

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Junctions Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Sump Depth (m)	Chamber Shape
Simple Junction (3)	Simple Junction	394746.555	349385.616					
Simple Junction (4)	Simple Junction	394755.622	349406.289					
S1	Manhole	394743.956	349404.700	232.000	1.500	230.500	0.890	Rectangular
Simple Junction (5)	Simple Junction	394757.814	349387.103					
Simple Junction (6)	Simple Junction	394758.206	349387.299					
S5	Manhole	394723.039	349410.835	241.400	1.216	240.184	0.000	Circular
S4	Manhole	394742.244	349405.804	241.800	1.000	240.800	0.000	Circular
Channel Drain Gully	Manhole	394786.171	349388.963	242.134	0.882	241.252	0.000	Rectangular
S2	Manhole	394756.118	349407.094	242.000	0.803	241.197	0.000	Circular
S6	Manhole	394708.117	349409.905	241.250	1.450	239.800	0.000	Circular
S7	Manhole	394701.907	349407.723	241.083	1.612	239.471	0.000	Circular
S8	Manhole	394686.777	349390.121	240.100	2.957	237.143	0.000	Circular
Simple Junction	Simple Junction	394783.469	349407.611					
S3 (1)	Manhole	394745.003	349383.825	241.879	0.918	240.961	0.000	Circular

Name	Diameter (m)	Diameter (m)	Width (m)	
Simple Junction (3)				
Simple Junction (4)				
S1		1.000	1.000	All
Simple Junction (5)				
Simple Junction (6)				
S5	1.200			None
S4	1.500			None
Channel Drain Gully		0.400	0.400	None
S2	1.200			None
S6	0.600			None
S7	0.600			None
S8	1.200			None
Simple Junction				
S3 (1)	0.600			None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
Simple Junction (3)	Inlet	1.000	(None)	No Restriction
	Inlet (2)	CA 1.001	(None)	No Restriction
Simple Junction (4)	Inlet	2.000	(None)	No Restriction
	Inlet (1)	CA 2.001	(None)	No Restriction
S1	Inlet (4)	1.001	(None)	No Restriction
	Inlet (5)	2.001	(None)	No Restriction
Simple Junction (5)	Inlet	CA 1.000	(None)	No Restriction
Simple Junction (6)	Inlet	CA 2.000	(None)	No Restriction
S5	Inlet	5.001	(None)	No Restriction
	Inlet (1)	1.003	(None)	No Restriction
S4	Inlet	No Delay	(None)	No Restriction
	Inlet (1)	4.001	(None)	No Restriction
	Inlet (2)	3.000	(None)	No Restriction
Channel Drain Gully	Inlet (1)	Linear Channel Drain	(None)	No Restriction
S2	Inlet (1)	CA 3.000	(None)	No Restriction
S6	Inlet	1.004	(None)	No Restriction
S7	Inlet	1.005	(None)	No Restriction
S8	Inlet	1.006	(None)	No Restriction
Simple Junction	Inlet	CA LCD	(None)	No Restriction
S3 (1)	Inlet	4.000	(None)	No Restriction

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Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Simple Junction (3)	Outlet	1.001	Free Discharge
Simple Junction (4)	Outlet	2.001	Free Discharge
S1	Outlet	No Delay	Pump
	Invert Level (m)	230.500	
	Depth (m)	Outflow (L/s)	
	0.100	5.0	
	0.200	5.0	
	0.300	5.0	
	0.400	5.0	
	0.500	5.0	
	0.600	5.0	
	0.700	5.0	
	0.800	5.0	
	0.900	5.0	
	1.000	5.0	
	1.100	5.0	
	1.200	5.0	
	1.300	5.0	
	1.400	5.0	
	1.500	5.0	
Simple Junction (5)	Outlet	1.000	Free Discharge
Simple Junction (6)	Outlet	2.000	Free Discharge
S5	Outlet	1.004	Free Discharge
S4	Outlet	1.003	Free Discharge
Channel Drain Gully	Outlet	4.000	Free Discharge
S2	Outlet	3.000	Free Discharge
S6	Outlet	1.005	Free Discharge
S7	Outlet	1.006	Free Discharge
S8	Outlet	1.007	Free Discharge
Simple Junction	Outlet	Linear Channel Drain	Free Discharge
S3 (1)	Outlet	4.001	Free Discharge

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Pond

Type : Pond

Dimensions

Exceedance Level (m)	239.040
Depth (m)	2.000
Base Level (m)	237.040
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	3.18
Total Volume (m³)	311.712

Depth (m)	Area (m²)	Volume (m³)
0.000	66.000	0.000
1.000	189.338	122.375

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.007
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced

Base Infiltration Rate (m/hr)	0.0359
Side Infiltration Rate (m/hr)	0.0359
Safety Factor	2.0
Perimeter	Circular
Length (m)	23.287
Friction Scheme	Manning's n
n	0.03

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Soakaway

Type : Soakaway

Dimensions

Exceedance Level (m)	237.400
Depth (m)	1.400
Base Level (m)	236.000
Freeboard (mm)	0
Soakaway Shape	Rectangular
Diameter / Width (m)	13.450
Length (m)	13.450
Porosity (%)	95
Ineffective Storage Depth (m)	0.000
Number of Soakaways	1
Base Infiltration Rate (m/hr)	0.0785
Side Infiltration Rate (m/hr)	0.0785
Safety Factor	2.0
Total Volume (m³)	240.600

Inlets

Inlet

Incoming Item(s)	6.000
Bypass Destination	(None)
Capacity Type	No Restriction

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SS (3)

Type : Porous Paving

Dimensions

Exceedance Level (m)	241.500
Depth (m)	0.300
Base Level (m)	241.200
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	55.951
Long. Slope (1:X)	103.00
Width (m)	4.787
Total Volume (m³)	24.026

Inlets

Inlet

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

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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SS (2)

Type : Porous Paving

Dimensions

Exceedance Level (m)	241.686
Depth (m)	0.300
Base Level (m)	241.386
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	22.799
Long. Slope (1:X)	148.00
Width (m)	7.313
Total Volume (m³)	14.954

Inlets

Inlet

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

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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SS (1)

Type : Porous Paving

Dimensions

Exceedance Level (m)	241.959
Depth (m)	0.300
Base Level (m)	241.659
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	21.713
Long. Slope (1:X)	75.00
Width (m)	5.118
Total Volume (m³)	9.968

