TECHNICAL DESIGN NOTE

Hydrock

Project name	Ocado, Bicester Plot B		
Design note title	Drainage Strategy Technical Note		
Document reference	Drainage Strategy Technical Note		
Author	James Welch		
Revision	P03		
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Revision P03 dated 19.01.21 - updates shown in red in response to LLFA comments dated 4.01.21

Hydrock Consultants have been commission to complete the detailed design of the foul and storm water drainage to accommodate the extension of the external yard and parking for Plot B at Symmetry Park, Bicester. The proposed works included additional parking area, out buildings, vehicle wash down, refuelling and storage zones.

This technical note is to be read in accordance with Hydrock drawings C-13482-HYD-00-ZZ-DR-7000 and 7001 - Drainage Strategy Sheets 1 and 2 respectively and additionally drawing C-13482-HYD-00-ZZ-DR-7003, the catchment plan.

1. EXISTING STORM DRAINAGE

The existing storm water system for Plot B has been designed and installed to accommodate a 1in100yr+20% climate change storm event. The existing network has a pumped outfall with a pump rate of 5.5l/s for storms up to and including a 1in2yr event and 12.5l/s for all storms exceeding this event. The existing as built system when modelled for a 1 in 100yr +20%CC storm event has 29.8m3 of flooding in total (See Appendix A for MicroDrainage Results). When modelled for the 1 in 100yr +40%CC event as required to comply with current legislation the existing system floods to a volume of 360.4m3 (See Appendix B for MicroDrainage Results). Regardless of any planned extension or development this flooding would be the case for such a storm event. This additional flooding can be accommodated safely within the yard docks and car park.

2. PROPOSED STORM WATER STRATEGY

Refer drawing C-13482-HYD-00-ZZ-DR-7003. This drawing illustrates the existing catchment (2.677Ha) and the additional catchment (0.67Ha) which is to be construction following this planning application.

It is proposed to limit any impact on the existing as built drainage as a result of the proposed works. With the exception of minor diversion to avoid proposed out buildings the existing network is to remain unchanged. This approach includes the existing pumping station and rising main that will remain as per the previously approved discharge rates and not increasing as a result of the increased impermeable area.

The proposed system primarily consists of a network of drainage channel with the surface levels graded to ensure car parking and yard areas fall towards the above-mentioned channels. Any rainwater pipes are connected via a traditional manhole and piped gravity system. The point of connection to the existing storm system is downstream of the existing petrol interceptor (to avoid overloading the existing

interceptor) but upstream of the existing attenuation tank. The proposed system drains to the existing pump via the existing network with the existing pump acting as the flow control device for the complete site (existing and proposed); there is therefore no requirement for a flow control device on the proposed network.

With the existing discharge rate not increasing but additional impermeable area draining to the system there is a need for additional attenuation to control flooding. Attenuation is provided in the form of an offline tank located on the proposed system. The required attenuation volume is 665m3 to ensure the extent of flooding on the proposed system is controlled and that the flooding on the existing system does not increase.

When modelling for a 1 in 100yr + 40%CC event the proposed system does not discharge at an increased rate from existing and has 20.1m3 of flooding. This flooding can be accommodated within the natural valley/low point of the proposed car park above ground. The existing system has 328.9m3 of flooding which is a decrease of 31.5m3 from the existing situation (See Appendix C for MicroDrainage Results).

The majority of the flood water (252.4m3) shall be retained within the docks at a depth less than 300mm. The remaining floodwater shall be retained against kerbs within the service yard and the car park.

There is no flooding during for any event up to and including the 1in30yr return period storm.

There is therefore no increase in discharge rate and no increase in flooding from the plot B site as a result of the increase in impermeable area.

2.1 Exceedance and pump failure

The site is to drain via the existing pumping station. The pumpstation comprises a duty and standby pump. In the unlikely event of both pumps failing the surface water run off shall follow the exceedance routes. Arrows have been added to the drainage plans to illustrate the exceedance routes.

The arrows show the all flows to either be away from the building or into the docks.

3. POLLUTION CONTROL AND SUDS FEATURES

Due to the nature of the development (primarily external yard and parking) the proposed works are to drain via a suitably sized full retention petrol interceptor.

