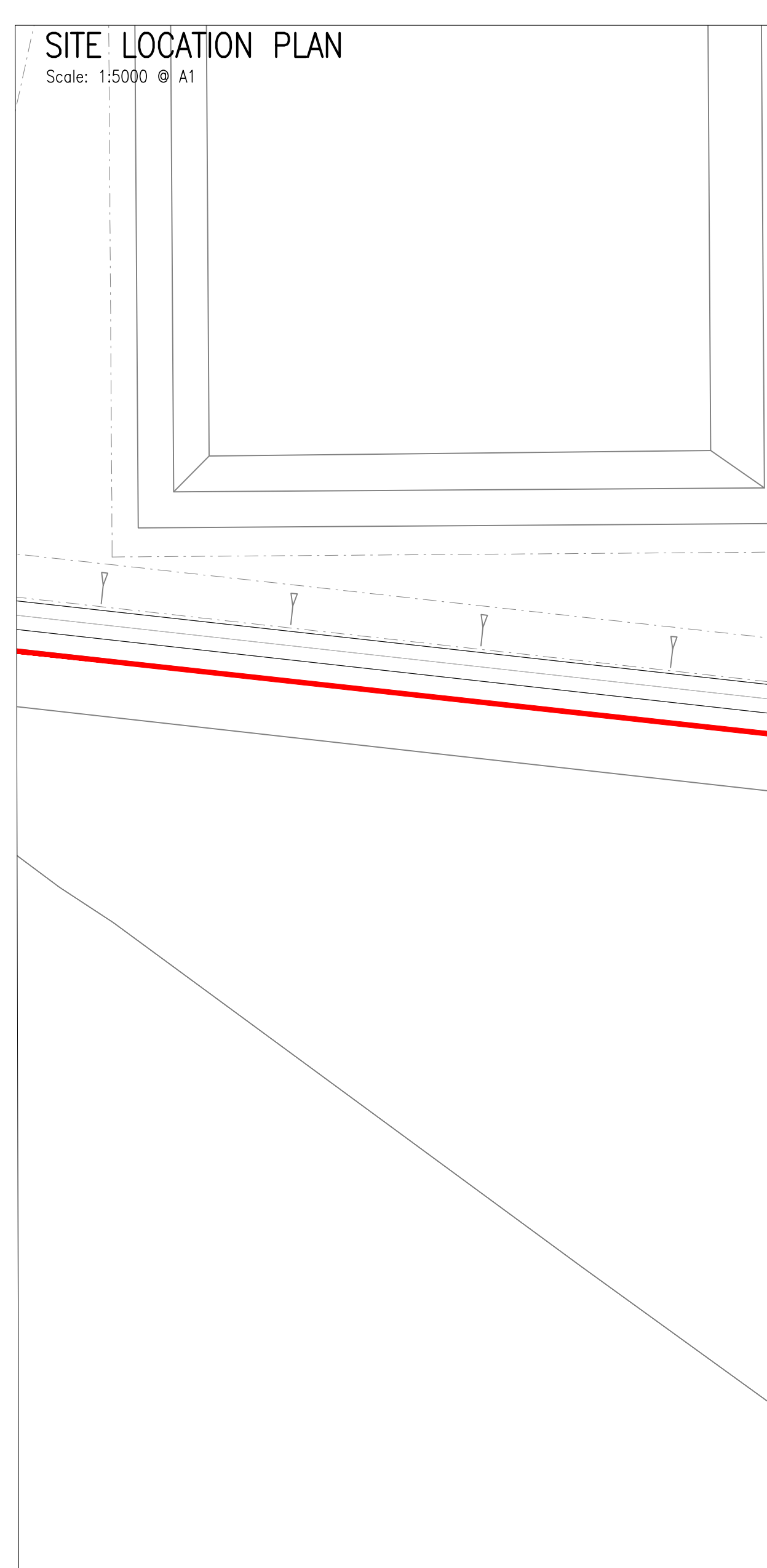
- 0 50m 100m 150m 200m 250m
Scale 1:5000 @ A1

W. Brown	JHC	JHC
Drg. No. 29419/P2/103		Rev P01



SITE LOCATION PLAN

Scale: 1:5000 @ A1



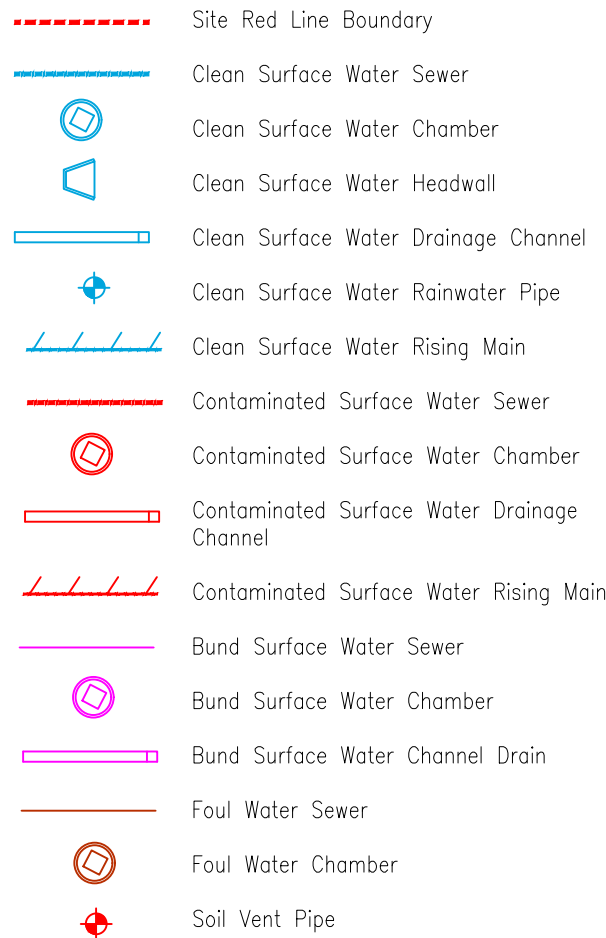
SITE PLAN

Scale: 1:500 @ A1

NOT FOR CONSTRUCTION

NOTES:

1. All dimensions must be checked on site and not scaled from this drawing.
2. The Contractor shall make a survey of the site and shall be responsible for obtaining all dimensions and levels necessary for the proper fabrication of the structure as indicated.
3. All levels shown on this drawing are relative to Agreed Topographic survey
4. This drawing is to be read in conjunction with 29419/100 Series Drawings.
5. All existing invert levels are to be confirmed by contractor prior to construction. Connection subject to approval.

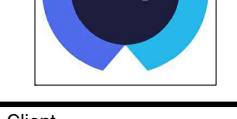


0 5m 10m 15m 20m 25m
Scale 1:500 @ A1

0 50m 100m 150m 200m 250m
Scale 1:5000 @ A1

Rev	Date	Description	DR	CH
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Client



Job Title

AD Plant.
Ashton Keynes

Drawing Title

Site Layout Plan
Sheet 2 of 2

Status
Planning

Scale
As Noted @ A1

Date
July '24

Drawn By
W. Brown

Checked
JHC

Approved
JHC

Dwg. No.

29419/P2/103

Rev

P01

APPENDIX V

Bund Calculations

GGP Consult					Page 1																																																																																																																																					
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Bund Calcs W/ No Outfall, HorseClose																																																																																																																																							
Date 09/09/2024 10:43 File Bund Outfall 1 in 100.SRCX			Designed by JHC Checked by JHC																																																																																																																																							
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<table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>92.257</td><td>0.257</td><td>1.5</td><td>89.8</td><td>O K</td></tr><tr><td>30 min Summer</td><td>92.280</td><td>0.280</td><td>1.5</td><td>116.4</td><td>O K</td></tr><tr><td>60 min Summer</td><td>92.302</td><td>0.302</td><td>1.5</td><td>145.6</td><td>O K</td></tr><tr><td>120 min Summer</td><td>92.322</td><td>0.322</td><td>1.5</td><td>176.7</td><td>O K</td></tr><tr><td>180 min Summer</td><td>92.333</td><td>0.333</td><td>1.5</td><td>195.7</td><td>O K</td></tr><tr><td>240 min Summer</td><td>92.340</td><td>0.340</td><td>1.5</td><td>209.2</td><td>O K</td></tr><tr><td>360 min Summer</td><td>92.350</td><td>0.350</td><td>1.5</td><td>226.4</td><td>O K</td></tr><tr><td>480 min Summer</td><td>92.355</td><td>0.355</td><td>1.5</td><td>236.6</td><td>O K</td></tr><tr><td>600 min Summer</td><td>92.358</td><td>0.358</td><td>1.5</td><td>243.3</td><td>O K</td></tr><tr><td>720 min Summer</td><td>92.360</td><td>0.360</td><td>1.5</td><td>247.5</td><td>O K</td></tr><tr><td>960 min Summer</td><td>92.362</td><td>0.362</td><td>1.5</td><td>251.3</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>92.360</td><td>0.360</td><td>1.5</td><td>247.9</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>92.357</td><td>0.357</td><td>1.5</td><td>241.2</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>92.354</td><td>0.354</td><td>1.5</td><td>235.0</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>92.347</td><td>0.347</td><td>1.5</td><td>222.4</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>92.340</td><td>0.340</td><td>1.5</td><td>208.5</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>92.332</td><td>0.332</td><td>1.5</td><td>194.0</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>92.323</td><td>0.323</td><td>1.5</td><td>179.3</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>92.314</td><td>0.314</td><td>1.5</td><td>164.8</td><td>O K</td></tr><tr><td>15 min Winter</td><td>92.257</td><td>0.257</td><td>1.5</td><td>89.8</td><td>O K</td></tr><tr><td>30 min Winter</td><td>92.280</td><td>0.280</td><td>1.5</td><td>116.5</td><td>O K</td></tr></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	15 min Summer	92.257	0.257	1.5	89.8	O K	30 min Summer	92.280	0.280	1.5	116.4	O K	60 min Summer	92.302	0.302	1.5	145.6	O K	120 min Summer	92.322	0.322	1.5	176.7	O K	180 min Summer	92.333	0.333	1.5	195.7	O K	240 min Summer	92.340	0.340	1.5	209.2	O K	360 min Summer	92.350	0.350	1.5	226.4	O K	480 min Summer	92.355	0.355	1.5	236.6	O K	600 min Summer	92.358	0.358	1.5	243.3	O K	720 min Summer	92.360	0.360	1.5	247.5	O K	960 min Summer	92.362	0.362	1.5	251.3	O K	1440 min Summer	92.360	0.360	1.5	247.9	O K	2160 min Summer	92.357	0.357	1.5	241.2	O K	2880 min Summer	92.354	0.354	1.5	235.0	O K	4320 min Summer	92.347	0.347	1.5	222.4	O K	5760 min Summer	92.340	0.340	1.5	208.5	O K	7200 min Summer	92.332	0.332	1.5	194.0	O K	8640 min Summer	92.323	0.323	1.5	179.3	O K	10080 min Summer	92.314	0.314	1.5	164.8	O K	15 min Winter	92.257	0.257	1.5	89.8	O K	30 min Winter	92.280	0.280	1.5	116.5	O K
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GGP Consult				Page 2	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:43 File Bund Outfall 1 in 100.SRCX		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 1 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	92.302	0.302	1.5	145.7	O K
120 min Winter	92.322	0.322	1.5	177.0	O K
180 min Winter	92.333	0.333	1.5	196.1	O K
240 min Winter	92.341	0.341	1.5	209.8	O K
360 min Winter	92.350	0.350	1.5	227.2	O K
480 min Winter	92.355	0.355	1.5	237.7	O K
600 min Winter	92.359	0.359	1.5	244.7	O K
720 min Winter	92.361	0.361	1.5	249.4	O K
960 min Winter	92.363	0.363	1.5	254.1	O K
1440 min Winter	92.363	0.363	1.5	253.2	O K
2160 min Winter	92.357	0.357	1.5	241.5	O K
2880 min Winter	92.353	0.353	1.5	232.9	O K
4320 min Winter	92.342	0.342	1.5	211.6	O K
5760 min Winter	92.328	0.328	1.5	187.8	O K
7200 min Winter	92.314	0.314	1.5	163.5	O K
8640 min Winter	92.298	0.298	1.5	139.9	O K
10080 min Winter	92.281	0.281	1.5	117.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	17.819	0.0	151.6	66	
120 min Winter	11.055	0.0	188.2	124	
180 min Winter	8.322	0.0	212.4	182	
240 min Winter	6.795	0.0	231.4	242	
360 min Winter	5.077	0.0	258.7	358	
480 min Winter	4.115	0.0	258.6	476	
600 min Winter	3.497	0.0	258.4	590	
720 min Winter	3.061	0.0	258.1	706	
960 min Winter	2.481	0.0	257.6	934	
1440 min Winter	1.846	0.0	256.1	1372	
2160 min Winter	1.375	0.0	421.2	1756	
2880 min Winter	1.114	0.0	455.1	2196	
4320 min Winter	0.829	0.0	471.8	3116	
5760 min Winter	0.672	0.0	549.2	4032	
7200 min Winter	0.571	0.0	583.6	4896	
8640 min Winter	0.500	0.0	613.2	5704	
10080 min Winter	0.448	0.0	639.8	6456	
©1982-2020 Innovyze					

GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose
Date 09/09/2024 10:43 File Bund Outfall 1 in 100.SRCX		Designed by JHC Checked by JHC
Innovyze		Source Control 2020.1.3
Micro Drainage		
Rainfall Details Rainfall Model Return Period (years) Region M5-60 (mm) Ratio R Summer Storms FSR 1 England and Wales 19.900 0.400 Yes Winter Storms Cv (Summer) Cv (Winter) Shortest Storm (mins) Longest Storm (mins) Climate Change % Yes 1.000 1.000 15 10080 +40 Time Area Diagram Total Area (ha) 0.851 Time (mins) Area From: To: (ha) Time (mins) Area From: To: (ha) 0 4 0.425 4 8 0.426 Time Area Diagram Total Area (ha) 0.000 Time (mins) Area From: To: (ha) 0 4 0.000 ©1982-2020 Innovyze		