Inlets

Inlet

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

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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NF PP 3

Type : Porous Paving

Dimensions	
Exceedance Level (m)	241.353
Depth (m)	0.300
Base Level (m)	241.053
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	81.845
Long. Slope (1:X)	55.35
Width (m)	30.773
Total Volume (m³)	225.918

Inlets	
Inlet	
Inlet Type	Lateral Inflow
Incoming Item(s)	CA NF PP 3
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced	
Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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NF PP 2

Type : Porous Paving

Dimensions

Exceedance Level (m)	242.045
Depth (m)	0.300
Base Level (m)	241.745
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	43.765
Long. Slope (1:X)	53.60
Width (m)	14.030
Total Volume (m³)	55.076

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA NF PP 2
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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NF PP 4

Type : Porous Paving

Dimensions

Exceedance Level (m)	241.823
Depth (m)	0.300
Base Level (m)	241.523
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	60.654
Long. Slope (1:X)	84.90
Width (m)	18.572
Total Volume (m³)	101.046

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA NF PP 4
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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NF PP 1

Type : Porous Paving

Dimensions	
Exceedance Level (m)	242.100
Depth (m)	0.300
Base Level (m)	241.800
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	91.969
Long. Slope (1:X)	92.00
Width (m)	27.226
Total Volume (m³)	224.603

Inlets	
Inlet (1)	
Inlet Type	Lateral Inflow
Incoming Item(s)	CA NF PP 1
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced	
Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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PP SF NE

Type : Porous Paving

Dimensions	
Exceedance Level (m)	241.933
Depth (m)	0.300
Base Level (m)	241.633
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	80.604
Long. Slope (1:X)	69.00
Width (m)	33.252
Total Volume (m³)	240.421

Inlets	
Inlet	
Inlet Type	Lateral Inflow
Incoming Item(s)	CA SF PP NE
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced	
Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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PP SF SW

Type : Porous Paving

Dimensions

Exceedance Level (m)	237.936
Depth (m)	0.300
Base Level (m)	237.636
Paving Layer Depth (mm)	1
Membrane Percolation (m/hr)	10000.0
Porosity (%)	30
Length (m)	175.059
Long. Slope (1:X)	22.62
Width (m)	56.847
Total Volume (m³)	892.648

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA SF PP SW
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	CA SF FD 2
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced

Base Infiltration Rate (m/hr)	0.0536
Safety Factor	2.0
Conductivity (m/hr)	300.0

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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



SS Filter Drain

Type : Infiltration Trench

Dimensions

Exceedance Level (m)	241.600
Depth (m)	1.325
Base Level (m)	240.275
Freeboard (mm)	0
Porosity (%)	30
Length (m)	86.000
Long. Slope (1:X)	254.437
Width (m)	0.950
Total Volume (m³)	33.540

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.012

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA SS FD
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	5.000
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	5.001
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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NF Filter Drain

Type : Infiltration Trench

Dimensions

Exceedance Level (m)	242.047
Depth (m)	1.011
Base Level (m)	241.036
Freeboard (mm)	0
Porosity (%)	30
Length (m)	89.325
Long. Slope (1:X)	150.00
Width (m)	1.000
Total Volume (m³)	28.197

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.012

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA NF FD
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

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

Outlets

Outlet

Outgoing Connection	5.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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SF FD

Type : Infiltration Trench

Dimensions

Exceedance Level (m)	239.600
Depth (m)	1.100
Base Level (m)	238.500
Freeboard (mm)	0
Porosity (%)	30
Length (m)	98.494
Long. Slope (1:X)	30.62
Width (m)	7.000
Total Volume (m³)	228.961

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	CA SF FD 1
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	CA SF SE
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	6.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



SF E FD

Type : Infiltration Trench

Dimensions

Exceedance Level (m)	242.216
Depth (m)	0.585
Base Level (m)	241.631
Freeboard (mm)	0
Porosity (%)	30
Length (m)	123.922
Long. Slope (1:X)	300.00
Width (m)	5.000
Total Volume (m³)	110.274

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	150
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	SF E FD
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	300.0
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Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Connections Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	No. of Barrels	Diameter / Base Width (mm)	Height (mm)
1.000	11.357	Custom	99.623	0.012		1	350	300
2.000	19.165	Custom	97.781	0.012		1	350	300
5.001	13.661	Pipe	150.120		0.6	1	225	
1.001	19.261	Custom	98.270	0.012		1	350	414
2.001	11.774	Custom	103.277	0.012		1	350	496
1.003	19.853	Pipe	32.229		0.6	1	150	
3.000	13.934	Pipe	35.099		0.6	1	150	
1.004	14.952	Pipe	38.937		0.6	1	225	
1.005	6.582	Pipe	20.000		0.6	1	225	
1.006	23.211	Pipe	15.000		0.6	1	225	
1.007	5.876	Pipe	150.673		0.6	1	225	
No Delay	2.037	No Delay						
5.000	6.099	Pipe	265.170		0.6	1	100	
6.000	71.419	Pipe	44.526		0.6	1	300	
Linear Channel Drain	18.843	Rectangular Channel	303.927	0.012		1	260	279
4.000	41.488	Pipe	142.530		0.6	1	150	
4.001	22.152	Pipe	137.659		0.6	1	150	
Pipe	4.337	Pipe	300.000		0.6	1	150	

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)	Culvert Type	Culvert Shape
1.000	232.000	231.700	232.000	231.586	All			
2.000	232.000	231.700	232.000	231.504	All			
5.001	241.938	240.275	241.400	240.184	None	0.0	(None)	
1.001	232.000	231.586	232.000	231.390	All			
2.001	232.000	231.504	232.000	231.390	All			
1.003	241.800	240.800	241.400	240.184	None		(None)	
3.000	242.000	241.197	241.800	240.800	None		(None)	
1.004	241.400	240.184	241.250	239.800	None		(None)	
1.005	241.250	239.800	241.083	239.471	None		(None)	
1.006	241.083	239.471	240.100	237.924	Levels		(None)	
1.007	240.100	237.143	239.040	237.104	Levels		(None)	
No Delay								
5.000	242.642	241.036	242.027	241.013	Levels	0.0	(None)	
6.000	239.600	238.500	237.400	236.896	Levels	0.0	(None)	
Linear Channel Drain	242.196	241.917	242.134	241.855	None			
4.000	242.134	241.252	241.879	240.961	Levels		(None)	
4.001	241.879	240.961	241.800	240.800	None		(None)	
Pipe	242.216	241.631	242.216	241.617	Levels	0.0	(None)	