The refuelling area is to drain via a class 1 forecourt interceptor that is sufficient to discharge to the storm water network.

The wash down area is to drain via a washdown silt trap interceptor and to a below ground holding tank. The water is to be reused within the wash facility but once full the waste water within the holding tank is to be tankered from site.

Both the wash down and fuelling areas are to have canopies to prevent rainwater from filling or diluting the washdown and forecourt interceptors. All interceptor and washdown units are to be alarmed.

3.1 Water Quality Assessment

A Water quality assessment has been carried out in accordance with section 26 of the CIRIA SuDS Manual.

Following the Simple index approach as specified by section 26.7.1:

Total SuDS mitigation index ≥ pollution hazard index

Pollution hazard index:

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]
Total hazard index		1.1	1.0	0.95

SuDs mitigation index:

	Mitigation indices[1]		
Type of SuDS component	TSS	Metals	Hydrocarbons
Swale	0.5	0.6	0.6
Proprietary treatment systems[5,6]	0.8	0.65	0.9
Total SuDS mitigation index	1.3	1.25	1.5

4.05 (SUDS mitigation index) > 3.05 (Total hazard index).

Suds mitigation index for each contaminant is also greater than the pollution hazard index.

Therefore, pollution mitigation is acceptable

Attenuation is primarily provided within a below ground storage crate due to the limited space available on site and the need for all external areas to be treated. There is a swale to collect runoff from the footpath area as an additional SUDs item.

4. FOUL DRAINAGE SYSTEM

Additional foul connections have been provided to proposed buildings that will require foul outlets. All connections can drain via gravity to the existing system.

At the time of writing this report the exact staff number is unknown. Subject to confirmation of this number the existing foul treatment facility may need to be upgraded.

Appendix A

Existing drainage network results modelled for a 1 in 100 yr +20% climate change

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.403
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	200.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+20%	100/15 Summer	100/15 Winter		
1.001	2	15 Winter	100	+20%	100/15 Summer			
1.002	3	15 Winter	100	+20%	100/15 Summer			
1.003	4	960 Winter	100	+20%	100/15 Summer			
1.004	5	960 Winter	100	+20%	100/15 Summer			
1.005	6	960 Winter	100	+20%	100/15 Summer			
2.000	7	960 Winter	100	+20%	100/15 Summer	100/480 Winter		
3.000	8	960 Winter	100	+20%	100/360 Winter			
1.006	7	960 Winter	100	+20%	100/15 Summer			
1.007	8	960 Winter	100	+20%	100/15 Summer			
1.008	9	960 Winter	100	+20%	100/15 Summer			
1.009	10	960 Winter	100	+20%	100/15 Summer			
4.000	13	15 Winter	100	+20%	100/15 Summer			
4.001	14	15 Winter	100	+20%	100/15 Summer			
4.002	15	15 Winter	100	+20%	100/15 Summer			
4.003	16	15 Winter	100	+20%	100/15 Summer			
4.004	17	960 Winter	100	+20%	100/15 Summer			
4.005	18	960 Winter	100	+20%	100/15 Summer			
1.010	11	960 Winter	100	+20%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	65.470	1.005	0.424	1.00		40.8	FLOOD	1
1.001	2	65.296	1.136	0.000	1.14		84.0	FLOOD RISK	
1.002	3	64.993	1.073	0.000	1.49		100.0	SURCHARGED	
1.003	4	64.911	1.081	0.000	0.12		9.2	SURCHARGED	
1.004	5	64.926	1.556	0.000	0.11		8.7	SURCHARGED	
1.005	6	64.925	1.670	0.000	0.08		15.9	SURCHARGED	
2.000	7	64.811	1.216	52.448	0.16		11.7	FLOOD	5
3.000	8	64.929	0.629	0.000	0.04		6.9	SURCHARGED	
1.006	7	64.925	1.820	0.000	0.16		30.5	SURCHARGED	
1.007	8	64.953	1.897	0.000	0.12		30.0	SURCHARGED	
1.008	9	64.963	2.207	0.000	0.12		29.8	SURCHARGED	
1.009	10	64.965	2.259	0.000	0.12		29.5	SURCHARGED	
4.000	13	65.636	0.706	0.000	0.39		119.1	SURCHARGED	
4.001	14	65.611	0.761	0.000	1.23		363.2	SURCHARGED	
4.002	15	65.489	0.719	0.000	2.19		601.1	SURCHARGED	
4.003	16	65.140	0.440	0.000	1.79		717.6	SURCHARGED	
4.004	17	64.953	0.413	0.000	0.05		50.7	SURCHARGED	
4.005	18	64.962	1.362	0.000	0.15		50.5	SURCHARGED	
1.010	11	64.965	2.915	0.000	0.84		12.8	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.000	21	15 Winter	100	+20%	100/15 Summer				64.937
5.001	22	960 Winter	100	+20%	100/15 Summer				64.853
5.002	23	960 Winter	100	+20%	100/15 Summer				64.878
1.011	13	1440 Winter	100	+20%	100/15 Summer				64.943
1.012	14	480 Summer	100	+20%	100/480 Summer				64.920