GGP Consult		Page 4																																																																																				
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Designed by JHC Checked by JHC																																																																																						
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Model Details Storage is Online Cover Level (m) 93.500 Tank or Pond Structure Invert Level (m) 92.000 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>0.0</td><td>0.500</td><td>3975.0</td><td>1.500</td><td>3975.0</td></tr></table> Pump Outflow Control Invert Level (m) 90.500 <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>1.5000</td><td>0.900</td><td>1.5000</td><td>1.700</td><td>1.5000</td><td>2.500</td><td>1.5000</td></tr><tr><td>0.200</td><td>1.5000</td><td>1.000</td><td>1.5000</td><td>1.800</td><td>1.5000</td><td>2.600</td><td>1.5000</td></tr><tr><td>0.300</td><td>1.5000</td><td>1.100</td><td>1.5000</td><td>1.900</td><td>1.5000</td><td>2.700</td><td>1.5000</td></tr><tr><td>0.400</td><td>1.5000</td><td>1.200</td><td>1.5000</td><td>2.000</td><td>1.5000</td><td>2.800</td><td>1.5000</td></tr><tr><td>0.500</td><td>1.5000</td><td>1.300</td><td>1.5000</td><td>2.100</td><td>1.5000</td><td>2.900</td><td>1.5000</td></tr><tr><td>0.600</td><td>1.5000</td><td>1.400</td><td>1.5000</td><td>2.200</td><td>1.5000</td><td>3.000</td><td>1.5000</td></tr><tr><td>0.700</td><td>1.5000</td><td>1.500</td><td>1.5000</td><td>2.300</td><td>1.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>1.5000</td><td>1.600</td><td>1.5000</td><td>2.400</td><td>1.5000</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	0.0	0.500	3975.0	1.500	3975.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.5000	0.900	1.5000	1.700	1.5000	2.500	1.5000	0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000	0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000	0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000	0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000	0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000	0.700	1.5000	1.500	1.5000	2.300	1.5000			0.800	1.5000	1.600	1.5000	2.400	1.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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0.100	1.5000	0.900	1.5000	1.700	1.5000	2.500	1.5000																																																																															
0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000																																																																															
0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000																																																																															
0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000																																																																															
0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000																																																																															
0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000																																																																															
0.700	1.5000	1.500	1.5000	2.300	1.5000																																																																																	
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GGP Consult					Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:39 File Bund Outfall 1 in 100.SRCX			Designed by JHC Checked by JHC			
Innovyze			Source Control 2020.1.3			
<u>Summary of Results for 2 year Return Period (+40%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	92.280	0.280	1.5	116.7	O K
	30 min Summer	92.305	0.305	1.5	150.5	O K
	60 min Summer	92.327	0.327	1.5	186.0	O K
	120 min Summer	92.348	0.348	1.5	223.1	O K
	180 min Summer	92.359	0.359	1.5	245.5	O K
	240 min Summer	92.367	0.367	1.5	261.4	O K
	360 min Summer	92.376	0.376	1.5	282.5	O K
	480 min Summer	92.382	0.382	1.5	295.9	O K
	600 min Summer	92.386	0.386	1.5	305.1	O K
	720 min Summer	92.389	0.389	1.5	311.4	O K
	960 min Summer	92.392	0.392	1.5	318.5	O K
	1440 min Summer	92.392	0.392	1.5	319.4	O K
	2160 min Summer	92.388	0.388	1.5	308.4	O K
	2880 min Summer	92.384	0.384	1.5	299.7	O K
	4320 min Summer	92.377	0.377	1.5	284.5	O K
	5760 min Summer	92.370	0.370	1.5	269.2	O K
	7200 min Summer	92.363	0.363	1.5	253.4	O K
	8640 min Summer	92.355	0.355	1.5	237.4	O K
	10080 min Summer	92.347	0.347	1.5	221.3	O K
	15 min Winter	92.280	0.280	1.5	116.7	O K
	30 min Winter	92.305	0.305	1.5	150.5	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	15 min Summer	55.792	0.0	118.7	23	
	30 min Summer	36.159	0.0	129.6	38	
	60 min Summer	22.561	0.0	192.1	68	
	120 min Summer	13.782	0.0	234.5	126	
	180 min Summer	10.275	0.0	259.2	186	
	240 min Summer	8.330	0.0	259.2	246	
	360 min Summer	6.177	0.0	259.2	366	
	480 min Summer	4.987	0.0	259.1	484	
	600 min Summer	4.224	0.0	259.1	604	
	720 min Summer	3.687	0.0	259.1	724	
	960 min Summer	2.975	0.0	259.0	962	
	1440 min Summer	2.199	0.0	259.0	1440	
	2160 min Summer	1.625	0.0	497.7	1868	
	2880 min Summer	1.311	0.0	506.5	2252	
	4320 min Summer	0.968	0.0	478.2	3028	
	5760 min Summer	0.781	0.0	638.0	3864	
	7200 min Summer	0.661	0.0	675.3	4680	
	8640 min Summer	0.577	0.0	707.3	5528	
	10080 min Summer	0.515	0.0	736.0	6264	
	15 min Winter	55.792	0.0	118.7	23	
	30 min Winter	36.159	0.0	129.6	37	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:39 File Bund Outfall 1 in 100.SRCX		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Summary of Results for 2 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	92.327	0.327	1.5	186.0	O K
120 min Winter	92.348	0.348	1.5	223.4	O K
180 min Winter	92.359	0.359	1.5	245.9	O K
240 min Winter	92.367	0.367	1.5	261.9	O K
360 min Winter	92.377	0.377	1.5	283.3	O K
480 min Winter	92.383	0.383	1.5	296.9	O K
600 min Winter	92.387	0.387	1.5	306.4	O K
720 min Winter	92.389	0.389	1.5	313.0	O K
960 min Winter	92.393	0.393	1.5	320.9	O K
1440 min Winter	92.394	0.394	1.5	324.1	O K
2160 min Winter	92.390	0.390	1.5	313.6	O K
2880 min Winter	92.384	0.384	1.5	299.6	O K
4320 min Winter	92.374	0.374	1.5	277.8	O K
5760 min Winter	92.363	0.363	1.5	252.9	O K
7200 min Winter	92.350	0.350	1.5	227.1	O K
8640 min Winter	92.336	0.336	1.5	201.2	O K
10080 min Winter	92.321	0.321	1.5	176.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	22.561	0.0	192.1	66	
120 min Winter	13.782	0.0	234.6	124	
180 min Winter	10.275	0.0	259.0	184	
240 min Winter	8.330	0.0	258.9	242	
360 min Winter	6.177	0.0	258.8	360	
480 min Winter	4.987	0.0	258.6	476	
600 min Winter	4.224	0.0	258.5	594	
720 min Winter	3.687	0.0	258.3	710	
960 min Winter	2.975	0.0	257.8	938	
1440 min Winter	2.199	0.0	256.6	1388	
2160 min Winter	1.625	0.0	498.0	2028	
2880 min Winter	1.311	0.0	506.5	2304	
4320 min Winter	0.968	0.0	481.5	3204	
5760 min Winter	0.781	0.0	638.2	4144	
7200 min Winter	0.661	0.0	675.5	4976	
8640 min Winter	0.577	0.0	707.4	5872	
10080 min Winter	0.515	0.0	735.6	6656	
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Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	0.0	0.500	3975.0	1.500	3975.0																																																																																	
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0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000																																																																															
0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000																																																																															
0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000																																																																															
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:38		Designed by JHC			
File Bund Outfall 1 in 100.SRCX		Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Summary of Results for 10 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.321	0.321	1.5	175.6	O K
30 min Summer	92.349	0.349	1.5	226.1	O K
60 min Summer	92.375	0.375	1.5	278.5	O K
120 min Summer	92.397	0.397	1.5	332.6	O K
180 min Summer	92.410	0.410	1.5	364.5	O K
240 min Summer	92.418	0.418	1.5	386.9	O K
360 min Summer	92.429	0.429	1.5	418.0	O K
480 min Summer	92.436	0.436	1.5	439.1	O K
600 min Summer	92.441	0.441	1.5	454.4	O K
720 min Summer	92.445	0.445	1.5	465.7	O K
960 min Summer	92.449	0.449	1.5	481.0	O K
1440 min Summer	92.453	0.453	1.5	493.6	O K
2160 min Summer	92.452	0.452	1.5	489.6	O K
2880 min Summer	92.447	0.447	1.5	473.0	O K
4320 min Summer	92.439	0.439	1.5	447.5	O K
5760 min Summer	92.432	0.432	1.5	427.0	O K
7200 min Summer	92.425	0.425	1.5	408.0	O K
8640 min Summer	92.419	0.419	1.5	389.0	O K
10080 min Summer	92.412	0.412	1.5	370.3	O K
15 min Winter	92.321	0.321	1.5	175.6	O K
30 min Winter	92.349	0.349	1.5	226.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	83.483	0.0	129.6	23	
30 min Summer	53.929	0.0	129.6	38	
60 min Summer	33.434	0.0	259.2	68	
120 min Summer	20.211	0.0	259.2	128	
180 min Summer	14.938	0.0	259.2	186	
240 min Summer	12.020	0.0	259.2	246	
360 min Summer	8.831	0.0	259.2	366	
480 min Summer	7.092	0.0	259.2	486	
600 min Summer	5.979	0.0	259.2	606	
720 min Summer	5.200	0.0	259.1	724	
960 min Summer	4.170	0.0	259.1	964	
1440 min Summer	3.052	0.0	259.0	1442	
2160 min Summer	2.233	0.0	518.2	2160	
2880 min Summer	1.788	0.0	517.3	2684	
4320 min Summer	1.307	0.0	500.4	3372	
5760 min Summer	1.046	0.0	854.5	4144	
7200 min Summer	0.880	0.0	898.2	4904	
8640 min Summer	0.764	0.0	921.4	5784	
10080 min Summer	0.678	0.0	882.4	6560	
15 min Winter	83.483	0.0	129.6	23	
30 min Winter	53.929	0.0	129.6	37	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
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<u>Summary of Results for 10 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	92.375	0.375	1.5	278.4	O K
120 min Winter	92.397	0.397	1.5	332.8	O K
180 min Winter	92.410	0.410	1.5	364.9	O K
240 min Winter	92.418	0.418	1.5	387.4	O K
360 min Winter	92.429	0.429	1.5	418.6	O K
480 min Winter	92.436	0.436	1.5	439.9	O K
600 min Winter	92.441	0.441	1.5	455.5	O K
720 min Winter	92.445	0.445	1.5	467.1	O K
960 min Winter	92.450	0.450	1.5	482.9	O K
1440 min Winter	92.454	0.454	1.5	497.0	O K
2160 min Winter	92.454	0.454	1.5	496.5	O K
2880 min Winter	92.450	0.450	1.5	483.1	O K
4320 min Winter	92.439	0.439	1.5	447.3	O K
5760 min Winter	92.430	0.430	1.5	420.8	O K
7200 min Winter	92.420	0.420	1.5	392.7	O K
8640 min Winter	92.409	0.409	1.5	363.7	O K
10080 min Winter	92.398	0.398	1.5	334.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	33.434	0.0	259.2	66	
120 min Winter	20.211	0.0	259.1	126	
180 min Winter	14.938	0.0	259.1	184	
240 min Winter	12.020	0.0	259.0	244	
360 min Winter	8.831	0.0	258.9	362	
480 min Winter	7.092	0.0	258.8	478	
600 min Winter	5.979	0.0	258.6	596	
720 min Winter	5.200	0.0	258.5	714	
960 min Winter	4.170	0.0	258.2	946	
1440 min Winter	3.052	0.0	257.3	1406	
2160 min Winter	2.233	0.0	514.8	2080	
2880 min Winter	1.788	0.0	512.3	2736	
4320 min Winter	1.307	0.0	500.5	3456	
5760 min Winter	1.046	0.0	854.7	4328	
7200 min Winter	0.880	0.0	898.7	5264	
8640 min Winter	0.764	0.0	934.1	6144	
10080 min Winter	0.678	0.0	900.3	7056	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Bund Calcs W/ No Outfall, HorseClose	
Date 09/09/2024 10:38	Designed by JHC	
File Bund Outfall 1 in 100.SRCX	Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.851

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.425	4	8	0.426

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

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Innovyze		Source Control 2020.1.3																																																																																				
Model Details Storage is Online Cover Level (m) 93.500 Tank or Pond Structure Invert Level (m) 92.000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>0.0</td><td>0.500</td><td>3975.0</td><td>1.500</td><td>3975.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 90.500 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>1.5000</td><td>0.900</td><td>1.5000</td><td>1.700</td><td>1.5000</td><td>2.500</td><td>1.5000</td></tr><tr><td>0.200</td><td>1.5000</td><td>1.000</td><td>1.5000</td><td>1.800</td><td>1.5000</td><td>2.600</td><td>1.5000</td></tr><tr><td>0.300</td><td>1.5000</td><td>1.100</td><td>1.5000</td><td>1.900</td><td>1.5000</td><td>2.700</td><td>1.5000</td></tr><tr><td>0.400</td><td>1.5000</td><td>1.200</td><td>1.5000</td><td>2.000</td><td>1.5000</td><td>2.800</td><td>1.5000</td></tr><tr><td>0.500</td><td>1.5000</td><td>1.300</td><td>1.5000</td><td>2.100</td><td>1.5000</td><td>2.900</td><td>1.5000</td></tr><tr><td>0.600</td><td>1.5000</td><td>1.400</td><td>1.5000</td><td>2.200</td><td>1.5000</td><td>3.000</td><td>1.5000</td></tr><tr><td>0.700</td><td>1.5000</td><td>1.500</td><td>1.5000</td><td>2.300</td><td>1.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>1.5000</td><td>1.600</td><td>1.5000</td><td>2.400</td><td>1.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	0.0	0.500	3975.0	1.500	3975.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.5000	0.900	1.5000	1.700	1.5000	2.500	1.5000	0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000	0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000	0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000	0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000	0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000	0.700	1.5000	1.500	1.5000	2.300	1.5000			0.800	1.5000	1.600	1.5000	2.400	1.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	0.0	0.500	3975.0	1.500	3975.0																																																																																	
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0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000																																																																															
0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000																																																																															
0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000																																																																															
0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000																																																																															
0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000																																																																															
0.700	1.5000	1.500	1.5000	2.300	1.5000																																																																																	
0.800	1.5000	1.600	1.5000	2.400	1.5000																																																																																	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:38			Designed by JHC			
File Bund Outfall 1 in 100.SRCX			Checked by JHC			
Innovyze			Source Control 2020.1.3			
<u>Summary of Results for 30 year Return Period (+40%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	92.348	0.348	1.5	223.2	O K
	30 min Summer	92.380	0.380	1.5	289.9	O K
	60 min Summer	92.408	0.408	1.5	359.2	O K
	120 min Summer	92.433	0.433	1.5	430.0	O K
	180 min Summer	92.446	0.446	1.5	471.1	O K
	240 min Summer	92.455	0.455	1.5	499.3	O K
	360 min Summer	92.467	0.467	1.5	538.7	O K
	480 min Summer	92.474	0.474	1.5	566.1	O K
	600 min Summer	92.480	0.480	1.5	586.3	O K
	720 min Summer	92.484	0.484	1.5	601.8	O K
	960 min Summer	92.490	0.490	1.5	623.5	O K
	1440 min Summer	92.496	0.496	1.5	645.3	O K
	2160 min Summer	92.497	0.497	1.5	650.4	O K
	2880 min Summer	92.494	0.494	1.5	638.4	O K
	4320 min Summer	92.484	0.484	1.5	599.7	O K
	5760 min Summer	92.476	0.476	1.5	570.8	O K
	7200 min Summer	92.469	0.469	1.5	546.5	O K
	8640 min Summer	92.462	0.462	1.5	524.1	O K
	10080 min Summer	92.456	0.456	1.5	502.2	O K
	15 min Winter	92.348	0.348	1.5	223.2	O K
	30 min Winter	92.380	0.380	1.5	289.9	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	15 min Summer	105.885	0.0	129.6	23	
	30 min Summer	68.936	0.0	129.6	38	
	60 min Summer	42.916	0.0	259.2	68	
	120 min Summer	25.934	0.0	259.2	128	
	180 min Summer	19.112	0.0	259.2	188	
	240 min Summer	15.324	0.0	259.2	246	
	360 min Summer	11.197	0.0	259.2	366	
	480 min Summer	8.958	0.0	259.2	486	
	600 min Summer	7.531	0.0	259.2	606	
	720 min Summer	6.533	0.0	259.2	726	
	960 min Summer	5.217	0.0	259.1	964	
	1440 min Summer	3.796	0.0	259.1	1444	
	2160 min Summer	2.758	0.0	518.3	2164	
	2880 min Summer	2.198	0.0	518.2	2880	
	4320 min Summer	1.594	0.0	512.3	3716	
	5760 min Summer	1.268	0.0	1010.3	4440	
	7200 min Summer	1.062	0.0	981.8	5184	
	8640 min Summer	0.918	0.0	948.7	5968	
	10080 min Summer	0.812	0.0	912.6	6768	
	15 min Winter	105.885	0.0	129.6	23	
	30 min Winter	68.936	0.0	129.6	37	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:38 File Bund Outfall 1 in 100.SRCX		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Summary of Results for 30 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	92.408	0.408	1.5	359.2	O K
120 min Winter	92.433	0.433	1.5	430.1	O K
180 min Winter	92.446	0.446	1.5	471.4	O K
240 min Winter	92.455	0.455	1.5	499.8	O K
360 min Winter	92.467	0.467	1.5	539.3	O K
480 min Winter	92.475	0.475	1.5	566.9	O K
600 min Winter	92.480	0.480	1.5	587.3	O K
720 min Winter	92.485	0.485	1.5	603.0	O K
960 min Winter	92.490	0.490	1.5	625.2	O K
1440 min Winter	92.496	0.496	1.5	648.2	O K
2160 min Winter	92.498	0.498	1.5	656.0	O K
2880 min Winter	92.496	0.496	1.5	647.7	O K
4320 min Winter	92.486	0.486	1.5	608.7	O K
5760 min Winter	92.476	0.476	1.5	570.0	O K
7200 min Winter	92.467	0.467	1.5	539.4	O K
8640 min Winter	92.458	0.458	1.5	507.9	O K
10080 min Winter	92.448	0.448	1.5	476.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	42.916	0.0	259.2	68	
120 min Winter	25.934	0.0	259.2	126	
180 min Winter	19.112	0.0	259.1	184	
240 min Winter	15.324	0.0	259.0	244	
360 min Winter	11.197	0.0	258.9	362	
480 min Winter	8.958	0.0	258.8	480	
600 min Winter	7.531	0.0	258.7	598	
720 min Winter	6.533	0.0	258.6	716	
960 min Winter	5.217	0.0	258.3	950	
1440 min Winter	3.796	0.0	257.6	1416	
2160 min Winter	2.758	0.0	515.5	2100	
2880 min Winter	2.198	0.0	513.6	2772	
4320 min Winter	1.594	0.0	507.8	4024	
5760 min Winter	1.268	0.0	1010.7	4552	
7200 min Winter	1.062	0.0	985.4	5472	
8640 min Winter	0.918	0.0	956.8	6392	
10080 min Winter	0.812	0.0	925.7	7264	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Bund Calcs W/ No Outfall, HorseClose	
Date 09/09/2024 10:38	Designed by JHC	
File Bund Outfall 1 in 100.SRCX	Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.851