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Name	Culvert Entrance
1.000	
2.000	
5.001	(None)
1.001	
2.001	
1.003	(None)
3.000	(None)
1.004	(None)
1.005	(None)
1.006	(None)
1.007	(None)
No Delay	
5.000	(None)
6.000	(None)
Linear Channel Drain	
4.000	(None)
4.001	(None)
Pipe	(None)

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
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Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Name	Cover Level (m) Invert Level (m)		Connection Details				Type
Coordinates (m)	Depth (m)	Manhole Size (m)	Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
Simple Junction (3)		Diameter / Length: 1.200	{1} 1.000	Custom	231.586	Diam/Width:350 Height:300	Simple Junction
E:394746.555							
N:349385.616			{a} 1.001	Custom	231.586	Diam/Width:350 Height:414	Not Applicable
Simple Junction (4)		Diameter / Length: 1.200	{1} 2.000	Custom	231.504	Diam/Width:350 Height:300	Simple Junction
E:394755.622							
N:349406.289			{a} 2.001	Custom	231.504	Diam/Width:350 Height:496	Not Applicable
S1	232.000 230.500	Diameter / Length: 1.000	{1} 1.001	Custom	231.390	Diam/Width:350 Height:414	Manhole
E:394743.956	1.500		{2} 2.001	Custom	231.390	Diam/Width:350 Height:496	
N:349404.700		Width: 1.000	{a} No Delay	No Delay	Not Applicable	Not Applicable	Not Applicable
Simple Junction (5)		Diameter / Length: 1.200					Simple Junction
E:394757.814							
N:349387.103			{a} 1.000	Custom	231.700	Diam/Width:350 Height:300	Not Applicable
Simple Junction (6)		Diameter / Length: 1.200					Simple Junction
E:394758.206							
N:349387.299			{a} 2.000	Custom	231.700	Diam/Width:350 Height:300	Not Applicable

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S5	241.400 240.184	Diameter / Length: 1.200	{1} 5.001	Pipe	240.184	Diam/Width:225	Manhole
E:394723.039 N:349410.835	1.216		{2} 1.003	Pipe	240.184	Diam/Width:150	
			{a} 1.004	Pipe	240.184	Diam/Width:225	Not Applicable
S4	241.800 240.800	Diameter / Length: 1.500	{1} 3.000	Pipe	240.800	Diam/Width:150	Manhole
E:394742.244 N:349405.804	1.000		{2} No Delay	No Delay	Not Applicable	Not Applicable	
			{3} 4.001	Pipe	240.800	Diam/Width:150	
			{a} 1.003	Pipe	240.800	Diam/Width:150	Not Applicable
Channel Drain Gully	242.134 241.252	Diameter / Length: 0.400	{1} Linear Channel Drain	Rectangular Channel	241.855	Diam/Width:260 Height:279	Manhole
E:394786.171 N:349388.963	0.882						
		Width: 0.400	{a} 4.000	Pipe	241.252	Diam/Width:150	Not Applicable
S2	242.000 241.197	Diameter / Length: 1.200					Manhole
E:394756.118 N:349407.094	0.803						
			{a} 3.000	Pipe	241.197	Diam/Width:150	Not Applicable

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S6	241.250 239.800	Diameter / Length: 0.600	{1} 1.004	Pipe	239.800	Diam/Width:225	Manhole
E:394708.117 N:349409.905	1.450						
			{a} 1.005	Pipe	239.800	Diam/Width:225	Not Applicable
S7	241.083 239.471	Diameter / Length: 0.600	{1} 1.005	Pipe	239.471	Diam/Width:225	Manhole
E:394701.907 N:349407.723	1.612						
			{a} 1.006	Pipe	239.471	Diam/Width:225	Not Applicable
S8	240.100 237.143	Diameter / Length: 1.200	{1} 1.006	Pipe	237.924	Diam/Width:225	Manhole
E:394686.777 N:349390.121	2.957						
			{a} 1.007	Pipe	237.143	Diam/Width:225	Not Applicable
Simple Junction		Diameter / Length: 1.200					Simple Junction
E:394783.469 N:349407.611							
			{a} Linear Channel Drain	Rectangular Channel	241.917	Diam/Width:260 Height:279	Not Applicable
S3 (1)	241.879 240.961	Diameter / Length: 0.600	{1} 4.000	Pipe	240.961	Diam/Width:150	Manhole
E:394745.003 N:349383.825	0.918						
			{a} 4.001	Pipe	240.961	Diam/Width:150	Not Applicable

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
CA 1.000	Simple Junction (5)		Time of Concentration	0.006	100	0	100	0.006
CA 1.001	Simple Junction (3)		Time of Concentration	0.006	100	0	100	0.006
CA 2.000	Simple Junction (6)		Time of Concentration	0.006	100	0	100	0.006
CA 2.001	Simple Junction (4)		Time of Concentration	0.006	100	0	100	0.006
CA 3.000	S2		Time of Concentration	0.031	100	0	100	0.031
CA LCD	Simple Junction		Time of Concentration	0.019	100	0	100	0.019
CA NF FD	NF Filter Drain		Time of Concentration	0.044	100	0	100	0.044
CA NF PP 1	NF PP 1		Time of Concentration	0.250	100	0	100	0.250
CA NF PP 2	NF PP 2		Time of Concentration	0.061	100	0	100	0.061
CA NF PP 3	NF PP 3		Time of Concentration	0.252	100	0	100	0.252
CA NF PP 4	NF PP 4		Time of Concentration	0.113	100	0	100	0.113
CA SF FD 1	SF FD		Time of Concentration	0.050	100	0	100	0.050
CA SF FD 2	PP SF SW		Time of Concentration	0.039	100	0	100	0.039
CA SF PP NE	PP SF NE		Time of Concentration	0.268	100	0	100	0.268
CA SF PP SW	PP SF SW		Time of Concentration	0.995	100	0	100	0.995
CA SF SE	SF FD		Time of Concentration	0.292	100	0	100	0.292
CA SS (1)	SS (1)		Time of Concentration	0.011	100	0	100	0.011
CA SS (2)	SS (2)		Time of Concentration	0.017	100	0	100	0.017
CA SS (3)	SS (3)		Time of Concentration	0.027	100	0	100	0.027
CA SS FD	SS Filter Drain		Time of Concentration	0.039	100	0	100	0.039
SF E FD	SF E FD		Time of Concentration	0.064	100	0	100	0.064
TOTAL		0.0		2.599				2.599