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.000	21	0.282	0.000	1.12		40.0	SURCHARGED	
5.001	22	0.598	0.000	0.07		3.9	SURCHARGED	
5.002	23	1.293	0.000	0.15		6.0	SURCHARGED	
1.011	13	3.063	0.000	2.30		12.5	SURCHARGED	
1.012	14	0.000	0.000	1.04		12.5	SURCHARGED	

Appendix B

Existing drainage network results modelled for a 1 in 100 yr +40% climate change

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.403
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	200.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
1.001	2	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
1.002	3	15 Winter	100	+40%	100/15 Summer			
1.003	4	15 Winter	100	+40%	100/15 Summer			
1.004	5	960 Winter	100	+40%	100/15 Summer			
1.005	6	960 Winter	100	+40%	100/15 Summer			
2.000	7	960 Winter	100	+40%	100/15 Summer	100/180 Winter		
3.000	8	960 Winter	100	+40%	100/15 Summer			
1.006	7	960 Winter	100	+40%	100/15 Summer			
1.007	8	960 Winter	100	+40%	100/15 Summer			
1.008	9	960 Winter	100	+40%	100/15 Summer			
1.009	10	960 Winter	100	+40%	100/15 Summer			
4.000	13	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
4.001	14	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
4.002	15	15 Winter	100	+40%	100/15 Summer	100/15 Winter		
4.003	16	15 Winter	100	+40%	100/15 Summer			
4.004	17	960 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	65.479	1.014	8.715	1.57		63.9	FLOOD	4
1.001	2	65.482	1.322	1.580	1.18		86.9	FLOOD	2
1.002	3	65.374	1.454	0.000	1.55		104.1	FLOOD RISK	
1.003	4	65.198	1.368	0.000	1.24		93.6	SURCHARGED	
1.004	5	65.139	1.744	0.000	0.13		9.9	SURCHARGED	
1.005	6	65.137	1.882	0.000	0.09		18.6	SURCHARGED	
2.000	7	65.128	1.533	327.917	0.15		11.7	FLOOD	18
3.000	8	65.138	0.838	0.000	0.05		8.1	SURCHARGED	
1.006	7	65.136	2.030	0.000	0.20		37.7	SURCHARGED	
1.007	8	65.135	2.079	0.000	0.15		37.5	SURCHARGED	
1.008	9	65.135	2.379	0.000	0.15		37.3	SURCHARGED	
1.009	10	65.135	2.429	0.000	0.15		37.1	SURCHARGED	
4.000	13	65.843	0.913	14.178	0.47		137.0	FLOOD	2
4.001	14	65.835	0.985	7.887	1.24		367.6	FLOOD	2
4.002	15	65.827	1.057	0.073	2.31		635.0	FLOOD	
4.003	16	65.453	0.753	0.000	1.89		759.0	SURCHARGED	
4.004	17	65.137	0.597	0.000	0.06		59.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.005	18	960 Winter	100	+40%	100/15 Summer				65.136
1.010	11	960 Winter	100	+40%	100/15 Summer				65.135
5.000	21	15 Winter	100	+40%	100/15 Summer				65.155
5.001	22	960 Winter	100	+40%	100/15 Summer				65.103
5.002	23	960 Winter	100	+40%	100/15 Summer				65.101
1.011	13	960 Winter	100	+40%	100/15 Summer				65.099
1.012	14	2880 Summer	100	+40%					65.020