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.425	4	8	0.426

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

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Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000																																																																															
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:37		Designed by JHC			
File Bund Outfall 1 in 100.SRCX		Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.380	0.380	1.5	290.3	O K
30 min Summer	92.416	0.416	1.5	380.5	O K
60 min Summer	92.447	0.447	1.5	474.1	O K
120 min Summer	92.475	0.475	1.5	568.7	O K
180 min Summer	92.490	0.490	1.5	622.4	O K
240 min Summer	92.499	0.499	1.5	658.4	O K
360 min Summer	92.512	0.512	1.5	708.4	O K
480 min Summer	92.521	0.521	1.5	744.1	O K
600 min Summer	92.527	0.527	1.5	770.7	O K
720 min Summer	92.532	0.532	1.5	791.3	O K
960 min Summer	92.540	0.540	1.5	821.2	O K
1440 min Summer	92.548	0.548	1.5	854.2	O K
2160 min Summer	92.552	0.552	1.5	870.4	O K
2880 min Summer	92.551	0.551	1.5	865.9	O K
4320 min Summer	92.541	0.541	1.5	825.4	O K
5760 min Summer	92.530	0.530	1.5	779.9	O K
7200 min Summer	92.521	0.521	1.5	744.8	O K
8640 min Summer	92.513	0.513	1.5	714.7	O K
10080 min Summer	92.506	0.506	1.5	687.6	O K
15 min Winter	92.380	0.380	1.5	290.3	O K
30 min Winter	92.416	0.416	1.5	380.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	137.396	0.0	129.6	23	
30 min Summer	90.218	0.0	129.6	38	
60 min Summer	56.422	0.0	259.2	68	
120 min Summer	34.083	0.0	259.2	128	
180 min Summer	25.037	0.0	259.2	188	
240 min Summer	19.995	0.0	259.2	248	
360 min Summer	14.522	0.0	259.2	366	
480 min Summer	11.573	0.0	259.2	486	
600 min Summer	9.697	0.0	259.2	606	
720 min Summer	8.389	0.0	259.2	726	
960 min Summer	6.669	0.0	259.2	966	
1440 min Summer	4.819	0.0	259.1	1444	
2160 min Summer	3.477	0.0	518.4	2164	
2880 min Summer	2.755	0.0	518.3	2884	
4320 min Summer	1.982	0.0	518.2	4288	
5760 min Summer	1.567	0.0	1027.8	4904	
7200 min Summer	1.306	0.0	1007.0	5616	
8640 min Summer	1.124	0.0	979.5	6312	
10080 min Summer	0.991	0.0	947.5	7064	
15 min Winter	137.396	0.0	129.6	23	
30 min Winter	90.218	0.0	129.6	38	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Bund Calcs W/ No Outfall, HorseClose			
Date 09/09/2024 10:37 File Bund Outfall 1 in 100.SRCX		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	92.447	0.447	1.5	474.1	O K
120 min Winter	92.475	0.475	1.5	568.8	O K
180 min Winter	92.490	0.490	1.5	622.6	O K
240 min Winter	92.499	0.499	1.5	658.7	O K
360 min Winter	92.512	0.512	1.5	709.0	O K
480 min Winter	92.521	0.521	1.5	744.8	O K
600 min Winter	92.527	0.527	1.5	771.5	O K
720 min Winter	92.533	0.533	1.5	792.4	O K
960 min Winter	92.540	0.540	1.5	822.6	O K
1440 min Winter	92.549	0.549	1.5	856.7	O K
2160 min Winter	92.553	0.553	1.5	874.9	O K
2880 min Winter	92.553	0.553	1.5	873.3	O K
4320 min Winter	92.545	0.545	1.5	841.0	O K
5760 min Winter	92.532	0.532	1.5	790.5	O K
7200 min Winter	92.521	0.521	1.5	744.5	O K
8640 min Winter	92.512	0.512	1.5	709.0	O K
10080 min Winter	92.503	0.503	1.5	673.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	56.422	0.0	259.2	68	
120 min Winter	34.083	0.0	259.2	126	
180 min Winter	25.037	0.0	259.1	186	
240 min Winter	19.995	0.0	259.1	244	
360 min Winter	14.522	0.0	259.0	362	
480 min Winter	11.573	0.0	258.9	482	
600 min Winter	9.697	0.0	258.8	600	
720 min Winter	8.389	0.0	258.7	718	
960 min Winter	6.669	0.0	258.4	954	
1440 min Winter	4.819	0.0	257.9	1420	
2160 min Winter	3.477	0.0	516.1	2120	
2880 min Winter	2.755	0.0	514.6	2800	
4320 min Winter	1.982	0.0	510.4	4144	
5760 min Winter	1.567	0.0	1022.5	5360	
7200 min Winter	1.306	0.0	1007.2	5760	
8640 min Winter	1.124	0.0	982.4	6648	
10080 min Winter	0.991	0.0	954.5	7560	
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Bund Calcs W/ No Outfall, HorseClose

Designed by JHC

Checked by JHC



Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.851

Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)
0 4	0.425	4 8	0.426

Time Area Diagram

Total Area (ha) 0.000

Time	(mins)	Area
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY																																																																																						
Bund Calcs W/ No Outfall, HorseClose																																																																																						
Date 09/09/2024 10:37 File Bund Outfall 1 in 100.SRCX																																																																																						
Designed by JHC Checked by JHC																																																																																						
Innovyze Source Control 2020.1.3																																																																																						
Model Details Storage is Online Cover Level (m) 93.500 Tank or Pond Structure Invert Level (m) 92.000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>0.0</td><td>0.500</td><td>3975.0</td><td>1.500</td><td>3975.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 90.500 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>1.5000</td><td>0.900</td><td>1.5000</td><td>1.700</td><td>1.5000</td><td>2.500</td><td>1.5000</td></tr><tr><td>0.200</td><td>1.5000</td><td>1.000</td><td>1.5000</td><td>1.800</td><td>1.5000</td><td>2.600</td><td>1.5000</td></tr><tr><td>0.300</td><td>1.5000</td><td>1.100</td><td>1.5000</td><td>1.900</td><td>1.5000</td><td>2.700</td><td>1.5000</td></tr><tr><td>0.400</td><td>1.5000</td><td>1.200</td><td>1.5000</td><td>2.000</td><td>1.5000</td><td>2.800</td><td>1.5000</td></tr><tr><td>0.500</td><td>1.5000</td><td>1.300</td><td>1.5000</td><td>2.100</td><td>1.5000</td><td>2.900</td><td>1.5000</td></tr><tr><td>0.600</td><td>1.5000</td><td>1.400</td><td>1.5000</td><td>2.200</td><td>1.5000</td><td>3.000</td><td>1.5000</td></tr><tr><td>0.700</td><td>1.5000</td><td>1.500</td><td>1.5000</td><td>2.300</td><td>1.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>1.5000</td><td>1.600</td><td>1.5000</td><td>2.400</td><td>1.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	0.0	0.500	3975.0	1.500	3975.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.5000	0.900	1.5000	1.700	1.5000	2.500	1.5000	0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000	0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000	0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000	0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000	0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000	0.700	1.5000	1.500	1.5000	2.300	1.5000			0.800	1.5000	1.600	1.5000	2.400	1.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	0.0	0.500	3975.0	1.500	3975.0																																																																																	
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0.100	1.5000	0.900	1.5000	1.700	1.5000	2.500	1.5000																																																																															
0.200	1.5000	1.000	1.5000	1.800	1.5000	2.600	1.5000																																																																															
0.300	1.5000	1.100	1.5000	1.900	1.5000	2.700	1.5000																																																																															
0.400	1.5000	1.200	1.5000	2.000	1.5000	2.800	1.5000																																																																															
0.500	1.5000	1.300	1.5000	2.100	1.5000	2.900	1.5000																																																																															
0.600	1.5000	1.400	1.5000	2.200	1.5000	3.000	1.5000																																																																															
0.700	1.5000	1.500	1.5000	2.300	1.5000																																																																																	
0.800	1.5000	1.600	1.5000	2.400	1.5000																																																																																	
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APPENDIX VI