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Prefill Manhole Sumps	☐
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 394806 349242 SJ 94806 49242
Rainfall Version	2022
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40.000
2.0	0.000
30.0	35.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA SS FD	FEH: 100 years: +40 %: 15 mins: Summer	0.04	28.4	12.351
CA SS (3)	FEH: 100 years: +40 %: 15 mins: Summer	0.03	19.3	8.382
CA SS (2)	FEH: 100 years: +40 %: 15 mins: Summer	0.02	12.0	5.219
CA SS (1)	FEH: 100 years: +40 %: 15 mins: Summer	0.01	8.0	3.475
CA 2.001	FEH: 100 years: +40 %: 15 mins: Summer	0.01	4.6	1.983
CA 2.000	FEH: 100 years: +40 %: 15 mins: Summer	0.01	4.6	1.983
CA 1.000	FEH: 100 years: +40 %: 15 mins: Summer	0.01	4.6	1.974
CA 1.001	FEH: 100 years: +40 %: 15 mins: Summer	0.01	4.6	1.983
CA LCD	FEH: 100 years: +40 %: 15 mins: Summer	0.02	10.5	4.559
CA 3.000	FEH: 100 years: +40 %: 15 mins: Summer	0.03	16.8	7.277
CA NF FD	FEH: 100 years: +40 %: 15 mins: Summer	0.04	31.9	13.873
CA NF PP 3	FEH: 100 years: +40 %: 15 mins: Summer	0.25	181.5	78.805
CA NF PP 2	FEH: 100 years: +40 %: 15 mins: Summer	0.06	44.2	19.214
CA NF PP 4	FEH: 100 years: +40 %: 15 mins: Summer	0.11	81.2	35.244

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

CA NF PP 1	FEH: 100 years: +40 %: 15 mins: Summer	0.25	180.4	78.350
CA SF PP NE	FEH: 100 years: +40 %: 15 mins: Summer	0.27	193.1	83.865
CA SF PP SW	FEH: 100 years: +40 %: 15 mins: Summer	1.00	717.1	311.379
CA SF FD 2	FEH: 100 years: +40 %: 15 mins: Summer	0.04	27.9	12.124
CA SF FD 1	FEH: 100 years: +40 %: 15 mins: Summer	0.05	36.2	15.712
CA SF SE	FEH: 100 years: +40 %: 15 mins: Summer	0.29	210.6	91.468
SF E FD	FEH: 100 years: +40 %: 15 mins: Summer	0.06	45.9	19.918

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025	
		Designed by: JD	Checked by:
		Approved By:	
Report Details: Type: Inflows Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB	



Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA SS FD	FEH: 2 years: +0 %: 15 mins: Summer	0.04	7.8	3.372
CA SS (3)	FEH: 2 years: +0 %: 15 mins: Summer	0.03	5.3	2.292
CA SS (2)	FEH: 2 years: +0 %: 15 mins: Summer	0.02	3.3	1.424
CA SS (1)	FEH: 2 years: +0 %: 15 mins: Summer	0.01	2.2	0.952
CA 2.001	FEH: 2 years: +0 %: 15 mins: Summer	0.01	1.2	0.542
CA 2.000	FEH: 2 years: +0 %: 15 mins: Summer	0.01	1.2	0.542
CA 1.000	FEH: 2 years: +0 %: 15 mins: Summer	0.01	1.2	0.542
CA 1.001	FEH: 2 years: +0 %: 15 mins: Summer	0.01	1.2	0.542
CA LCD	FEH: 2 years: +0 %: 15 mins: Summer	0.02	2.9	1.245
CA 3.000	FEH: 2 years: +0 %: 15 mins: Summer	0.03	4.6	1.987
CA NF FD	FEH: 2 years: +0 %: 15 mins: Summer	0.04	8.7	3.791
CA NF PP 3	FEH: 2 years: +0 %: 15 mins: Summer	0.25	49.5	21.527
CA NF PP 2	FEH: 2 years: +0 %: 15 mins: Summer	0.06	12.1	5.251
CA NF PP 4	FEH: 2 years: +0 %: 15 mins: Summer	0.11	22.2	9.623
CA NF PP 1	FEH: 2 years: +0 %: 15 mins: Summer	0.25	49.3	21.398
CA SF PP NE	FEH: 2 years: +0 %: 15 mins: Summer	0.27	52.7	22.909
CA SF PP SW	FEH: 2 years: +0 %: 15 mins: Summer	1.00	195.8	85.041
CA SF FD 2	FEH: 2 years: +0 %: 15 mins: Summer	0.04	7.6	3.309
CA SF FD 1	FEH: 2 years: +0 %: 15 mins: Summer	0.05	9.9	4.288
CA SF SE	FEH: 2 years: +0 %: 15 mins: Summer	0.29	57.5	24.980
SF E FD	FEH: 2 years: +0 %: 15 mins: Summer	0.06	12.5	5.437

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		



FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
CA SS FD	FEH: 30 years: +35 %: 15 mins: Summer	0.04	21.7	9.445
CA SS (3)	FEH: 30 years: +35 %: 15 mins: Summer	0.03	14.8	6.412
CA SS (2)	FEH: 30 years: +35 %: 15 mins: Summer	0.02	9.2	3.992
CA SS (1)	FEH: 30 years: +35 %: 15 mins: Summer	0.01	6.1	2.662
CA 2.001	FEH: 30 years: +35 %: 15 mins: Summer	0.01	3.5	1.515
CA 2.000	FEH: 30 years: +35 %: 15 mins: Summer	0.01	3.5	1.515
CA 1.000	FEH: 30 years: +35 %: 15 mins: Summer	0.01	3.5	1.515
CA 1.001	FEH: 30 years: +35 %: 15 mins: Summer	0.01	3.5	1.515
CA LCD	FEH: 30 years: +35 %: 15 mins: Summer	0.02	8.0	3.486
CA 3.000	FEH: 30 years: +35 %: 15 mins: Summer	0.03	12.8	5.567
CA NF FD	FEH: 30 years: +35 %: 15 mins: Summer	0.04	24.4	10.613
CA NF PP 3	FEH: 30 years: +35 %: 15 mins: Summer	0.25	138.8	60.281
CA NF PP 2	FEH: 30 years: +35 %: 15 mins: Summer	0.06	33.8	14.695
CA NF PP 4	FEH: 30 years: +35 %: 15 mins: Summer	0.11	62.1	26.962