Rainwater Attenuation Storage Calculations

GGP Consult					Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:30 File Attenuation Tank 1 in 1...			Designed by JHC Checked by JHC			
Innovyze			Source Control 2020.1.3			
<u>Summary of Results for 1 year Return Period (+40%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	15 min Summer	89.376	0.136	7.5	96.9	O K
	30 min Summer	89.414	0.174	7.5	123.5	O K
	60 min Summer	89.450	0.210	7.5	149.0	O K
	120 min Summer	89.478	0.238	7.5	168.7	O K
	180 min Summer	89.486	0.246	7.5	174.6	O K
	240 min Summer	89.488	0.248	7.5	176.2	O K
	360 min Summer	89.486	0.246	7.5	174.5	O K
	480 min Summer	89.479	0.239	7.5	169.9	O K
	600 min Summer	89.472	0.232	7.5	164.4	O K
	720 min Summer	89.463	0.223	7.5	158.6	O K
	960 min Summer	89.447	0.207	7.5	147.2	O K
	1440 min Summer	89.416	0.176	7.5	125.0	O K
	2160 min Summer	89.374	0.134	7.5	95.4	O K
	2880 min Summer	89.340	0.100	7.5	71.3	O K
	4320 min Summer	89.300	0.060	7.5	42.5	O K
	5760 min Summer	89.285	0.045	6.4	31.7	O K
	7200 min Summer	89.274	0.034	5.5	24.1	O K
	8640 min Summer	89.266	0.026	5.0	18.6	O K
	10080 min Summer	89.260	0.020	4.5	14.3	O K
	15 min Winter	89.377	0.137	7.5	97.0	O K
	30 min Winter	89.414	0.174	7.5	123.7	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	15 min Summer	43.161	0.0	104.3	22	
	30 min Summer	28.145	0.0	136.2	36	
	60 min Summer	17.819	0.0	172.4	64	
	120 min Summer	11.055	0.0	214.0	122	
	180 min Summer	8.322	0.0	241.6	178	
	240 min Summer	6.795	0.0	263.3	206	
	360 min Summer	5.077	0.0	295.1	270	
	480 min Summer	4.115	0.0	319.0	338	
	600 min Summer	3.497	0.0	338.8	408	
	720 min Summer	3.061	0.0	355.8	476	
	960 min Summer	2.481	0.0	384.6	612	
	1440 min Summer	1.846	0.0	429.3	878	
	2160 min Summer	1.375	0.0	479.9	1256	
	2880 min Summer	1.114	0.0	518.4	1612	
	4320 min Summer	0.829	0.0	578.4	2252	
	5760 min Summer	0.672	0.0	625.2	2992	
	7200 min Summer	0.571	0.0	664.7	3680	
	8640 min Summer	0.500	0.0	698.6	4416	
	10080 min Summer	0.448	0.0	728.9	5144	
	15 min Winter	43.161	0.0	104.3	21	
	30 min Winter	28.145	0.0	136.2	35	
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GGP Consult				Page 2	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:30 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 1 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.450	0.210	7.5	149.4	O K
120 min Winter	89.479	0.239	7.5	169.5	O K
180 min Winter	89.488	0.248	7.5	175.8	O K
240 min Winter	89.489	0.249	7.5	176.5	O K
360 min Winter	89.483	0.243	7.5	172.5	O K
480 min Winter	89.473	0.233	7.5	165.2	O K
600 min Winter	89.461	0.221	7.5	156.6	O K
720 min Winter	89.448	0.208	7.5	147.3	O K
960 min Winter	89.421	0.181	7.5	128.7	O K
1440 min Winter	89.374	0.134	7.5	94.9	O K
2160 min Winter	89.319	0.079	7.5	55.8	O K
2880 min Winter	89.293	0.053	7.0	37.8	O K
4320 min Winter	89.272	0.032	5.4	22.7	O K
5760 min Winter	89.259	0.019	4.4	13.7	O K
7200 min Winter	89.251	0.011	3.8	7.8	O K
8640 min Winter	89.245	0.005	3.4	3.4	O K
10080 min Winter	89.241	0.001	3.1	0.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	17.819	0.0	172.5	64	
120 min Winter	11.055	0.0	214.0	120	
180 min Winter	8.322	0.0	241.8	174	
240 min Winter	6.795	0.0	263.2	226	
360 min Winter	5.077	0.0	294.9	282	
480 min Winter	4.115	0.0	318.9	358	
600 min Winter	3.497	0.0	338.9	434	
720 min Winter	3.061	0.0	356.1	508	
960 min Winter	2.481	0.0	384.6	650	
1440 min Winter	1.846	0.0	429.3	914	
2160 min Winter	1.375	0.0	479.7	1256	
2880 min Winter	1.114	0.0	518.3	1564	
4320 min Winter	0.829	0.0	578.4	2292	
5760 min Winter	0.672	0.0	625.2	3008	
7200 min Winter	0.571	0.0	664.5	3744	
8640 min Winter	0.500	0.0	698.6	4488	
10080 min Winter	0.448	0.0	729.2	5144	
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GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:30 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose																																																																																				
Date 09/09/2024 11:30 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC																																																																																				
Innovyze		Source Control 2020.1.3																																																																																				
Model Details Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 89.200 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	710.0	1.050	710.0	1.051	1.0																																																																																	
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0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000																																																																															
0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000																																																																															
0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
0.700	7.5000	1.500	7.5000	2.300	7.5000																																																																																	
0.800	7.5000	1.600	7.5000	2.400	7.5000																																																																																	
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GGP Consult				Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:28 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 2 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.419	0.179	7.5	127.3	O K
30 min Summer	89.468	0.228	7.5	161.9	O K
60 min Summer	89.513	0.273	7.5	194.0	O K
120 min Summer	89.550	0.310	7.5	220.0	O K
180 min Summer	89.563	0.323	7.5	229.1	O K
240 min Summer	89.565	0.325	7.5	231.1	O K
360 min Summer	89.562	0.322	7.5	228.6	O K
480 min Summer	89.555	0.315	7.5	223.7	O K
600 min Summer	89.547	0.307	7.5	217.8	O K
720 min Summer	89.538	0.298	7.5	211.5	O K
960 min Summer	89.519	0.279	7.5	198.4	O K
1440 min Summer	89.484	0.244	7.5	173.1	O K
2160 min Summer	89.434	0.194	7.5	138.1	O K
2880 min Summer	89.392	0.152	7.5	107.6	O K
4320 min Summer	89.330	0.090	7.5	63.6	O K
5760 min Summer	89.298	0.058	7.4	41.4	O K
7200 min Summer	89.286	0.046	6.4	32.3	O K
8640 min Summer	89.276	0.036	5.7	25.8	O K
10080 min Summer	89.269	0.029	5.2	20.7	O K
15 min Winter	89.419	0.179	7.5	127.3	O K
30 min Winter	89.468	0.228	7.5	162.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	55.792	0.0	135.0	22	
30 min Summer	36.159	0.0	174.9	36	
60 min Summer	22.561	0.0	218.2	66	
120 min Summer	13.782	0.0	267.1	124	
180 min Summer	10.275	0.0	298.5	182	
240 min Summer	8.330	0.0	322.8	238	
360 min Summer	6.177	0.0	359.3	294	
480 min Summer	4.987	0.0	386.7	358	
600 min Summer	4.224	0.0	409.2	424	
720 min Summer	3.687	0.0	429.0	492	
960 min Summer	2.975	0.0	461.2	630	
1440 min Summer	2.199	0.0	511.4	898	
2160 min Summer	1.625	0.0	567.3	1284	
2880 min Summer	1.311	0.0	609.9	1648	
4320 min Summer	0.968	0.0	675.8	2336	
5760 min Summer	0.781	0.0	726.8	2992	
7200 min Summer	0.661	0.0	769.4	3680	
8640 min Summer	0.577	0.0	806.0	4416	
10080 min Summer	0.515	0.0	838.3	5144	
15 min Winter	55.792	0.0	135.0	22	
30 min Winter	36.159	0.0	174.9	36	
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GGP Consult					Page 2
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:28 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 2 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.514	0.274	7.5	194.6	O K
120 min Winter	89.551	0.311	7.5	220.9	O K
180 min Winter	89.565	0.325	7.5	230.5	O K
240 min Winter	89.568	0.328	7.5	232.9	O K
360 min Winter	89.561	0.321	7.5	227.8	O K
480 min Winter	89.551	0.311	7.5	221.0	O K
600 min Winter	89.539	0.299	7.5	212.3	O K
720 min Winter	89.525	0.285	7.5	202.7	O K
960 min Winter	89.497	0.257	7.5	182.4	O K
1440 min Winter	89.441	0.201	7.5	143.0	O K
2160 min Winter	89.370	0.130	7.5	92.4	O K
2880 min Winter	89.318	0.078	7.5	55.7	O K
4320 min Winter	89.284	0.044	6.3	31.3	O K
5760 min Winter	89.269	0.029	5.2	20.6	O K
7200 min Winter	89.259	0.019	4.4	13.4	O K
8640 min Winter	89.252	0.012	3.9	8.2	O K
10080 min Winter	89.246	0.006	3.5	4.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	22.561	0.0	218.3	64	
120 min Winter	13.782	0.0	267.1	120	
180 min Winter	10.275	0.0	298.5	178	
240 min Winter	8.330	0.0	322.9	232	
360 min Winter	6.177	0.0	359.0	302	
480 min Winter	4.987	0.0	386.8	372	
600 min Winter	4.224	0.0	409.4	450	
720 min Winter	3.687	0.0	429.0	526	
960 min Winter	2.975	0.0	461.4	674	
1440 min Winter	2.199	0.0	511.4	952	
2160 min Winter	1.625	0.0	567.1	1324	
2880 min Winter	1.311	0.0	609.9	1644	
4320 min Winter	0.968	0.0	675.7	2292	
5760 min Winter	0.781	0.0	726.9	3008	
7200 min Winter	0.661	0.0	769.3	3744	
8640 min Winter	0.577	0.0	805.9	4416	
10080 min Winter	0.515	0.0	838.3	5152	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:28 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose																																																																																				
Date 09/09/2024 11:28 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC																																																																																				
Innovyze		Source Control 2020.1.3																																																																																				
Model Details Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 89.200 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
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0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Lagoon Clean W/ No Bund HorseClose		
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...			Designed by JHC Checked by JHC		
Innovyze			Source Control 2020.1.3		
Summary of Results for 10 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.513	0.273	7.5	194.1	O K
30 min Summer	89.588	0.348	7.5	247.4	O K
60 min Summer	89.660	0.420	7.5	298.5	O K
120 min Summer	89.722	0.482	7.5	342.2	O K
180 min Summer	89.748	0.508	7.5	360.9	O K
240 min Summer	89.760	0.520	7.5	369.0	O K
360 min Summer	89.761	0.521	7.5	370.1	O K
480 min Summer	89.752	0.512	7.5	363.7	O K
600 min Summer	89.742	0.502	7.5	356.6	O K
720 min Summer	89.732	0.492	7.5	349.0	O K
960 min Summer	89.710	0.470	7.5	333.6	O K
1440 min Summer	89.666	0.426	7.5	302.8	O K
2160 min Summer	89.605	0.365	7.5	259.0	O K
2880 min Summer	89.548	0.308	7.5	218.4	O K
4320 min Summer	89.450	0.210	7.5	149.0	O K
5760 min Summer	89.377	0.137	7.5	97.2	O K
7200 min Summer	89.328	0.088	7.5	62.5	O K
8640 min Summer	89.301	0.061	7.5	43.3	O K
10080 min Summer	89.291	0.051	6.8	36.2	O K
15 min Winter	89.514	0.274	7.5	194.2	O K
30 min Winter	89.589	0.349	7.5	247.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	83.483	0.0	202.2	22	
30 min Summer	53.929	0.0	261.2	37	
60 min Summer	33.434	0.0	324.1	66	
120 min Summer	20.211	0.0	391.7	124	
180 min Summer	14.938	0.0	434.2	184	
240 min Summer	12.020	0.0	466.0	242	
360 min Summer	8.831	0.0	513.7	360	
480 min Summer	7.092	0.0	549.8	418	
600 min Summer	5.979	0.0	579.6	480	
720 min Summer	5.200	0.0	604.7	542	
960 min Summer	4.170	0.0	646.8	674	
1440 min Summer	3.052	0.0	710.3	944	
2160 min Summer	2.233	0.0	779.8	1348	
2880 min Summer	1.788	0.0	832.3	1736	
4320 min Summer	1.307	0.0	912.4	2468	
5760 min Summer	1.046	0.0	973.6	3168	
7200 min Summer	0.880	0.0	1023.8	3816	
8640 min Summer	0.764	0.0	1066.4	4416	
10080 min Summer	0.678	0.0	1103.9	5144	
15 min Winter	83.483	0.0	202.0	22	
30 min Winter	53.929	0.0	261.2	36	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 10 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.661	0.421	7.5	298.8	O K
120 min Winter	89.724	0.484	7.5	343.4	O K
180 min Winter	89.751	0.511	7.5	362.7	O K
240 min Winter	89.763	0.523	7.5	371.3	O K
360 min Winter	89.766	0.526	7.5	373.6	O K
480 min Winter	89.756	0.516	7.5	366.3	O K
600 min Winter	89.741	0.501	7.5	355.7	O K
720 min Winter	89.727	0.487	7.5	346.1	O K
960 min Winter	89.697	0.457	7.5	324.6	O K
1440 min Winter	89.632	0.392	7.5	278.6	O K
2160 min Winter	89.539	0.299	7.5	212.5	O K
2880 min Winter	89.457	0.217	7.5	153.9	O K
4320 min Winter	89.335	0.095	7.5	67.5	O K
5760 min Winter	89.292	0.052	6.9	37.1	O K
7200 min Winter	89.278	0.038	5.9	27.2	O K
8640 min Winter	89.268	0.028	5.1	20.2	O K
10080 min Winter	89.261	0.021	4.6	14.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	33.434	0.0	324.1	64	
120 min Winter	20.211	0.0	391.6	122	
180 min Winter	14.938	0.0	434.4	180	
240 min Winter	12.020	0.0	466.2	236	
360 min Winter	8.831	0.0	513.6	348	
480 min Winter	7.092	0.0	549.9	452	
600 min Winter	5.979	0.0	579.6	490	
720 min Winter	5.200	0.0	604.9	562	
960 min Winter	4.170	0.0	646.6	716	
1440 min Winter	3.052	0.0	710.4	1012	
2160 min Winter	2.233	0.0	779.2	1428	
2880 min Winter	1.788	0.0	832.2	1816	
4320 min Winter	1.307	0.0	912.4	2464	
5760 min Winter	1.046	0.0	973.5	3008	
7200 min Winter	0.880	0.0	1023.6	3744	
8640 min Winter	0.764	0.0	1066.3	4488	
10080 min Winter	0.678	0.0	1103.8	5152	
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Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose																																																																																				
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Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
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0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 30 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.590	0.350	7.5	248.3	O K
30 min Summer	89.691	0.451	7.5	319.9	O K
60 min Summer	89.789	0.549	7.5	389.7	O K
120 min Summer	89.876	0.636	7.5	451.7	O K
180 min Summer	89.916	0.676	7.5	480.2	O K
240 min Summer	89.936	0.696	7.5	494.2	O K
360 min Summer	89.948	0.708	7.5	502.9	O K
480 min Summer	89.943	0.703	7.5	499.0	O K
600 min Summer	89.930	0.690	7.5	489.6	O K
720 min Summer	89.916	0.676	7.5	480.2	O K
960 min Summer	89.890	0.650	7.5	461.5	O K
1440 min Summer	89.840	0.600	7.5	426.1	O K
2160 min Summer	89.769	0.529	7.5	375.8	O K
2880 min Summer	89.703	0.463	7.5	328.8	O K
4320 min Summer	89.584	0.344	7.5	244.4	O K
5760 min Summer	89.486	0.246	7.5	174.6	O K
7200 min Summer	89.410	0.170	7.5	120.4	O K
8640 min Summer	89.353	0.113	7.5	80.6	O K
10080 min Summer	89.317	0.077	7.5	54.8	O K
15 min Winter	89.590	0.350	7.5	248.3	O K
30 min Winter	89.691	0.451	7.5	320.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	105.885	0.0	256.4	22	
30 min Summer	68.936	0.0	334.0	37	
60 min Summer	42.916	0.0	415.9	66	
120 min Summer	25.934	0.0	502.7	126	
180 min Summer	19.112	0.0	555.7	184	
240 min Summer	15.324	0.0	594.0	244	
360 min Summer	11.197	0.0	651.4	362	
480 min Summer	8.958	0.0	694.8	480	
600 min Summer	7.531	0.0	730.0	546	
720 min Summer	6.533	0.0	760.0	600	
960 min Summer	5.217	0.0	809.3	722	
1440 min Summer	3.796	0.0	883.2	986	
2160 min Summer	2.758	0.0	962.5	1388	
2880 min Summer	2.198	0.0	1022.7	1792	
4320 min Summer	1.594	0.0	1112.9	2556	
5760 min Summer	1.268	0.0	1180.7	3288	
7200 min Summer	1.062	0.0	1235.9	3960	
8640 min Summer	0.918	0.0	1282.4	4592	
10080 min Summer	0.812	0.0	1323.2	5248	
15 min Winter	105.885	0.0	256.4	22	
30 min Winter	68.936	0.0	334.0	36	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Summary of Results for 30 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.789	0.549	7.5	390.1	O K
120 min Winter	89.878	0.638	7.5	453.1	O K
180 min Winter	89.919	0.679	7.5	482.2	O K
240 min Winter	89.940	0.700	7.5	496.7	O K
360 min Winter	89.954	0.714	7.5	506.7	O K
480 min Winter	89.950	0.710	7.5	504.1	O K
600 min Winter	89.937	0.697	7.5	494.9	O K
720 min Winter	89.919	0.679	7.5	481.9	O K
960 min Winter	89.885	0.645	7.5	458.3	O K
1440 min Winter	89.816	0.576	7.5	409.2	O K
2160 min Winter	89.712	0.472	7.5	334.9	O K
2880 min Winter	89.614	0.374	7.5	265.5	O K
4320 min Winter	89.449	0.209	7.5	148.6	O K
5760 min Winter	89.336	0.096	7.5	68.2	O K
7200 min Winter	89.295	0.055	7.1	38.8	O K
8640 min Winter	89.282	0.042	6.2	29.9	O K
10080 min Winter	89.273	0.033	5.5	23.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	42.916	0.0	415.8	66	
120 min Winter	25.934	0.0	502.6	122	
180 min Winter	19.112	0.0	555.8	180	
240 min Winter	15.324	0.0	594.1	238	
360 min Winter	11.197	0.0	651.4	352	
480 min Winter	8.958	0.0	694.8	464	
600 min Winter	7.531	0.0	730.1	570	
720 min Winter	6.533	0.0	760.0	664	
960 min Winter	5.217	0.0	809.5	750	
1440 min Winter	3.796	0.0	883.2	1054	
2160 min Winter	2.758	0.0	962.6	1492	
2880 min Winter	2.198	0.0	1022.5	1904	
4320 min Winter	1.594	0.0	1113.0	2636	
5760 min Winter	1.268	0.0	1180.8	3232	
7200 min Winter	1.062	0.0	1236.0	3744	
8640 min Winter	0.918	0.0	1282.4	4488	
10080 min Winter	0.812	0.0	1323.2	5240	
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GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose																																																																																				
Date 09/09/2024 11:26 File Attenuation Tank 1 in 1...		Designed by JHC Checked by JHC																																																																																				
Innovyze		Source Control 2020.1.3																																																																																				
Model Details Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 89.200 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	710.0	1.050	710.0	1.051	1.0																																																																																	
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																															
0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000																																																																															
0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000																																																																															
0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
0.700	7.5000	1.500	7.5000	2.300	7.5000																																																																																	
0.800	7.5000	1.600	7.5000	2.400	7.5000																																																																																	
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GGP Consult					Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:24 File Attenuation Tank 1 in 1...			Designed by JHC Checked by JHC			
Innovyze			Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+40%)						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer		89.697	0.457	7.5	324.4	O K
30 min Summer		89.835	0.595	7.5	422.8	O K
60 min Summer		89.972	0.732	7.5	520.0	O K
120 min Summer		90.097	0.857	7.5	608.8	O K
180 min Summer		90.157	0.917	7.5	650.7	O K
240 min Summer		90.188	0.948	7.5	672.8	O K
360 min Summer		90.215	0.975	7.5	692.2	O K
480 min Summer		90.220	0.980	7.5	695.7	O K
600 min Summer		90.211	0.971	7.5	689.5	O K
720 min Summer		90.194	0.954	7.5	677.6	O K
960 min Summer		90.159	0.919	7.5	652.3	O K
1440 min Summer		90.095	0.855	7.5	607.3	O K
2160 min Summer		90.012	0.772	7.5	547.9	O K
2880 min Summer		89.934	0.694	7.5	493.0	O K
4320 min Summer		89.793	0.553	7.5	392.6	O K
5760 min Summer		89.669	0.429	7.5	304.5	O K
7200 min Summer		89.563	0.323	7.5	229.5	O K
8640 min Summer		89.477	0.237	7.5	167.9	O K
10080 min Summer		89.409	0.169	7.5	119.6	O K
15 min Winter		89.697	0.457	7.5	324.5	O K
30 min Winter		89.836	0.596	7.5	423.0	O K
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer		137.396	0.0	332.8	23	
30 min Summer		90.218	0.0	437.3	37	
60 min Summer		56.422	0.0	546.9	66	
120 min Summer		34.083	0.0	660.7	126	
180 min Summer		25.037	0.0	728.2	186	
240 min Summer		19.995	0.0	775.3	244	
360 min Summer		14.522	0.0	844.7	364	
480 min Summer		11.573	0.0	897.7	482	
600 min Summer		9.697	0.0	940.4	600	
720 min Summer		8.389	0.0	976.0	704	
960 min Summer		6.669	0.0	1034.7	808	
1440 min Summer		4.819	0.0	1121.6	1052	
2160 min Summer		3.477	0.0	1213.3	1452	
2880 min Summer		2.755	0.0	1282.1	1852	
4320 min Summer		1.982	0.0	1383.5	2640	
5760 min Summer		1.567	0.0	1458.8	3400	
7200 min Summer		1.306	0.0	1519.5	4112	
8640 min Summer		1.124	0.0	1569.9	4840	
10080 min Summer		0.991	0.0	1613.8	5448	
15 min Winter		137.396	0.0	332.8	22	
30 min Winter		90.218	0.0	437.2	37	
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GGP Consult					Page 2
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Lagoon Clean W/ No Bund HorseClose		
Date 09/09/2024 11:24 File Attenuation Tank 1 in 1...			Designed by JHC Checked by JHC		
Innovyze			Source Control 2020.1.3		
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.973	0.733	7.5	520.4	O K
120 min Winter	90.099	0.859	7.5	610.0	O K
180 min Winter	90.159	0.919	7.5	652.8	O K
240 min Winter	90.191	0.951	7.5	675.5	O K
360 min Winter	90.220	0.980	7.5	696.1	O K
480 min Winter	90.227	0.987	7.5	700.9	O K
600 min Winter	90.221	0.981	7.5	696.3	O K
720 min Winter	90.206	0.966	7.5	686.0	O K
960 min Winter	90.165	0.925	7.5	656.4	O K
1440 min Winter	90.085	0.845	7.5	600.3	O K
2160 min Winter	89.969	0.729	7.5	517.8	O K
2880 min Winter	89.857	0.617	7.5	438.0	O K
4320 min Winter	89.654	0.414	7.5	293.8	O K
5760 min Winter	89.488	0.248	7.5	175.8	O K
7200 min Winter	89.366	0.126	7.5	89.4	O K
8640 min Winter	89.301	0.061	7.5	43.4	O K
10080 min Winter	89.289	0.049	6.7	34.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	56.422	0.0	546.8	66	
120 min Winter	34.083	0.0	660.9	124	
180 min Winter	25.037	0.0	728.3	182	
240 min Winter	19.995	0.0	775.3	240	
360 min Winter	14.522	0.0	844.8	356	
480 min Winter	11.573	0.0	897.7	470	
600 min Winter	9.697	0.0	940.3	582	
720 min Winter	8.389	0.0	976.0	690	
960 min Winter	6.669	0.0	1034.7	890	
1440 min Winter	4.819	0.0	1121.4	1100	
2160 min Winter	3.477	0.0	1213.7	1556	
2880 min Winter	2.755	0.0	1282.1	1988	
4320 min Winter	1.982	0.0	1383.7	2772	
5760 min Winter	1.567	0.0	1458.9	3512	
7200 min Winter	1.306	0.0	1519.5	4104	
8640 min Winter	1.124	0.0	1570.0	4496	
10080 min Winter	0.991	0.0	1613.9	5184	
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GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:24 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose																																																																																					
Date 09/09/2024 11:24 File Attenuation Tank 1 in 1...	Designed by JHC Checked by JHC																																																																																					
InnovyzeSource Control 2020.1.3																																																																																						
Model Details Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></table> Pump Outflow Control Invert Level (m) 89.200 <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	710.0	1.050	710.0	1.051	1.0																																																																																	
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0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000																																																																															
0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000																																																																															
0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
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0.800	7.5000	1.600	7.5000	2.400	7.5000																																																																																	
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APPENDIX VII