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

CA NF PP 1	FEH: 30 years: +35 %: 15 mins: Summer	0.25	138.0	59.931
CA SF PP NE	FEH: 30 years: +35 %: 15 mins: Summer	0.27	147.7	64.148
CA SF PP SW	FEH: 30 years: +35 %: 15 mins: Summer	1.00	548.4	238.176
CA SF FD 2	FEH: 30 years: +35 %: 15 mins: Summer	0.04	21.3	9.272
CA SF FD 1	FEH: 30 years: +35 %: 15 mins: Summer	0.05	27.7	12.018
CA SF SE	FEH: 30 years: +35 %: 15 mins: Summer	0.29	161.1	69.967
SF E FD	FEH: 30 years: +35 %: 15 mins: Summer	0.06	35.1	15.234

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Simple Junction (3)	FEH: 100 years: +40 %: 30 mins: Summer		231.586	231.671	0.085	6.1			5.6	5.187	OK
Simple Junction (4)	FEH: 100 years: +40 %: 30 mins: Summer		231.504	231.672	0.168	6.1			5.6	5.220	OK
S1	FEH: 100 years: +40 %: 30 mins: Summer	232.000	230.500	231.672	1.172	11.3	1.172	0.000	5.0	10.551	OK
Simple Junction (5)	FEH: 100 years: +40 %: 15 mins: Summer		231.700	231.722	0.022	4.6			4.5	1.975	OK
Simple Junction (6)	FEH: 100 years: +40 %: 15 mins: Summer		231.700	231.721	0.021	4.6			4.4	1.983	OK
S5	FEH: 100 years: +40 %: 15 mins: Summer	241.400	240.184	240.287	0.103	31.6	0.116	0.000	30.7	23.031	OK
S4	FEH: 100 years: +40 %: 15 mins: Summer	241.800	240.800	240.924	0.124	29.9	0.218	0.000	28.3	19.314	OK
Channel Drain Gully	FEH: 100 years: +40 %: 15 mins: Summer	242.134	241.252	241.342	0.090	9.9	0.014	0.000	9.3	4.553	OK
S2	FEH: 100 years: +40 %: 15 mins: Summer	242.000	241.197	241.279	0.082	16.8	0.092	0.000	16.5	7.280	OK
S6	FEH: 100 years: +40 %: 15 mins: Summer	241.250	239.800	239.889	0.089	30.7	0.025	0.000	30.3	22.965	OK
S7	FEH: 100 years: +40 %: 15 mins: Summer	241.083	239.471	239.545	0.074	30.3	0.021	0.000	29.6	22.849	OK
S8	FEH: 100 years: +40 %: 1440 mins: Winter	240.100	237.143	238.062	0.919	4.3	1.039	0.000	4.3	232.555	Surcharged
Simple Junction	FEH: 100 years: +40 %: 15 mins: Summer		241.917	241.986	0.069	10.5			9.9	4.552	OK
S3 (1)	FEH: 100 years: +40 %: 15 mins: Summer	241.879	240.961	241.041	0.080	9.3	0.023	0.000	8.5	4.535	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Simple Junction (3)	FEH: 2 years: +0 %: 15 mins: Summer		231.586	231.600	0.014	2.5			2.2	1.077	OK
Simple Junction (4)	FEH: 2 years: +0 %: 15 mins: Summer		231.504	231.518	0.014	2.4			2.2	1.078	OK
S1	FEH: 2 years: +0 %: 15 mins: Summer	232.000	230.500	230.583	0.083	4.5	0.083	0.000	4.1	2.154	OK
Simple Junction (5)	FEH: 2 years: +0 %: 15 mins: Summer		231.700	231.710	0.010	1.2			1.2	0.542	OK
Simple Junction (6)	FEH: 2 years: +0 %: 15 mins: Summer		231.700	231.709	0.009	1.2			1.2	0.541	OK
S5	FEH: 2 years: +0 %: 15 mins: Summer	241.400	240.184	240.239	0.055	10.5	0.062	0.000	9.9	6.460	OK
S4	FEH: 2 years: +0 %: 15 mins: Summer	241.800	240.800	240.861	0.061	10.6	0.107	0.000	9.9	5.347	OK
Channel Drain Gully	FEH: 2 years: +0 %: 15 mins: Summer	242.134	241.252	241.294	0.042	2.6	0.007	0.000	2.4	1.239	OK
S2	FEH: 2 years: +0 %: 15 mins: Summer	242.000	241.197	241.236	0.039	4.6	0.044	0.000	4.5	1.989	OK
S6	FEH: 2 years: +0 %: 15 mins: Summer	241.250	239.800	239.847	0.047	9.9	0.013	0.000	9.7	6.440	OK
S7	FEH: 2 years: +0 %: 15 mins: Summer	241.083	239.471	239.511	0.041	9.7	0.011	0.000	9.3	6.407	OK
S8	FEH: 2 years: +0 %: 960 mins: Winter	240.100	237.143	237.482	0.339	2.2	0.384	0.000	2.1	73.222	Surcharged
Simple Junction	FEH: 2 years: +0 %: 15 mins: Summer		241.917	241.946	0.029	2.9			2.6	1.239	OK
S3 (1)	FEH: 2 years: +0 %: 15 mins: Summer	241.879	240.961	240.998	0.037	2.4	0.011	0.000	2.0	1.224	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Simple Junction (3)	FEH: 30 years: +35 %: 15 mins: Summer		231.586	231.614	0.028	6.9			6.5	2.934	OK
Simple Junction (4)	FEH: 30 years: +35 %: 15 mins: Summer		231.504	231.562	0.058	6.9			6.5	2.970	OK
S1	FEH: 30 years: +35 %: 15 mins: Summer	232.000	230.500	231.563	1.063	12.9	1.063	0.000	5.0	6.045	OK
Simple Junction (5)	FEH: 30 years: +35 %: 15 mins: Summer		231.700	231.718	0.018	3.5			3.4	1.516	OK
Simple Junction (6)	FEH: 30 years: +35 %: 15 mins: Summer		231.700	231.718	0.018	3.5			3.4	1.515	OK
S5	FEH: 30 years: +35 %: 15 mins: Summer	241.400	240.184	240.274	0.090	25.3	0.102	0.000	24.5	17.972	OK
S4	FEH: 30 years: +35 %: 15 mins: Summer	241.800	240.800	240.902	0.102	23.9	0.181	0.000	22.9	15.051	OK
Channel Drain Gully	FEH: 30 years: +35 %: 15 mins: Summer	242.134	241.252	241.328	0.076	7.5	0.012	0.000	7.1	3.480	OK
S2	FEH: 30 years: +35 %: 15 mins: Summer	242.000	241.197	241.265	0.068	12.8	0.077	0.000	12.6	5.572	OK
S6	FEH: 30 years: +35 %: 15 mins: Summer	241.250	239.800	239.878	0.078	24.5	0.022	0.000	24.1	17.942	OK
S7	FEH: 30 years: +35 %: 15 mins: Summer	241.083	239.471	239.537	0.066	24.1	0.019	0.000	23.6	17.892	OK
S8	FEH: 30 years: +35 %: 1440 mins: Winter	240.100	237.143	237.939	0.796	3.6	0.900	0.000	3.5	183.240	Surcharged
Simple Junction	FEH: 30 years: +35 %: 15 mins: Summer		241.917	241.974	0.057	8.0			7.5	3.479	OK
S3 (1)	FEH: 30 years: +35 %: 15 mins: Summer	241.879	240.961	241.029	0.068	7.1	0.019	0.000	6.4	3.463	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Designed by: JD	Checked by:	Approved By:	
	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



**FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By:
Max. Resident Volume**

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025		
		Designed by: JD	Checked by:	
		Approved By:		
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		

Stormwater Control	Storm Event	Max. DS Level (m)	Max. Avg. Level (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SS Filter Drain	FEH: 100 years: +40 %: 240 mins: Summer	240.448	241.005	0.730	8.5	17.905	0.000	0.000	3.4	54.994	OK
SS (3)	FEH: 100 years: +40 %: 60 mins: Summer	241.305	241.297	0.097	11.4	7.769	0.000	13.484	0.0	0.000	OK
SS (2)	FEH: 100 years: +40 %: 60 mins: Summer	241.494	241.483	0.097	7.1	4.838	0.000	8.311	0.0	0.000	OK
SS (1)	FEH: 100 years: +40 %: 60 mins: Summer	241.782	241.756	0.097	4.7	3.221	0.000	5.293	0.0	0.000	OK
Pond	FEH: 100 years: +40 %: 1440 mins: Winter	238.062	238.062	1.022	4.3	126.520	0.000	137.046	0.0	0.000	OK
NF PP 3	FEH: 100 years: +40 %: 60 mins: Summer	241.161	241.150	0.097	107.2	73.104	0.000	125.880	0.0	0.000	OK
NF PP 2	FEH: 100 years: +40 %: 60 mins: Summer	241.867	241.842	0.097	26.1	17.821	0.000	29.830	0.0	0.000	OK
NF PP 4	FEH: 100 years: +40 %: 60 mins: Summer	241.629	241.620	0.097	47.9	32.691	0.000	56.526	0.0	0.000	OK
NF PP 1	FEH: 100 years: +40 %: 60 mins: Summer	241.902	241.897	0.097	106.6	72.679	0.000	126.779	0.0	0.000	OK
NF Filter Drain	FEH: 100 years: +40 %: 240 mins: Summer	241.757	241.651	0.615	8.6	16.471	0.000	0.000	1.8	38.237	OK
PP SF NE	FEH: 100 years: +40 %: 60 mins: Summer	241.739	241.730	0.097	114.1	77.798	0.000	134.635	0.0	0.000	OK
PP SF SW	FEH: 100 years: +40 %: 60 mins: Summer	237.747	237.739	0.103	440.0	306.236	0.000	510.334	0.0	0.000	OK
SF FD	FEH: 100 years: +40 %: 60 mins: Summer	239.068	239.119	0.619	145.8	127.971	0.000	0.000	28.0	148.666	OK
Soakaway	FEH: 100 years: +40 %: 480 mins: Winter	237.358	237.358	1.358	22.6	233.447	0.000	138.291	0.0	0.000	OK
SF E FD	FEH: 100 years: +40 %: 480 mins: Summer	242.053	241.935	0.304	8.3	56.487	0.000	0.000	1.0	27.362	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		





FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Stormwater Control	Storm Event	Max. DS Level (m)	Max. Avg. Level (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SS Filter Drain	FEH: 2 years: +0 %: 360 mins: Summer	240.379	240.595	0.320	3.2	7.844	0.000	0.000	1.6	31.101	OK
SS (3)	FEH: 2 years: +0 %: 15 mins: Summer	241.210	241.210	0.010	5.3	0.773	0.000	2.294	0.0	0.000	OK
SS (2)	FEH: 2 years: +0 %: 15 mins: Summer	241.396	241.396	0.010	3.3	0.480	0.000	1.425	0.0	0.000	OK
SS (1)	FEH: 2 years: +0 %: 15 mins: Summer	241.669	241.669	0.010	2.2	0.321	0.000	0.952	0.0	0.000	OK
Pond	FEH: 2 years: +0 %: 960 mins: Winter	237.482	237.482	0.442	2.1	39.064	0.000	53.513	0.0	0.000	OK
NF PP 3	FEH: 2 years: +0 %: 15 mins: Summer	241.063	241.063	0.010	49.5	7.258	0.000	21.542	0.0	0.000	OK
NF PP 2	FEH: 2 years: +0 %: 15 mins: Summer	241.755	241.755	0.010	12.1	1.772	0.000	5.255	0.0	0.000	OK
NF PP 4	FEH: 2 years: +0 %: 15 mins: Summer	241.533	241.533	0.010	22.2	3.244	0.000	9.630	0.0	0.000	OK
NF PP 1	FEH: 2 years: +0 %: 15 mins: Summer	241.810	241.810	0.010	49.3	7.215	0.000	21.413	0.0	0.000	OK
NF Filter Drain	FEH: 2 years: +0 %: 120 mins: Summer	241.147	241.170	0.134	3.9	3.580	0.000	0.000	1.7	10.332	OK
PP SF NE	FEH: 2 years: +0 %: 15 mins: Summer	241.643	241.643	0.010	52.7	7.725	0.000	22.925	0.0	0.000	OK
PP SF SW	FEH: 2 years: +0 %: 15 mins: Summer	237.646	237.646	0.010	203.4	31.363	0.000	88.408	0.0	0.000	OK
SF FD	FEH: 2 years: +0 %: 120 mins: Summer	238.795	238.666	0.166	29.9	34.346	0.000	0.000	15.7	61.290	OK
Soakaway	FEH: 2 years: +0 %: 360 mins: Winter	236.291	236.291	0.291	9.9	49.934	0.000	80.751	0.0	0.000	OK
SF E FD	FEH: 2 years: +0 %: 960 mins: Summer	241.716	241.708	0.077	1.6	14.315	0.000	0.000	0.5	21.543	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design	Date: 10/11/2025		
	Designed by: JD	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB		





FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Resident Volume

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Stormwater Control	Storm Event	Max. DS Level (m)	Max. Avg. Level (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SS Filter Drain	FEH: 30 years: +35 %: 240 mins: Summer	240.424	240.867	0.592	6.8	14.510	0.000	0.000	2.8	48.331	OK
SS (3)	FEH: 30 years: +35 %: 60 mins: Summer	241.266	241.262	0.062	8.6	4.992	0.000	10.694	0.0	0.000	OK
SS (2)	FEH: 30 years: +35 %: 60 mins: Summer	241.453	241.448	0.062	5.3	3.110	0.000	6.658	0.0	0.000	OK
SS (1)	FEH: 30 years: +35 %: 60 mins: Summer	241.734	241.721	0.062	3.5	2.070	0.000	4.429	0.0	0.000	OK
Pond	FEH: 30 years: +35 %: 1440 mins: Winter	237.939	237.939	0.899	3.5	103.982	0.000	120.539	0.0	0.000	OK
NF PP 3	FEH: 30 years: +35 %: 60 mins: Summer	241.120	241.115	0.062	80.4	46.911	0.000	100.501	0.0	0.000	OK
NF PP 2	FEH: 30 years: +35 %: 60 mins: Summer	241.818	241.807	0.062	19.6	11.434	0.000	24.496	0.0	0.000	OK
NF PP 4	FEH: 30 years: +35 %: 60 mins: Summer	241.589	241.585	0.062	36.0	20.979	0.000	44.954	0.0	0.000	OK
NF PP 1	FEH: 30 years: +35 %: 60 mins: Summer	241.864	241.862	0.062	80.0	46.636	0.000	99.913	0.0	0.000	OK
NF Filter Drain	FEH: 30 years: +35 %: 240 mins: Summer	241.550	241.475	0.439	6.6	11.769	0.000	0.000	1.8	35.088	OK
PP SF NE	FEH: 30 years: +35 %: 60 mins: Summer	241.699	241.695	0.062	85.6	49.917	0.000	106.943	0.0	0.000	OK
PP SF SW	FEH: 30 years: +35 %: 60 mins: Summer	237.704	237.702	0.066	330.2	197.032	0.000	412.527	0.0	0.000	OK
SF FD	FEH: 30 years: +35 %: 60 mins: Summer	238.963	238.956	0.456	109.4	94.303	0.000	0.000	24.3	126.061	OK
Soakaway	FEH: 30 years: +35 %: 480 mins: Winter	236.976	236.976	0.976	18.9	167.783	0.000	128.578	0.0	0.000	OK
SF E FD	FEH: 30 years: +35 %: 480 mins: Summer	241.921	241.842	0.211	6.2	39.314	0.000	0.000	0.9	28.152	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 100 years: +40 %: 15 mins: Summer	Custom	Simple Junction (5)	Simple Junction (3)	232.000	231.722	0.044	1.975	0.5	0.02	4.5	OK
2.000	FEH: 100 years: +40 %: 15 mins: Summer	Custom	Simple Junction (6)	Simple Junction (4)	232.000	231.721	0.083	1.983	0.5	0.02	4.4	OK
5.001	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	SS Filter Drain	S5	241.938	240.953	0.068	17.230	0.7	0.1	4.1	Surcharged
1.001	FEH: 100 years: +40 %: 15 mins: Summer	Custom	Simple Junction (3)	S1	232.000	231.664	0.176	3.852	0.4	0.03	8.7	OK
2.001	FEH: 100 years: +40 %: 15 mins: Summer	Custom	Simple Junction (4)	S1	232.000	231.661	0.215	3.896	0.4	0.02	8.7	OK
1.003	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S4	S5	241.800	240.924	0.113	19.314	2.0	0.9	28.3	OK
3.000	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S2	S4	242.000	241.279	0.103	7.280	1.3	0.55	16.5	OK
1.004	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S5	S6	241.400	240.287	0.096	23.031	1.9	0.37	30.7	OK
1.005	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S6	S7	241.250	239.889	0.082	22.965	2.3	0.26	30.3	OK
1.006	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S7	S8	241.083	239.545	0.073	22.849	2.7	0.22	29.6	OK
1.007	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S8	Pond	240.100	237.317	0.193	22.488	1.1	0.68	28.7	OK
No Delay	FEH: 100 years: +40 %: 15 mins: Summer	No Delay	S1	S4		231.663	0.085	7.678	0.0		5.0	
5.000	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	NF Filter Drain	SS Filter Drain	242.642	241.410	0.100	2.609	0.6	0.94	3.4	Surcharged
6.000	FEH: 100 years: +40 %: 60 mins: Summer	Pipe	SF FD	Soakaway	239.600	239.119	0.083	147.664	1.7	0.17	28.1	Surcharged