Rainwater Attenuation Cascade Calculations

GGP Consult					Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:36 File			Designed by JHC Checked by JHC			
Innovyze			Source Control 2020.1.3			
<u>Cascade Summary of Results for Attenuation Tank 1 in 1.SRCX</u>						
Upstream Structures			Outflow To Overflow To			
Bund Outfall 1 in 1.SRCX			(None)		(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	89.379	0.139	7.5	98.8	O K	
30 min Summer	89.418	0.178	7.5	126.6	O K	
60 min Summer	89.457	0.217	7.5	154.4	O K	
120 min Summer	89.492	0.252	7.5	178.8	O K	
180 min Summer	89.507	0.267	7.5	189.3	O K	
240 min Summer	89.513	0.273	7.5	193.6	O K	
360 min Summer	89.514	0.274	7.5	194.8	O K	
480 min Summer	89.512	0.272	7.5	192.9	O K	
600 min Summer	89.507	0.267	7.5	189.9	O K	
720 min Summer	89.502	0.262	7.5	186.1	O K	
960 min Summer	89.490	0.250	7.5	177.5	O K	
1440 min Summer	89.464	0.224	7.5	159.0	O K	
2160 min Summer	89.426	0.186	7.5	132.3	O K	
2880 min Summer	89.392	0.152	7.5	107.9	O K	
4320 min Summer	89.339	0.099	7.5	70.2	O K	
5760 min Summer	89.307	0.067	7.5	47.4	O K	
7200 min Summer	89.294	0.054	7.0	38.2	O K	
8640 min Summer	89.286	0.046	6.5	32.7	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	43.161	0.0	196.1	22		
30 min Summer	28.145	0.0	255.8	36		
60 min Summer	17.819	0.0	323.8	66		
120 min Summer	11.055	0.0	402.5	124		
180 min Summer	8.322	0.0	454.5	182		
240 min Summer	6.795	0.0	495.0	240		
360 min Summer	5.077	0.0	554.2	298		
480 min Summer	4.115	0.0	578.1	362		
600 min Summer	3.497	0.0	597.9	428		
720 min Summer	3.061	0.0	615.0	496		
960 min Summer	2.481	0.0	643.7	636		
1440 min Summer	1.846	0.0	688.1	908		
2160 min Summer	1.375	0.0	901.2	1300		
2880 min Summer	1.114	0.0	973.5	1672		
4320 min Summer	0.829	0.0	1044.7	2376		
5760 min Summer	0.672	0.0	1174.2	3008		
7200 min Summer	0.571	0.0	1248.0	3680		
8640 min Summer	0.500	0.0	1311.5	4416		
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GGP Consult				Page 2		
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose				
Date 09/09/2024 11:36 File		Designed by JHC Checked by JHC				
Innovyze		Source Control 2020.1.3				
<u>Cascade Summary of Results for Attenuation Tank 1 in 1.SRCX</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	10080 min Summer	89.280	0.040	6.0	28.4	O K
	15 min Winter	89.379	0.139	7.5	98.8	O K
	30 min Winter	89.418	0.178	7.5	126.7	O K
	60 min Winter	89.458	0.218	7.5	154.7	O K
	120 min Winter	89.493	0.253	7.5	179.4	O K
	180 min Winter	89.508	0.268	7.5	190.0	O K
	240 min Winter	89.514	0.274	7.5	194.7	O K
	360 min Winter	89.513	0.273	7.5	194.0	O K
	480 min Winter	89.508	0.268	7.5	190.6	O K
	600 min Winter	89.501	0.261	7.5	185.4	O K
	720 min Winter	89.492	0.252	7.5	179.1	O K
	960 min Winter	89.472	0.232	7.5	164.9	O K
	1440 min Winter	89.431	0.191	7.5	135.3	O K
	2160 min Winter	89.374	0.134	7.5	95.0	O K
	2880 min Winter	89.329	0.089	7.5	63.2	O K
	4320 min Winter	89.292	0.052	6.9	36.9	O K
	5760 min Winter	89.279	0.039	5.9	27.9	O K
	7200 min Winter	89.271	0.031	5.3	21.9	O K
	8640 min Winter	89.265	0.025	4.9	17.6	O K
	10080 min Winter	89.260	0.020	4.5	14.3	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	10080 min Summer	0.448	0.0	1368.4	5144	
	15 min Winter	43.161	0.0	196.1	22	
	30 min Winter	28.145	0.0	256.0	36	
	60 min Winter	17.819	0.0	324.0	64	
	120 min Winter	11.055	0.0	402.3	120	
	180 min Winter	8.322	0.0	454.4	178	
	240 min Winter	6.795	0.0	495.1	232	
	360 min Winter	5.077	0.0	554.3	330	
	480 min Winter	4.115	0.0	577.5	376	
	600 min Winter	3.497	0.0	597.1	452	
	720 min Winter	3.061	0.0	614.2	530	
	960 min Winter	2.481	0.0	642.4	678	
	1440 min Winter	1.846	0.0	685.5	958	
	2160 min Winter	1.375	0.0	900.9	1344	
	2880 min Winter	1.114	0.0	973.5	1676	
	4320 min Winter	0.829	0.0	1050.1	2296	
	5760 min Winter	0.672	0.0	1174.5	3008	
	7200 min Winter	0.571	0.0	1248.1	3744	
	8640 min Winter	0.500	0.0	1311.8	4488	
	10080 min Winter	0.448	0.0	1368.8	5152	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:36 File	Designed by JHC Checked by JHC	
Innovyze		Source Control 2020.1.3

Cascade Rainfall Details for Attenuation Tank 1 in 1.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose																																																																																					
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InnovyzeSource Control 2020.1.3																																																																																						
Cascade Model Details for Attenuation Tank 1 in 1.SRCX Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></tbody></table> Pump Outflow Control Invert Level (m) 89.200 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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GGP Consult				Page 1	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:35 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Attenuation Tank 1 in 30.SRCX</u>					
Upstream Structures		Outflow To		Overflow To	
Bund Outfall 1 in 30.SRCX		(None)		(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.592	0.352	7.5	250.2	O K
30 min Summer	89.695	0.455	7.5	323.2	O K
60 min Summer	89.797	0.557	7.5	395.5	O K
120 min Summer	89.892	0.652	7.5	462.8	O K
180 min Summer	89.939	0.699	7.5	496.1	O K
240 min Summer	89.965	0.725	7.5	515.0	O K
360 min Summer	89.991	0.751	7.5	533.2	O K
480 min Summer	89.998	0.758	7.5	538.3	O K
600 min Summer	89.994	0.754	7.5	535.6	O K
720 min Summer	89.984	0.744	7.5	528.4	O K
960 min Summer	89.962	0.722	7.5	512.9	O K
1440 min Summer	89.920	0.680	7.5	483.1	O K
2160 min Summer	89.861	0.621	7.5	441.1	O K
2880 min Summer	89.805	0.565	7.5	401.0	O K
4320 min Summer	89.699	0.459	7.5	326.0	O K
5760 min Summer	89.605	0.365	7.5	259.1	O K
7200 min Summer	89.523	0.283	7.5	201.0	O K
8640 min Summer	89.455	0.215	7.5	152.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	105.885	0.0	386.0	23	
30 min Summer	68.936	0.0	463.6	37	
60 min Summer	42.916	0.0	675.2	66	
120 min Summer	25.934	0.0	762.0	126	
180 min Summer	19.112	0.0	814.8	186	
240 min Summer	15.324	0.0	853.3	244	
360 min Summer	11.197	0.0	910.4	364	
480 min Summer	8.958	0.0	954.0	482	
600 min Summer	7.531	0.0	989.4	600	
720 min Summer	6.533	0.0	1019.2	692	
960 min Summer	5.217	0.0	1068.4	800	
1440 min Summer	3.796	0.0	1142.3	1044	
2160 min Summer	2.758	0.0	1481.2	1452	
2880 min Summer	2.198	0.0	1541.2	1848	
4320 min Summer	1.594	0.0	1625.4	2640	
5760 min Summer	1.268	0.0	2191.1	3408	
7200 min Summer	1.062	0.0	2217.7	4112	
8640 min Summer	0.918	0.0	2231.3	4840	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:35 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Attenuation Tank 1 in 30.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	89.400	0.160	7.5	113.4	O K
15 min Winter	89.592	0.352	7.5	250.2	O K
30 min Winter	89.695	0.455	7.5	323.3	O K
60 min Winter	89.797	0.557	7.5	395.7	O K
120 min Winter	89.893	0.653	7.5	463.7	O K
180 min Winter	89.941	0.701	7.5	497.6	O K
240 min Winter	89.968	0.728	7.5	517.0	O K
360 min Winter	89.995	0.755	7.5	536.1	O K
480 min Winter	90.004	0.764	7.5	542.1	O K
600 min Winter	90.002	0.762	7.5	540.7	O K
720 min Winter	89.993	0.753	7.5	534.6	O K
960 min Winter	89.965	0.725	7.5	514.8	O K
1440 min Winter	89.911	0.671	7.5	476.6	O K
2160 min Winter	89.827	0.587	7.5	416.5	O K
2880 min Winter	89.743	0.503	7.5	356.8	O K
4320 min Winter	89.588	0.348	7.5	247.0	O K
5760 min Winter	89.459	0.219	7.5	155.6	O K
7200 min Winter	89.362	0.122	7.5	86.8	O K
8640 min Winter	89.305	0.065	7.5	46.2	O K
10080 min Winter	89.293	0.053	7.0	37.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	0.812	0.0	2235.7	5456	
15 min Winter	105.885	0.0	386.0	22	
30 min Winter	68.936	0.0	463.5	37	
60 min Winter	42.916	0.0	675.0	66	
120 min Winter	25.934	0.0	761.9	124	
180 min Winter	19.112	0.0	814.9	182	
240 min Winter	15.324	0.0	853.2	240	
360 min Winter	11.197	0.0	910.2	356	
480 min Winter	8.958	0.0	953.6	468	
600 min Winter	7.531	0.0	988.8	580	
720 min Winter	6.533	0.0	1018.6	688	
960 min Winter	5.217	0.0	1067.6	884	
1440 min Winter	3.796	0.0	1140.9	1098	
2160 min Winter	2.758	0.0	1478.3	1556	
2880 min Winter	2.198	0.0	1536.3	1988	
4320 min Winter	1.594	0.0	1620.8	2772	
5760 min Winter	1.268	0.0	2191.5	3512	
7200 min Winter	1.062	0.0	2221.3	4112	
8640 min Winter	0.918	0.0	2239.2	4584	
10080 min Winter	0.812	0.0	2248.8	5176	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose																									
Date 09/09/2024 11:35		Designed by JHC																									
File		Checked by JHC																									
Innovyze		Source Control 2020.1.3																									
<u>Cascade Rainfall Details for Attenuation Tank 1 in 30.SRCX</u>																											
Rainfall Model	FSR	Winter Storms	Yes																								
Return Period (years)	30	Cv (Summer)	1.000																								
Region	England and Wales	Cv (Winter)	1.000																								
M5-60 (mm)	19.900	Shortest Storm (mins)	15																								
Ratio R	0.400	Longest Storm (mins)	10080																								
Summer Storms	Yes	Climate Change %	+40																								
<u>Time Area Diagram</u>																											
Total Area (ha) 0.970																											
<table><tr><td colspan="2">Time (mins)</td><td colspan="2">Area</td><td colspan="2">Time (mins)</td><td colspan="2">Area</td></tr><tr><td>From:</td><td>To:</td><td>(ha)</td><td></td><td>From:</td><td>To:</td><td>(ha)</td><td></td></tr><tr><td>0</td><td>4</td><td>0.485</td><td></td><td>4</td><td>8</td><td>0.485</td><td></td></tr></table>				Time (mins)		Area		Time (mins)		Area		From:	To:	(ha)		From:	To:	(ha)		0	4	0.485		4	8	0.485	
Time (mins)		Area		Time (mins)		Area																					
From:	To:	(ha)		From:	To:	(ha)																					
0	4	0.485		4	8	0.485																					
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Time (mins)		Area																									
From:	To:	(ha)																									
0	4	0.000																									
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose																																																																																					
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Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
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Date 09/09/2024 11:33 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Attenuation Tank 1 in 100.SRCX</u>					
Upstream Structures		Outflow To Overflow To			
Bund Outfall 1 in 100.SRCX		(None)		(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.700	0.460	7.5	326.5	O K
30 min Summer	89.840	0.600	7.5	426.0	O K
60 min Summer	89.981	0.741	7.5	525.8	O K
120 min Summer	90.113	0.873	7.5	619.8	O K
180 min Summer	90.180	0.940	7.5	667.1	O K
240 min Summer	90.218	0.978	7.5	694.1	O K
360 min Summer	90.259	1.019	7.5	723.5	O K
480 min Summer	90.277	1.037	7.5	736.5	O K
600 min Summer	90.282	1.042	7.5	739.6	O K
720 min Summer	90.277	1.037	7.5	736.3	O K
960 min Summer	90.251	1.011	7.5	718.1	O K
1440 min Summer	90.194	0.954	7.5	677.3	O K
2160 min Summer	90.120	0.880	7.5	624.9	O K
2880 min Summer	90.054	0.814	7.5	577.7	O K
4320 min Summer	89.931	0.691	7.5	490.5	O K
5760 min Summer	89.818	0.578	7.5	410.6	O K
7200 min Summer	89.716	0.476	7.5	338.2	O K
8640 min Summer	89.626	0.386	7.5	274.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	137.396	0.0	462.4	23	
30 min Summer	90.218	0.0	566.8	37	
60 min Summer	56.422	0.0	806.1	68	
120 min Summer	34.083	0.0	920.0	126	
180 min Summer	25.037	0.0	987.5	186	
240 min Summer	19.995	0.0	1034.5	246	
360 min Summer	14.522	0.0	1104.0	364	
480 min Summer	11.573	0.0	1156.9	484	
600 min Summer	9.697	0.0	1199.5	602	
720 min Summer	8.389	0.0	1235.4	722	
960 min Summer	6.669	0.0	1264.7	936	
1440 min Summer	4.819	0.0	1240.3	1144	
2160 min Summer	3.477	0.0	1731.9	1520	
2880 min Summer	2.755	0.0	1800.7	1932	
4320 min Summer	1.982	0.0	1902.0	2728	
5760 min Summer	1.567	0.0	2486.5	3520	
7200 min Summer	1.306	0.0	2526.4	4256	
8640 min Summer	1.124	0.0	2549.6	5016	
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GGP Consult					Page 2
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Lagoon Clean W/ No Bund HorseClose			
Date 09/09/2024 11:33		Designed by JHC			
File		Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Attenuation Tank 1 in 100.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	89.547	0.307	7.5	218.2	O K
15 min Winter	89.700	0.460	7.5	326.5	O K
30 min Winter	89.840	0.600	7.5	426.2	O K
60 min Winter	89.981	0.741	7.5	526.3	O K
120 min Winter	90.114	0.874	7.5	620.7	O K
180 min Winter	90.182	0.942	7.5	668.5	O K
240 min Winter	90.221	0.981	7.5	696.2	O K
360 min Winter	90.263	1.023	7.5	726.5	O K
480 min Winter	90.283	1.043	7.5	740.6	O K
600 min Winter	90.289	1.049	7.5	744.8	O K
720 min Winter	90.286	1.046	7.5	742.7	O K
960 min Winter	90.264	1.024	7.5	727.2	O K
1440 min Winter	90.195	0.955	7.5	677.7	O K
2160 min Winter	90.101	0.861	7.5	611.6	O K
2880 min Winter	90.008	0.768	7.5	545.1	O K
4320 min Winter	89.829	0.589	7.5	417.9	O K
5760 min Winter	89.668	0.428	7.5	304.0	O K
7200 min Winter	89.531	0.291	7.5	206.7	O K
8640 min Winter	89.420	0.180	7.5	128.1	O K
10080 min Winter	89.340	0.100	7.5	71.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	0.991	0.0	2561.2	5744	
15 min Winter	137.396	0.0	462.5	22	
30 min Winter	90.218	0.0	566.7	37	
60 min Winter	56.422	0.0	806.1	66	
120 min Winter	34.083	0.0	920.1	124	
180 min Winter	25.037	0.0	987.2	182	
240 min Winter	19.995	0.0	1034.4	240	
360 min Winter	14.522	0.0	1103.7	358	
480 min Winter	11.573	0.0	1156.6	472	
600 min Winter	9.697	0.0	1199.0	588	
720 min Winter	8.389	0.0	1234.7	700	
960 min Winter	6.669	0.0	1262.4	918	
1440 min Winter	4.819	0.0	1239.1	1172	
2160 min Winter	3.477	0.0	1729.6	1620	
2880 min Winter	2.755	0.0	1796.8	2072	
4320 min Winter	1.982	0.0	1894.2	2904	
5760 min Winter	1.567	0.0	2481.4	3696	
7200 min Winter	1.306	0.0	2526.6	4400	
8640 min Winter	1.124	0.0	2552.5	5024	
10080 min Winter	0.991	0.0	2568.3	5552	
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GGP Consult		Page 3
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose	
Date 09/09/2024 11:33 File	Designed by JHC Checked by JHC	
Innovyze	Source Control 2020.1.3	

Cascade Rainfall Details for Attenuation Tank 1 in 100.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.900	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.970

Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)
0	4	0.485	4	8	0.485

Time Area Diagram

Total Area (ha) 0.000

Time (mins) Area		
From:	To:	(ha)
0	4	0.000

GGP Consult		Page 4																																																																																				
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Lagoon Clean W/ No Bund HorseClose																																																																																					
Date 09/09/2024 11:33	Designed by JHC																																																																																					
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Innovyze	Source Control 2020.1.3																																																																																					
Cascade Model Details for Attenuation Tank 1 in 100.SRCX Storage is Online Cover Level (m) 91.600 Tank or Pond Structure Invert Level (m) 89.240 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>710.0</td><td>1.050</td><td>710.0</td><td>1.051</td><td>1.0</td></tr></table> Pump Outflow Control Invert Level (m) 89.200 <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>7.5000</td><td>0.900</td><td>7.5000</td><td>1.700</td><td>7.5000</td><td>2.500</td><td>7.5000</td></tr><tr><td>0.200</td><td>7.5000</td><td>1.000</td><td>7.5000</td><td>1.800</td><td>7.5000</td><td>2.600</td><td>7.5000</td></tr><tr><td>0.300</td><td>7.5000</td><td>1.100</td><td>7.5000</td><td>1.900</td><td>7.5000</td><td>2.700</td><td>7.5000</td></tr><tr><td>0.400</td><td>7.5000</td><td>1.200</td><td>7.5000</td><td>2.000</td><td>7.5000</td><td>2.800</td><td>7.5000</td></tr><tr><td>0.500</td><td>7.5000</td><td>1.300</td><td>7.5000</td><td>2.100</td><td>7.5000</td><td>2.900</td><td>7.5000</td></tr><tr><td>0.600</td><td>7.5000</td><td>1.400</td><td>7.5000</td><td>2.200</td><td>7.5000</td><td>3.000</td><td>7.5000</td></tr><tr><td>0.700</td><td>7.5000</td><td>1.500</td><td>7.5000</td><td>2.300</td><td>7.5000</td><td></td><td></td></tr><tr><td>0.800</td><td>7.5000</td><td>1.600</td><td>7.5000</td><td>2.400</td><td>7.5000</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	710.0	1.050	710.0	1.051	1.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000	0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000	0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000	0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000	0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000	0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000	0.700	7.5000	1.500	7.5000	2.300	7.5000			0.800	7.5000	1.600	7.5000	2.400	7.5000		
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																																																	
0.000	710.0	1.050	710.0	1.051	1.0																																																																																	
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																															
0.100	7.5000	0.900	7.5000	1.700	7.5000	2.500	7.5000																																																																															
0.200	7.5000	1.000	7.5000	1.800	7.5000	2.600	7.5000																																																																															
0.300	7.5000	1.100	7.5000	1.900	7.5000	2.700	7.5000																																																																															
0.400	7.5000	1.200	7.5000	2.000	7.5000	2.800	7.5000																																																																															
0.500	7.5000	1.300	7.5000	2.100	7.5000	2.900	7.5000																																																																															
0.600	7.5000	1.400	7.5000	2.200	7.5000	3.000	7.5000																																																																															
0.700	7.5000	1.500	7.5000	2.300	7.5000																																																																																	
0.800	7.5000	1.600	7.5000	2.400	7.5000																																																																																	
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APPENDIX VIII