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Linear Channel Drain	FEH: 100 years: +40 %: 15 mins: Summer	Rectangular Channel	Simple Junction	Channel Drain Gully	242.196	241.986	0.061	4.552	0.6	0.14	9.9	OK
4.000	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	Channel Drain Gully	S3 (1)	242.134	241.342	0.085	4.553	0.9	0.63	9.3	OK
4.001	FEH: 100 years: +40 %: 15 mins: Summer	Pipe	S3 (1)	S4	241.879	241.041	0.102	4.535	0.7	0.56	8.5	OK
Pipe	FEH: 100 years: +40 %: 480 mins: Summer	Pipe	SF E FD	NF Filter Drain	242.216	241.935	0.150	24.950	0.1	0.1	1.0	Surcharged

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 2 years: +0 %: 15 mins: Summer	Custom	Simple Junction (5)	Simple Junction (3)	232.000	231.710	0.012	0.542	0.3	0.01	1.2	OK
2.000	FEH: 2 years: +0 %: 15 mins: Summer	Custom	Simple Junction (6)	Simple Junction (4)	232.000	231.709	0.012	0.541	0.3	0.01	1.2	OK
5.001	FEH: 2 years: +0 %: 480 mins: Summer	Pipe	SS Filter Drain	S5	241.938	240.591	0.031	36.806	0.6	0.04	1.6	Surcharged
1.001	FEH: 2 years: +0 %: 15 mins: Summer	Custom	Simple Junction (3)	S1	232.000	231.600	0.014	1.077	0.5	0.01	2.2	OK
2.001	FEH: 2 years: +0 %: 15 mins: Summer	Custom	Simple Junction (4)	S1	232.000	231.518	0.014	1.078	0.4	0.01	2.2	OK
1.003	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S4	S5	241.800	240.861	0.058	5.347	1.6	0.32	9.9	OK
3.000	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S2	S4	242.000	241.236	0.050	1.989	0.9	0.15	4.5	OK
1.004	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S5	S6	241.400	240.239	0.051	6.460	1.5	0.12	9.9	OK
1.005	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S6	S7	241.250	239.847	0.044	6.440	1.8	0.08	9.7	OK
1.006	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S7	S8	241.083	239.511	0.040	6.407	1.9	0.07	9.3	OK
1.007	FEH: 2 years: +0 %: 30 mins: Summer	Pipe	S8	Pond	240.100	237.220	0.073	9.860	0.8	0.21	9.1	OK
No Delay	FEH: 2 years: +0 %: 15 mins: Summer	No Delay	S1	S4		230.583	0.076	2.150	0.0		4.1	
5.000	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	NF Filter Drain	SS Filter Drain	242.642	241.170	0.075	9.954	0.5	0.45	1.7	Surcharged
6.000	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	SF FD	Soakaway	239.600	238.666	0.062	61.246	1.5	0.09	15.7	OK
Linear Channel Drain	FEH: 2 years: +0 %: 15 mins: Summer	Rectangular Channel	Simple Junction	Channel Drain Gully	242.196	241.946	0.025	1.239	0.4	0.04	2.6	OK
4.000	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	Channel Drain Gully	S3 (1)	242.134	241.294	0.040	1.239	0.6	0.16	2.4	OK
4.001	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S3 (1)	S4	241.879	240.998	0.049	1.224	0.4	0.14	2.0	OK
Pipe	FEH: 2 years: +0 %: 960 mins: Summer	Pipe	SF E FD	NF Filter Drain	242.216	241.708	0.083	21.547	0.1	0.05	0.5	OK

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			



FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 30 years: +35 %: 15 mins: Summer	Custom	Simple Junction (5)	Simple Junction (3)	232.000	231.718	0.023	1.516	0.4	0.02	3.4	OK
2.000	FEH: 30 years: +35 %: 15 mins: Summer	Custom	Simple Junction (6)	Simple Junction (4)	232.000	231.718	0.033	1.515	0.4	0.02	3.4	OK
5.001	FEH: 30 years: +35 %: 30 mins: Summer	Pipe	SS Filter Drain	S5	241.938	240.735	0.063	6.301	0.6	0.08	3.3	Surcharged
1.001	FEH: 30 years: +35 %: 15 mins: Summer	Custom	Simple Junction (3)	S1	232.000	231.614	0.093	2.934	0.7	0.02	6.5	OK
2.001	FEH: 30 years: +35 %: 15 mins: Summer	Custom	Simple Junction (4)	S1	232.000	231.562	0.116	2.970	0.7	0.02	6.5	OK
1.003	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S4	S5	241.800	240.902	0.096	15.051	1.9	0.73	22.9	OK
3.000	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S2	S4	242.000	241.265	0.085	5.572	1.2	0.42	12.6	OK
1.004	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S5	S6	241.400	240.274	0.084	17.972	1.8	0.29	24.5	OK
1.005	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S6	S7	241.250	239.878	0.072	17.942	2.2	0.21	24.1	OK
1.006	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S7	S8	241.083	239.537	0.065	17.892	2.5	0.17	23.6	OK
1.007	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S8	Pond	240.100	237.275	0.139	17.643	1.0	0.54	22.9	OK
No Delay	FEH: 30 years: +35 %: 15 mins: Summer	No Delay	S1	S4		231.563	0.084	6.039	0.0		5.0	
5.000	FEH: 30 years: +35 %: 60 mins: Winter	Pipe	NF Filter Drain	SS Filter Drain	242.642	241.452	0.100	9.123	0.6	0.78	2.8	Surcharged
6.000	FEH: 30 years: +35 %: 120 mins: Summer	Pipe	SF FD	Soakaway	239.600	238.937	0.078	162.324	1.7	0.15	24.5	Surcharged

Project: Cellarhead Battery Energy Storage Surface Water Drainage Design		Date: 10/11/2025			
		Designed by: JD	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase		Company Address: 4245 Park Approach Thorpe Park Leeds, LS15 8GB			

Linear Channel Drain	FEH: 30 years: +35 %: 15 mins: Summer	Rectangular Channel	Simple Junction	Channel Drain Gully	242.196	241.974	0.050	3.479	0.6	0.11	7.5	OK
4.000	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	Channel Drain Gully	S3 (1)	242.134	241.328	0.072	3.480	0.8	0.48	7.1	OK
4.001	FEH: 30 years: +35 %: 15 mins: Summer	Pipe	S3 (1)	S4	241.879	241.029	0.085	3.463	0.6	0.42	6.4	OK
Pipe	FEH: 30 years: +35 %: 240 mins: Winter	Pipe	SF E FD	NF Filter Drain	242.216	241.836	0.150	11.792	0.1	0.11	1.1	Surcharged