Yard – Process Storage Calculations

GGP Consult						Page 1
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY				Contaminated HorseClose		
Date 09/09/2024 11:55 File				Designed by JHC Checked by JHC		
Innovyze				Source Control 2020.1.3		
<u>Cascade Summary of Results for Contaminated 1 in 10.SRCX</u>						
Upstream Structures		Outflow To			Overflow To	
(None)		Process Storage Contaminated 1 in 10.SRCX			(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	92.848	1.298	432.8	50.3	O K	
30 min Summer	93.027	1.477	440.0	52.1	Flood Risk	
60 min Summer	93.028	1.478	440.0	52.1	Flood Risk	
120 min Summer	92.827	1.277	344.2	50.4	O K	
180 min Summer	92.813	1.263	288.6	50.3	O K	
240 min Summer	92.806	1.256	259.7	50.3	O K	
360 min Summer	92.798	1.248	226.8	50.3	O K	
480 min Summer	92.783	1.233	162.9	50.3	O K	
600 min Summer	92.780	1.230	152.6	50.3	O K	
720 min Summer	92.774	1.224	127.9	50.3	O K	
960 min Summer	92.768	1.218	101.1	50.3	O K	
1440 min Summer	92.764	1.214	86.7	50.3	O K	
2160 min Summer	92.759	1.209	64.0	50.3	O K	
2880 min Summer	92.754	1.204	45.5	50.3	O K	
4320 min Summer	92.245	0.695	28.0	34.8	O K	
5760 min Summer	91.838	0.288	25.3	14.4	O K	
7200 min Summer	91.822	0.272	21.5	13.6	O K	
8640 min Summer	91.810	0.260	18.7	13.0	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	79.094	0.0	382.4	12		
30 min Summer	52.183	0.0	504.6	18		
60 min Summer	33.096	0.0	640.1	38		
120 min Summer	20.474	0.0	791.9	70		
180 min Summer	15.333	0.0	889.6	96		
240 min Summer	12.449	0.0	963.1	124		
360 min Summer	9.275	0.0	1076.2	192		
480 min Summer	7.518	0.0	1163.3	252		
600 min Summer	6.386	0.0	1235.0	294		
720 min Summer	5.586	0.0	1296.5	352		
960 min Summer	4.522	0.0	1399.2	500		
1440 min Summer	3.354	0.0	1556.8	804		
2160 min Summer	2.486	0.0	1730.7	1128		
2880 min Summer	2.009	0.0	1864.9	1520		
4320 min Summer	1.487	0.0	2070.7	2252		
5760 min Summer	1.201	0.0	2229.4	2872		
7200 min Summer	1.017	0.0	2361.0	3552		
8640 min Summer	0.889	0.0	2474.6	4304		
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GGP Consult				Page 2	
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose			
Date 09/09/2024 11:55 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Contaminated 1 in 10.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.801	0.251	16.8	12.6	O K
15 min Winter	92.849	1.299	436.9	50.3	O K
30 min Winter	93.015	1.465	440.0	50.8	Flood Risk
60 min Winter	92.844	1.294	414.2	50.3	O K
120 min Winter	92.813	1.263	286.5	50.3	O K
180 min Winter	92.800	1.250	233.0	50.3	O K
240 min Winter	92.793	1.243	204.1	50.3	O K
360 min Winter	92.774	1.224	125.8	50.3	O K
480 min Winter	92.770	1.220	111.4	50.3	O K
600 min Winter	92.767	1.217	97.0	50.3	O K
720 min Winter	92.763	1.213	82.6	50.3	O K
960 min Winter	92.762	1.212	76.4	50.3	O K
1440 min Winter	92.757	1.207	57.9	50.3	O K
2160 min Winter	92.752	1.202	35.2	50.3	O K
2880 min Winter	91.847	0.297	27.4	14.9	O K
4320 min Winter	91.816	0.266	20.2	13.3	O K
5760 min Winter	91.799	0.249	16.3	12.5	O K
7200 min Winter	91.789	0.239	13.9	11.9	O K
8640 min Winter	91.781	0.231	12.1	11.5	O K
10080 min Winter	91.775	0.225	10.8	11.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	0.793	0.0	2575.0	5008	
15 min Winter	79.094	0.0	382.4	12	
30 min Winter	52.183	0.0	504.6	19	
60 min Winter	33.096	0.0	640.1	42	
120 min Winter	20.474	0.0	791.9	82	
180 min Winter	15.333	0.0	889.6	86	
240 min Winter	12.449	0.0	963.1	142	
360 min Winter	9.275	0.0	1076.2	180	
480 min Winter	7.518	0.0	1163.3	240	
600 min Winter	6.386	0.0	1235.0	332	
720 min Winter	5.586	0.0	1296.5	368	
960 min Winter	4.522	0.0	1399.2	580	
1440 min Winter	3.354	0.0	1556.8	704	
2160 min Winter	2.486	0.0	1730.7	1212	
2880 min Winter	2.009	0.0	1864.9	1440	
4320 min Winter	1.487	0.0	2070.6	2148	
5760 min Winter	1.201	0.0	2229.4	2912	
7200 min Winter	1.017	0.0	2361.0	3552	
8640 min Winter	0.889	0.0	2474.6	4400	
10080 min Winter	0.793	0.0	2575.0	4976	
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GGP Consult			Page 3																																																						
2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose																																																							
Date 09/09/2024 11:55 File		Designed by JHC Checked by JHC																																																							
Innovyze		Source Control 2020.1.3																																																							
Cascade Rainfall Details for Contaminated 1 in 10.SRCX <table><tr><td>Rainfall Model</td><td>FSR</td><td>Winter Storms</td><td>Yes</td></tr><tr><td>Return Period (years)</td><td>10</td><td>Cv (Summer)</td><td>1.000</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>1.000</td></tr><tr><td>M5-60 (mm)</td><td>19.700</td><td>Shortest Storm (mins)</td><td>15</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Longest Storm (mins)</td><td>10080</td></tr><tr><td>Summer Storms</td><td>Yes</td><td>Climate Change %</td><td>+40</td></tr></table> Time Area Diagram Total Area (ha) 1.934 <table><tr><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To: (ha)</td><td></td><td>From: To: (ha)</td><td></td><td>From: To: (ha)</td><td></td><td>From: To: (ha)</td><td></td></tr><tr><td>0 4 0.484</td><td></td><td>4 8 0.484</td><td></td><td>8 12 0.483</td><td></td><td>12 16 0.483</td><td></td></tr></table> Time Area Diagram Total Area (ha) 0.000 <table><tr><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To: (ha)</td><td></td></tr><tr><td>0 4 0.000</td><td></td></tr></table>				Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	10	Cv (Summer)	1.000	Region	England and Wales	Cv (Winter)	1.000	M5-60 (mm)	19.700	Shortest Storm (mins)	15	Ratio R	0.350	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	From: To: (ha)		From: To: (ha)		From: To: (ha)		From: To: (ha)		0 4 0.484		4 8 0.484		8 12 0.483		12 16 0.483		Time (mins)	Area	From: To: (ha)		0 4 0.000	
Rainfall Model	FSR	Winter Storms	Yes																																																						
Return Period (years)	10	Cv (Summer)	1.000																																																						
Region	England and Wales	Cv (Winter)	1.000																																																						
M5-60 (mm)	19.700	Shortest Storm (mins)	15																																																						
Ratio R	0.350	Longest Storm (mins)	10080																																																						
Summer Storms	Yes	Climate Change %	+40																																																						
Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area																																																		
From: To: (ha)		From: To: (ha)		From: To: (ha)		From: To: (ha)																																																			
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Cascade Model Details for Contaminated 1 in 10.SRCX Storage is Online Cover Level (m) 93.125 Tank or Pond Structure Invert Level (m) 91.550 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>50.0</td><td>1.001</td><td>1.0</td><td>1.575</td><td>3000.0</td></tr><tr><td>1.000</td><td>50.0</td><td>1.450</td><td>1.0</td><td></td><td></td></tr></tbody></table> Pump Outflow Control Invert Level (m) 91.550 <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>2.0000</td><td>0.900</td><td>28.0000</td><td>1.700</td><td>270.0000</td><td>2.500</td><td>220.0000</td></tr><tr><td>0.200</td><td>5.0000</td><td>1.000</td><td>28.0000</td><td>1.800</td><td>180.0000</td><td>2.600</td><td>220.0000</td></tr><tr><td>0.300</td><td>28.0000</td><td>1.100</td><td>28.0000</td><td>1.900</td><td>180.0000</td><td>2.700</td><td>220.0000</td></tr><tr><td>0.400</td><td>28.0000</td><td>1.200</td><td>28.0000</td><td>2.000</td><td>180.0000</td><td>2.800</td><td>220.0000</td></tr><tr><td>0.500</td><td>28.0000</td><td>1.300</td><td>440.0000</td><td>2.100</td><td>180.0000</td><td>2.900</td><td>220.0000</td></tr><tr><td>0.600</td><td>28.0000</td><td>1.400</td><td>440.0000</td><td>2.200</td><td>250.0000</td><td>3.000</td><td>220.0000</td></tr><tr><td>0.700</td><td>28.0000</td><td>1.500</td><td>440.0000</td><td>2.300</td><td>250.0000</td><td></td><td></td></tr><tr><td>0.800</td><td>28.0000</td><td>1.600</td><td>440.0000</td><td>2.400</td><td>250.0000</td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	50.0	1.001	1.0	1.575	3000.0	1.000	50.0	1.450	1.0			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.0000	0.900	28.0000	1.700	270.0000	2.500	220.0000	0.200	5.0000	1.000	28.0000	1.800	180.0000	2.600	220.0000	0.300	28.0000	1.100	28.0000	1.900	180.0000	2.700	220.0000	0.400	28.0000	1.200	28.0000	2.000	180.0000	2.800	220.0000	0.500	28.0000	1.300	440.0000	2.100	180.0000	2.900	220.0000	0.600	28.0000	1.400	440.0000	2.200	250.0000	3.000	220.0000	0.700	28.0000	1.500	440.0000	2.300	250.0000			0.800	28.0000	1.600	440.0000	2.400	250.0000		
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Contaminated HorseClose			
Date 09/09/2024 11:53 File			Designed by JHC Checked by JHC			
Innovyze			Source Control 2020.1.3			
<u>Cascade Summary of Results for Contaminated 1 in 30.SRCX</u>						
Upstream Structures		Outflow To			Overflow To	
(None)		Process Storage Contaminated 1 in 30.SRCX			(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	93.087	1.537	440.0	94.5	Flood Risk	
30 min Summer	93.106	1.556	440.0	129.2	Flood Risk	
60 min Summer	93.091	1.541	440.0	100.9	Flood Risk	
120 min Summer	92.848	1.298	430.7	50.4	O K	
180 min Summer	92.829	1.279	354.5	50.4	O K	
240 min Summer	92.815	1.265	296.8	50.3	O K	
360 min Summer	92.802	1.252	243.3	50.3	O K	
480 min Summer	92.789	1.239	189.7	50.3	O K	
600 min Summer	92.785	1.235	173.2	50.3	O K	
720 min Summer	92.777	1.227	140.3	50.3	O K	
960 min Summer	92.774	1.224	125.8	50.3	O K	
1440 min Summer	92.767	1.217	97.0	50.3	O K	
2160 min Summer	92.760	1.210	70.2	50.3	O K	
2880 min Summer	92.757	1.207	57.9	50.3	O K	
4320 min Summer	92.751	1.201	33.1	50.3	O K	
5760 min Summer	91.845	0.295	26.8	14.7	O K	
7200 min Summer	91.826	0.276	22.4	13.8	O K	
8640 min Summer	91.813	0.263	19.4	13.1	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	105.885	0.0	511.9	21		
30 min Summer	68.936	0.0	666.6	30		
60 min Summer	42.916	0.0	830.0	44		
120 min Summer	25.934	0.0	1003.1	68		
180 min Summer	19.112	0.0	1108.9	100		
240 min Summer	15.324	0.0	1185.4	144		
360 min Summer	11.197	0.0	1299.3	202		
480 min Summer	8.958	0.0	1386.0	256		
600 min Summer	7.531	0.0	1456.5	328		
720 min Summer	6.533	0.0	1516.1	366		
960 min Summer	5.217	0.0	1614.3	464		
1440 min Summer	3.796	0.0	1761.7	714		
2160 min Summer	2.758	0.0	1920.3	1056		
2880 min Summer	2.198	0.0	2040.1	1528		
4320 min Summer	1.594	0.0	2219.6	2256		
5760 min Summer	1.268	0.0	2355.0	2904		
7200 min Summer	1.062	0.0	2464.9	3576		
8640 min Summer	0.918	0.0	2557.8	4360		
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose			
Date 09/09/2024 11:53 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Contaminated 1 in 30.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.803	0.253	17.1	12.6	O K
15 min Winter	93.085	1.535	440.0	92.0	Flood Risk
30 min Winter	93.101	1.551	440.0	117.9	Flood Risk
60 min Winter	93.066	1.516	440.0	69.8	Flood Risk
120 min Winter	92.829	1.279	352.4	50.3	O K
180 min Winter	92.807	1.257	261.8	50.3	O K
240 min Winter	92.799	1.249	228.8	50.3	O K
360 min Winter	92.784	1.234	169.1	50.3	O K
480 min Winter	92.776	1.226	136.1	50.3	O K
600 min Winter	92.771	1.221	113.5	50.3	O K
720 min Winter	92.768	1.218	103.2	50.3	O K
960 min Winter	92.767	1.217	99.1	50.3	O K
1440 min Winter	92.759	1.209	64.0	50.3	O K
2160 min Winter	92.754	1.204	43.4	50.3	O K
2880 min Winter	92.150	0.600	28.0	30.0	O K
4320 min Winter	91.823	0.273	21.7	13.6	O K
5760 min Winter	91.803	0.253	17.2	12.7	O K
7200 min Winter	91.791	0.241	14.5	12.1	O K
8640 min Winter	91.783	0.233	12.5	11.6	O K
10080 min Winter	91.776	0.226	11.0	11.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	0.812	0.0	2638.7	4984	
15 min Winter	105.885	0.0	511.9	21	
30 min Winter	68.936	0.0	666.6	29	
60 min Winter	42.916	0.0	830.0	42	
120 min Winter	25.934	0.0	1003.1	66	
180 min Winter	19.112	0.0	1108.9	98	
240 min Winter	15.324	0.0	1185.4	124	
360 min Winter	11.197	0.0	1299.3	156	
480 min Winter	8.958	0.0	1386.0	274	
600 min Winter	7.531	0.0	1456.5	280	
720 min Winter	6.533	0.0	1516.1	398	
960 min Winter	5.217	0.0	1614.3	504	
1440 min Winter	3.796	0.0	1761.7	702	
2160 min Winter	2.758	0.0	1920.3	1260	
2880 min Winter	2.198	0.0	2040.1	1560	
4320 min Winter	1.594	0.0	2219.6	2196	
5760 min Winter	1.268	0.0	2355.0	2928	
7200 min Winter	1.062	0.0	2464.8	3672	
8640 min Winter	0.918	0.0	2557.8	4352	
10080 min Winter	0.812	0.0	2638.7	4960	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY			Contaminated HorseClose																																																								
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Cascade Rainfall Details for Contaminated 1 in 30.SRCX <table><tr><td>Rainfall Model</td><td>FSR</td><td>Winter Storms</td><td>Yes</td></tr><tr><td>Return Period (years)</td><td>30</td><td>Cv (Summer)</td><td>1.000</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>1.000</td></tr><tr><td>M5-60 (mm)</td><td>19.900</td><td>Shortest Storm (mins)</td><td>15</td></tr><tr><td>Ratio R</td><td>0.400</td><td>Longest Storm (mins)</td><td>10080</td></tr><tr><td>Summer Storms</td><td>Yes</td><td>Climate Change %</td><td>+40</td></tr></table> Time Area Diagram Total Area (ha) 1.934 <table><tr><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td></tr><tr><td>0 4</td><td>0.484</td><td>4 8</td><td>0.484</td><td>8 12</td><td>0.483</td><td>12 16</td><td>0.483</td></tr></table> Time Area Diagram Total Area (ha) 0.000 <table><tr><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To:</td><td>(ha)</td></tr><tr><td>0 4</td><td>0.000</td></tr></table>						Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	30	Cv (Summer)	1.000	Region	England and Wales	Cv (Winter)	1.000	M5-60 (mm)	19.900	Shortest Storm (mins)	15	Ratio R	0.400	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	0 4	0.484	4 8	0.484	8 12	0.483	12 16	0.483	Time (mins)	Area	From: To:	(ha)	0 4	0.000
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Date 09/09/2024 11:45 File				Designed by JHC Checked by JHC		
Innovyze				Source Control 2020.1.3		
<u>Cascade Summary of Results for Contaminated 1 in 100.SRCX</u>						
Upstream Structures		Outflow To			Overflow To	
(None) Process Storage Contaminated 1 in 100.SRCX				(None)		
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	93.128	1.578	440.0	185.9	FLOOD	
30 min Summer	93.150	1.600	440.0	252.2	FLOOD	
60 min Summer	93.142	1.592	440.0	230.0	FLOOD	
120 min Summer	93.108	1.558	440.0	133.2	Flood Risk	
180 min Summer	93.051	1.501	440.0	59.9	Flood Risk	
240 min Summer	92.840	1.290	397.8	50.3	O K	
360 min Summer	92.817	1.267	303.0	50.3	O K	
480 min Summer	92.804	1.254	249.4	50.3	O K	
600 min Summer	92.796	1.246	218.5	50.3	O K	
720 min Summer	92.793	1.243	204.1	50.3	O K	
960 min Summer	92.781	1.231	156.7	50.3	O K	
1440 min Summer	92.773	1.223	121.7	50.3	O K	
2160 min Summer	92.764	1.214	84.6	50.3	O K	
2880 min Summer	92.760	1.210	70.2	50.3	O K	
4320 min Summer	92.756	1.206	51.7	50.3	O K	
5760 min Summer	92.754	1.204	45.5	50.4	O K	
7200 min Summer	92.379	0.829	28.0	41.5	O K	
8640 min Summer	91.845	0.295	26.8	14.7	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	129.682	8.1	627.0	23		
30 min Summer	87.133	74.4	842.6	31		
60 min Summer	55.837	52.3	1079.9	46		
120 min Summer	34.509	0.0	1334.8	76		
180 min Summer	25.637	0.0	1487.4	102		
240 min Summer	20.604	0.0	1593.9	134		
360 min Summer	15.169	0.0	1760.2	184		
480 min Summer	12.185	0.0	1885.3	234		
600 min Summer	10.272	0.0	1986.6	300		
720 min Summer	8.930	0.0	2072.4	368		
960 min Summer	7.152	0.0	2213.1	480		
1440 min Summer	5.221	0.0	2423.2	726		
2160 min Summer	3.803	0.0	2647.5	1048		
2880 min Summer	3.033	0.0	2815.4	1432		
4320 min Summer	2.201	0.0	3064.7	2140		
5760 min Summer	1.751	0.0	3250.8	2864		
7200 min Summer	1.466	0.0	3403.3	3744		
8640 min Summer	1.270	0.0	3535.7	4400		
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose			
Date 09/09/2024 11:45 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Contaminated 1 in 100.SRCX</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.831	0.281	23.7	14.1	O K
15 min Winter	93.127	1.577	440.0	183.6	FLOOD
30 min Winter	93.145	1.595	440.0	236.3	FLOOD
60 min Winter	93.124	1.574	440.0	174.3	Flood Risk
120 min Winter	93.018	1.468	440.0	51.0	Flood Risk
180 min Winter	92.828	1.278	348.3	50.3	O K
240 min Winter	92.811	1.261	280.3	50.3	O K
360 min Winter	92.793	1.243	204.1	50.3	O K
480 min Winter	92.785	1.235	171.2	50.3	O K
600 min Winter	92.780	1.230	152.6	50.3	O K
720 min Winter	92.776	1.226	134.1	50.3	O K
960 min Winter	92.767	1.217	99.1	50.3	O K
1440 min Winter	92.763	1.213	82.6	50.3	O K
2160 min Winter	92.760	1.210	68.2	50.3	O K
2880 min Winter	92.756	1.206	51.7	50.3	O K
4320 min Winter	92.320	0.770	28.0	38.5	O K
5760 min Winter	91.832	0.282	23.8	14.1	O K
7200 min Winter	91.815	0.265	20.0	13.3	O K
8640 min Winter	91.803	0.253	17.2	12.7	O K
10080 min Winter	91.795	0.245	15.3	12.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
10080 min Summer	1.124	0.0	3651.8	5056	
15 min Winter	129.682	5.8	627.0	22	
30 min Winter	87.133	58.5	842.6	31	
60 min Winter	55.837	0.0	1079.9	46	
120 min Winter	34.509	0.0	1334.8	68	
180 min Winter	25.637	0.0	1487.4	100	
240 min Winter	20.604	0.0	1593.9	134	
360 min Winter	15.169	0.0	1760.2	182	
480 min Winter	12.185	0.0	1885.2	246	
600 min Winter	10.272	0.0	1986.6	302	
720 min Winter	8.930	0.0	2072.4	320	
960 min Winter	7.152	0.0	2213.1	464	
1440 min Winter	5.221	0.0	2423.2	726	
2160 min Winter	3.803	0.0	2647.5	896	
2880 min Winter	3.033	0.0	2815.4	1280	
4320 min Winter	2.201	0.0	3064.7	2336	
5760 min Winter	1.751	0.0	3250.8	2904	
7200 min Winter	1.466	0.0	3403.2	3624	
8640 min Winter	1.270	0.0	3535.7	4400	
10080 min Winter	1.124	0.0	3651.8	5096	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose																																																							
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Cascade Rainfall Details for Contaminated 1 in 100.SRCX <table><tr><td>Rainfall Model</td><td>FSR</td><td>Winter Storms</td><td>Yes</td></tr><tr><td>Return Period (years)</td><td>100</td><td>Cv (Summer)</td><td>1.000</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>1.000</td></tr><tr><td>M5-60 (mm)</td><td>19.700</td><td>Shortest Storm (mins)</td><td>15</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Longest Storm (mins)</td><td>10080</td></tr><tr><td>Summer Storms</td><td>Yes</td><td>Climate Change %</td><td>+40</td></tr></table> Time Area Diagram Total Area (ha) 1.934 <table><tr><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td><td>From: To:</td><td>(ha)</td></tr><tr><td>0 4</td><td>0.484</td><td>4 8</td><td>0.484</td><td>8 12</td><td>0.483</td><td>12 16</td><td>0.483</td></tr></table> Time Area Diagram Total Area (ha) 0.000 <table><tr><td>Time (mins)</td><td>Area</td></tr><tr><td>From: To:</td><td>(ha)</td></tr><tr><td>0 4</td><td>0.000</td></tr></table>				Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	1.000	Region	England and Wales	Cv (Winter)	1.000	M5-60 (mm)	19.700	Shortest Storm (mins)	15	Ratio R	0.350	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	0 4	0.484	4 8	0.484	8 12	0.483	12 16	0.483	Time (mins)	Area	From: To:	(ha)	0 4	0.000
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Cascade Model Details for Contaminated 1 in 100.SRCX Storage is Online Cover Level (m) 93.125 Tank or Pond Structure Invert Level (m) 91.550 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>50.0</td><td>1.001</td><td>1.0</td><td>1.575</td><td>3000.0</td></tr><tr><td>1.000</td><td>50.0</td><td>1.450</td><td>1.0</td><td></td><td></td></tr></table> Pump Outflow Control Invert Level (m) 91.550 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>2.0000</td><td>0.900</td><td>28.0000</td><td>1.700</td><td>270.0000</td><td>2.500</td><td>220.0000</td></tr><tr><td>0.200</td><td>5.0000</td><td>1.000</td><td>28.0000</td><td>1.800</td><td>180.0000</td><td>2.600</td><td>220.0000</td></tr><tr><td>0.300</td><td>28.0000</td><td>1.100</td><td>28.0000</td><td>1.900</td><td>180.0000</td><td>2.700</td><td>220.0000</td></tr><tr><td>0.400</td><td>28.0000</td><td>1.200</td><td>28.0000</td><td>2.000</td><td>180.0000</td><td>2.800</td><td>220.0000</td></tr><tr><td>0.500</td><td>28.0000</td><td>1.300</td><td>440.0000</td><td>2.100</td><td>180.0000</td><td>2.900</td><td>220.0000</td></tr><tr><td>0.600</td><td>28.0000</td><td>1.400</td><td>440.0000</td><td>2.200</td><td>250.0000</td><td>3.000</td><td>220.0000</td></tr><tr><td>0.700</td><td>28.0000</td><td>1.500</td><td>440.0000</td><td>2.300</td><td>250.0000</td><td></td><td></td></tr><tr><td>0.800</td><td>28.0000</td><td>1.600</td><td>440.0000</td><td>2.400</td><td>250.0000</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	50.0	1.001	1.0	1.575	3000.0	1.000	50.0	1.450	1.0			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.0000	0.900	28.0000	1.700	270.0000	2.500	220.0000	0.200	5.0000	1.000	28.0000	1.800	180.0000	2.600	220.0000	0.300	28.0000	1.100	28.0000	1.900	180.0000	2.700	220.0000	0.400	28.0000	1.200	28.0000	2.000	180.0000	2.800	220.0000	0.500	28.0000	1.300	440.0000	2.100	180.0000	2.900	220.0000	0.600	28.0000	1.400	440.0000	2.200	250.0000	3.000	220.0000	0.700	28.0000	1.500	440.0000	2.300	250.0000			0.800	28.0000	1.600	440.0000	2.400	250.0000		
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1440 min Summer	3.354	0.0	172.2	1504																																																																																																										
2160 min Summer	2.486	0.0	345.0	2220																																																																																																										
2880 min Summer	2.009	0.0	344.9	2932																																																																																																										
4320 min Summer	1.487	0.0	344.7	4364																																																																																																										
5760 min Summer	1.201	0.0	690.2	5800																																																																																																										
7200 min Summer	1.017	0.0	690.1	7232																																																																																																										
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose				
Date 09/09/2024 11:55 File		Designed by JHC Checked by JHC				
Innovyze		Source Control 2020.1.3				
<u>Cascade Summary of Results for Process Storage Contaminated 1 in 10.SRCX</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	8640 min Summer	97.152	4.652	1.0	1953.8	O K
	10080 min Summer	97.186	4.686	1.0	1968.2	O K
	15 min Winter	93.389	0.889	1.0	373.4	O K
	30 min Winter	93.678	1.178	1.0	494.8	O K
	60 min Winter	93.997	1.497	1.0	628.6	O K
	120 min Winter	94.351	1.851	1.0	777.2	O K
	180 min Winter	94.575	2.075	1.0	871.6	O K
	240 min Winter	94.742	2.242	1.0	941.8	O K
	360 min Winter	94.997	2.497	1.0	1048.9	O K
	480 min Winter	95.188	2.688	1.0	1129.1	O K
	600 min Winter	95.343	2.843	1.0	1193.9	O K
	720 min Winter	95.472	2.972	1.0	1248.4	O K
	960 min Winter	95.684	3.184	1.0	1337.3	O K
	1440 min Winter	95.993	3.493	1.0	1467.0	O K
	2160 min Winter	96.308	3.808	1.0	1599.2	O K
	2880 min Winter	96.528	4.028	1.0	1691.7	O K
	4320 min Winter	96.819	4.319	1.0	1814.0	O K
	5760 min Winter	96.998	4.498	1.0	1889.3	O K
	7200 min Winter	97.114	4.614	1.0	1937.8	O K
	8640 min Winter	97.188	4.688	1.0	1968.8	O K
	10080 min Winter	97.231	4.731	1.0	1987.0	O K
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	8640 min Summer	0.889	0.0	689.9	8664	
	10080 min Summer	0.793	0.0	689.7	10104	
	15 min Winter	79.094	0.0	86.3	111	
	30 min Winter	52.183	0.0	86.3	125	
	60 min Winter	33.096	0.0	172.6	152	
	120 min Winter	20.474	0.0	172.5	210	
	180 min Winter	15.333	0.0	172.4	266	
	240 min Winter	12.449	0.0	172.3	322	
	360 min Winter	9.275	0.0	172.2	426	
	480 min Winter	7.518	0.0	172.0	542	
	600 min Winter	6.386	0.0	171.9	660	
	720 min Winter	5.586	0.0	171.8	776	
	960 min Winter	4.522	0.0	171.6	1012	
	1440 min Winter	3.354	0.0	171.2	1482	
	2160 min Winter	2.486	0.0	343.4	2188	
	2880 min Winter	2.009	0.0	342.8	2892	
	4320 min Winter	1.487	0.0	341.5	4300	
	5760 min Winter	1.201	0.0	685.7	5704	
	7200 min Winter	1.017	0.0	684.1	7088	
	8640 min Winter	0.889	0.0	682.2	8480	
	10080 min Winter	0.793	0.0	680.1	9824	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY	Contaminated HorseClose																									
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<u>Cascade Rainfall Details for Process Storage Contaminated 1 in 10.SRCX</u>																										
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Rainfall Model	FSR	Winter Storms	Yes																							
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Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
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0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000																																																																			
0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000																																																																			
0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000																																																																			
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose			
Date 09/09/2024 11:53 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
<u>Cascade Summary of Results for Process Storage Contaminated 1 in 30.SRCX</u>					
Upstream Structures		Outflow To Overflow To			
Contaminated 1 in 30.SRCX		(None)		(None)	
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	94.595	2.095	1.0	502.9	O K
30 min Summer	95.236	2.736	1.0	656.7	O K
60 min Summer	95.910	3.410	1.0	818.4	O K
120 min Summer	96.617	4.117	1.0	988.1	O K
180 min Summer	97.043	4.543	1.0	1090.4	O K
240 min Summer	97.348	4.848	1.0	1163.5	O K
360 min Summer	97.796	5.296	1.0	1271.0	O K
480 min Summer	98.129	5.629	1.0	1351.0	O K
600 min Summer	98.393	5.893	1.0	1414.3	O K
720 min Summer	98.612	6.112	1.0	1466.8	O K
960 min Summer	98.961	6.461	1.0	1550.7	O K
1440 min Summer	99.456	6.956	1.0	1669.5	O K
2160 min Summer	99.938	7.438	1.0	1785.2	O K
2880 min Summer	100.259	7.759	1.0	1862.3	O K
4320 min Summer	100.650	8.150	1.0	1956.1	FLOOD
5760 min Summer	100.857	8.357	1.0	2005.7	FLOOD
7200 min Summer	100.957	8.457	1.0	2029.7	FLOOD
8640 min Summer	100.987	8.487	1.0	2036.8	FLOOD
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	105.885	0.0	86.3	111	
30 min Summer	68.936	0.0	86.3	125	
60 min Summer	42.916	0.0	172.7	154	
120 min Summer	25.934	0.0	172.6	212	
180 min Summer	19.112	0.0	172.6	270	
240 min Summer	15.324	0.0	172.6	328	
360 min Summer	11.197	0.0	172.5	436	
480 min Summer	8.958	0.0	172.5	550	
600 min Summer	7.531	0.0	172.4	668	
720 min Summer	6.533	0.0	172.4	788	
960 min Summer	5.217	0.0	172.4	1026	
1440 min Summer	3.796	0.0	172.3	1504	
2160 min Summer	2.758	0.0	345.0	2220	
2880 min Summer	2.198	0.0	344.9	2936	
4320 min Summer	1.594	36.1	344.7	4368	
5760 min Summer	1.268	85.7	690.3	5800	
7200 min Summer	1.062	109.7	690.1	7232	
8640 min Summer	0.918	116.8	689.9	8664	
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose				
Date 09/09/2024 11:53 File		Designed by JHC Checked by JHC				
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<u>Cascade Summary of Results for Process Storage Contaminated 1 in 30.SRCX</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
	10080 min Summer	100.966	8.466	1.0	2031.8	FLOOD
	15 min Winter	94.595	2.095	1.0	502.9	O K
	30 min Winter	95.236	2.736	1.0	656.8	O K
	60 min Winter	95.911	3.411	1.0	818.5	O K
	120 min Winter	96.618	4.118	1.0	988.3	O K
	180 min Winter	97.045	4.545	1.0	1090.8	O K
	240 min Winter	97.350	4.850	1.0	1164.0	O K
	360 min Winter	97.797	5.297	1.0	1271.3	O K
	480 min Winter	98.132	5.632	1.0	1351.8	O K
	600 min Winter	98.397	5.897	1.0	1415.3	O K
	720 min Winter	98.616	6.116	1.0	1467.9	O K
	960 min Winter	98.968	6.468	1.0	1552.2	O K
	1440 min Winter	99.466	6.966	1.0	1671.7	O K
	2160 min Winter	99.953	7.453	1.0	1788.6	O K
	2880 min Winter	100.278	7.778	1.0	1866.6	O K
	4320 min Winter	100.677	8.177	1.0	1962.6	FLOOD
	5760 min Winter	100.894	8.394	1.0	2014.5	FLOOD
	7200 min Winter	101.005	8.505	1.0	2041.2	FLOOD
	8640 min Winter	101.048	8.548	1.0	2051.5	FLOOD
	10080 min Winter	101.043	8.543	1.0	2050.3	FLOOD
	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
	10080 min Summer	0.812	111.8	689.7	10104	
	15 min Winter	105.885	0.0	86.3	111	
	30 min Winter	68.936	0.0	86.3	125	
	60 min Winter	42.916	0.0	172.6	152	
	120 min Winter	25.934	0.0	172.5	210	
	180 min Winter	19.112	0.0	172.4	268	
	240 min Winter	15.324	0.0	172.3	324	
	360 min Winter	11.197	0.0	172.2	436	
	480 min Winter	8.958	0.0	172.1	542	
	600 min Winter	7.531	0.0	172.0	660	
	720 min Winter	6.533	0.0	171.9	778	
	960 min Winter	5.217	0.0	171.7	1014	
	1440 min Winter	3.796	0.0	171.3	1484	
	2160 min Winter	2.758	0.0	343.5	2188	
	2880 min Winter	2.198	0.0	342.9	2896	
	4320 min Winter	1.594	42.6	341.6	4304	
	5760 min Winter	1.268	94.5	685.9	5712	
	7200 min Winter	1.062	121.2	684.3	7088	
	8640 min Winter	0.918	131.5	682.4	8480	
	10080 min Winter	0.812	130.3	680.3	9832	
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Innovyze	Source Control 2020.1.3											
<u>Cascade Rainfall Details for Process Storage Contaminated 1 in 30.SRCX</u>												
Rainfall Model	FSR	Winter Storms	Yes									
Return Period (years)	30	Cv (Summer)	1.000									
Region	England and Wales	Cv (Winter)	1.000									
M5-60 (mm)	19.900	Shortest Storm (mins)	15									
Ratio R	0.400	Longest Storm (mins)	10080									
Summer Storms	Yes	Climate Change %	+40									
<u>Time Area Diagram</u>												
Total Area (ha) 0.000												
<table><tr><td colspan="2">Time (mins)</td><td>Area</td></tr><tr><td>From:</td><td>To:</td><td>(ha)</td></tr><tr><td>0</td><td>4</td><td>0.000</td></tr></table>				Time (mins)		Area	From:	To:	(ha)	0	4	0.000
Time (mins)		Area										
From:	To:	(ha)										
0	4	0.000										
<u>Time Area Diagram</u>												
Total Area (ha) 0.000												
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2 Hallam Road, Priory Park East Hull, Humberside HU4 7DY		Contaminated HorseClose			
Date 09/09/2024 11:45 File		Designed by JHC Checked by JHC			
Innovyze		Source Control 2020.1.3			
Cascade Summary of Results for Process Storage Contaminated 1 in 100.SRCX					
Upstream Structures		Outflow To		Overflow To	
Contaminated 1 in 100.SRCX		(None)		(None)	
Outflow is too low. Design is unsatisfactory.					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	93.972	1.472	1.0	618.3	O K
30 min Summer	94.483	1.983	1.0	832.8	O K
60 min Summer	95.043	2.543	1.0	1068.2	O K
120 min Summer	95.642	3.142	1.0	1319.7	O K
180 min Summer	95.997	3.497	1.0	1468.8	O K
240 min Summer	96.242	3.742	1.0	1571.8	O K
360 min Summer	96.622	4.122	1.0	1731.0	O K
480 min Summer	96.904	4.404	1.0	1849.6	O K
600 min Summer	97.129	4.629	1.0	1944.3	O K
720 min Summer	97.316	4.816	1.0	2022.9	O K
960 min Summer	97.618	5.118	1.0	2149.4	O K
1440 min Summer	98.050	5.550	1.0	2330.9	O K
2160 min Summer	98.481	5.981	1.0	2512.1	O K
2880 min Summer	98.779	6.279	1.0	2637.0	O K
4320 min Summer	99.168	6.668	1.0	2800.5	O K
5760 min Summer	99.406	6.906	1.0	2900.7	O K
7200 min Summer	99.565	7.065	1.0	2967.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	129.682	0.0	86.3	106	
30 min Summer	87.133	0.0	86.3	124	
60 min Summer	55.837	0.0	172.7	154	
120 min Summer	34.509	0.0	172.7	214	
180 min Summer	25.637	0.0	172.6	272	
240 min Summer	20.604	0.0	172.6	330	
360 min Summer	15.169	0.0	172.6	448	
480 min Summer	12.185	0.0	172.5	558	
600 min Summer	10.272	0.0	172.5	670	
720 min Summer	8.930	0.0	172.5	790	
960 min Summer	7.152	0.0	172.4	1028	
1440 min Summer	5.221	0.0	172.4	1506	
2160 min Summer	3.803	0.0	345.1	2224	
2880 min Summer	3.033	0.0	345.0	2944	
4320 min Summer	2.201	0.0	344.9	4376	
5760 min Summer	1.751	0.0	690.5	5808	
7200 min Summer	1.466	0.0	690.4	7240	
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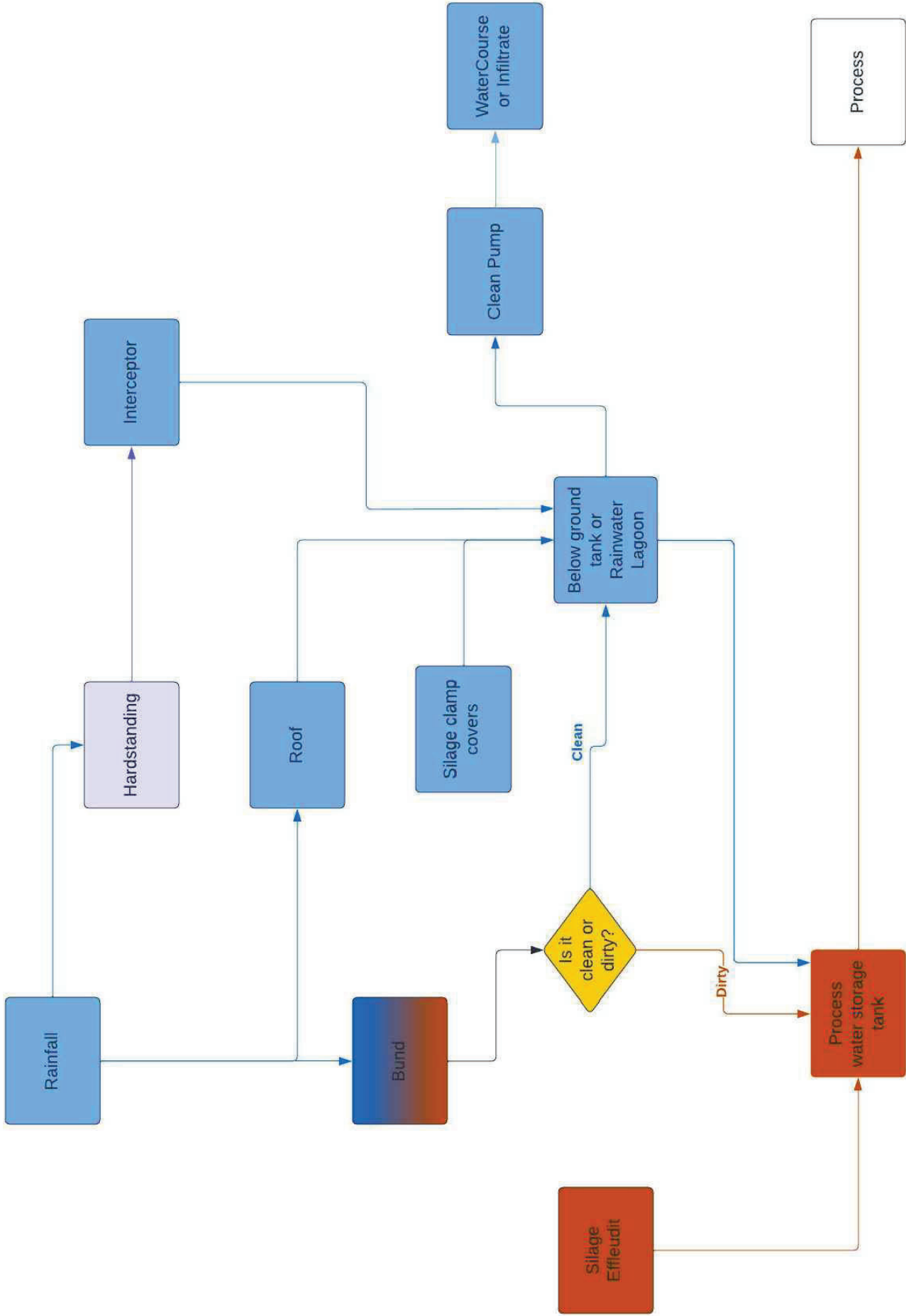
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Innovyze	Source Control 2020.1.3											
<u>Cascade Rainfall Details for Process Storage Contaminated 1 in 100.SRCX</u>												
Rainfall Model	FSR	Winter Storms	Yes									
Return Period (years)	100	Cv (Summer)	1.000									
Region	England and Wales	Cv (Winter)	1.000									
M5-60 (mm)	19.700	Shortest Storm (mins)	15									
Ratio R	0.350	Longest Storm (mins)	10080									
Summer Storms	Yes	Climate Change %	+40									
<u>Time Area Diagram</u>												
Total Area (ha) 0.000												
<table><tr><td colspan="2">Time (mins)</td><td>Area</td></tr><tr><td>From:</td><td>To:</td><td>(ha)</td></tr><tr><td>0</td><td>4</td><td>0.000</td></tr></table>				Time (mins)		Area	From:	To:	(ha)	0	4	0.000
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<u>Cascade Model Details for Process Storage Contaminated 1 in 100.SRCX</u> Storage is Online Cover Level (m) 100.500 <u>Tank or Pond Structure</u> Invert Level (m) 92.500 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>420.0</td><td>8.000</td><td>420.0</td></tr></table> <u>Pump Outflow Control</u> Invert Level (m) 92.250 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>1.0000</td><td>0.900</td><td>1.0000</td><td>1.700</td><td>1.0000</td><td>2.500</td><td>1.0000</td></tr><tr><td>0.200</td><td>1.0000</td><td>1.000</td><td>1.0000</td><td>1.800</td><td>1.0000</td><td>2.600</td><td>1.0000</td></tr><tr><td>0.300</td><td>1.0000</td><td>1.100</td><td>1.0000</td><td>1.900</td><td>1.0000</td><td>2.700</td><td>1.0000</td></tr><tr><td>0.400</td><td>1.0000</td><td>1.200</td><td>1.0000</td><td>2.000</td><td>1.0000</td><td>2.800</td><td>1.0000</td></tr><tr><td>0.500</td><td>1.0000</td><td>1.300</td><td>1.0000</td><td>2.100</td><td>1.0000</td><td>2.900</td><td>1.0000</td></tr><tr><td>0.600</td><td>1.0000</td><td>1.400</td><td>1.0000</td><td>2.200</td><td>1.0000</td><td>3.000</td><td>1.0000</td></tr><tr><td>0.700</td><td>1.0000</td><td>1.500</td><td>1.0000</td><td>2.300</td><td>1.0000</td><td></td><td></td></tr><tr><td>0.800</td><td>1.0000</td><td>1.600</td><td>1.0000</td><td>2.400</td><td>1.0000</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	420.0	8.000	420.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.0000	0.900	1.0000	1.700	1.0000	2.500	1.0000	0.200	1.0000	1.000	1.0000	1.800	1.0000	2.600	1.0000	0.300	1.0000	1.100	1.0000	1.900	1.0000	2.700	1.0000	0.400	1.0000	1.200	1.0000	2.000	1.0000	2.800	1.0000	0.500	1.0000	1.300	1.0000	2.100	1.0000	2.900	1.0000	0.600	1.0000	1.400	1.0000	2.200	1.0000	3.000	1.0000	0.700	1.0000	1.500	1.0000	2.300	1.0000			0.800	1.0000	1.600	1.0000	2.400	1.0000		
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APPENDIX X

Rainfall & Process Water Flow Diagram



Rev	Issued For Approval	By	Date
A	15/02/23	JHC	15/02/23

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Client

Job Title
FLOW DIAGRAM

Drawing Title
**AD PLANTS
FLOW DIAGRAM**

Status
APPROVAL

Scale	Date
A1	FEB '23

Drawn By	Checked	Approved
W. B. B. A. 17.27	JHC	JHC

Proj No.	Rev
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