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
4.005	18	1.536	0.000	0.18		58.9	SURCHARGED	
1.010	11	3.085	0.000	1.62		24.8	SURCHARGED	
5.000	21	0.460	0.000	1.10		45.8	SURCHARGED	
5.001	22	0.948	0.000	0.11		4.6	SURCHARGED	
5.002	23	1.266	0.000	0.12		4.6	SURCHARGED	
1.011	13	3.099	0.000	2.30		12.5	SURCHARGED	
1.012	14	0.000	0.000	1.04		12.5	OK	

Appendix C

Microdrainage results for 1 in 2, 30 and 100 +40%CC for drainage network incorporating additional impermeable area

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.403	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.850	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	45.400	0.305	148.9	0.101	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	48.040	0.240	200.0	0.122	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	18.000	0.090	200.0	0.052	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	86.800	0.460	188.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	11.000	0.050	220.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	19.900	0.095	209.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	56.170	0.119	472.0	0.228	0.00	0.0	0.600	o	525	Pipe/Conduit	
2.000	49.800	1.194	41.7	0.205	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	18.600	0.050	372.0	0.350	0.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	72.33	4.71	64.240	0.101	0.0	0.0	0.0	1.07	42.5	22.4
1.001	68.06	5.43	63.860	0.223	0.0	0.0	0.0	1.11	78.3	46.6
1.002	66.61	5.70	63.620	0.275	0.0	0.0	0.0	1.11	78.3	56.2
1.003	60.65	6.97	63.530	0.275	0.0	0.0	0.0	1.14	80.7	56.2
1.004	59.93	7.14	63.070	0.275	0.0	0.0	0.0	1.06	74.6	56.2
1.005	58.70	7.45	63.020	0.275	0.0	0.0	0.0	1.08	76.5	56.2
1.006	55.36	8.36	62.700	0.503	0.0	0.0	0.0	1.02	221.7	85.5
2.000	74.75	4.34	64.000	0.205	0.0	0.0	0.0	2.44	172.6	47.0
1.007	54.46	8.63	62.581	1.058	0.0	0.0	0.0	1.16	250.1	176.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.008	5.250	0.050	105.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	5.250	0.050	105.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
3.000	85.700	0.355	241.4	0.229	4.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	57.300	0.355	161.4	0.412	4.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	21.900	1.814	12.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	21.300	1.789	11.9	0.052	4.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	5.000	0.020	250.0	0.000	4.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	12.100	0.030	403.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.010	5.250	0.050	105.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
7.000	28.180	0.080	352.3	0.237	4.00	0.0	0.600	o	600	Pipe/Conduit	
7.001	27.910	0.080	348.9	0.484	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.002	28.300	0.070	404.3	0.484	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.003	19.700	0.100	197.0	0.245	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.004	12.600	0.060	210.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.008	54.33	8.67	62.531	1.058	0.0	0.0	0.0	2.19	473.2	176.9
1.009	54.20	8.71	62.231	1.058	0.0	0.0	0.0	2.19	473.2	176.9
3.000	68.13	5.42	64.705	0.229	0.0	0.0	0.0	1.01	71.2	47.9
4.000	71.91	4.77	64.705	0.412	0.0	0.0	0.0	1.23	87.3«	90.9
3.001	67.69	5.50	64.350	0.641	0.0	0.0	0.0	4.55	321.6	133.2
5.000	76.28	4.12	64.375	0.052	0.0	0.0	0.0	2.94	51.9	12.2
6.000	76.54	4.08	62.231	0.000	0.0	0.0	0.0	0.99	70.0	0.0
3.002	66.72	5.68	62.211	0.693	0.0	0.0	0.0	1.11	240.1	141.9
1.010	54.07	8.75	62.181	1.751	0.0	0.0	0.0	2.19	473.2	290.6
7.000	74.59	4.36	64.330	0.237	0.0	0.0	0.0	1.29	365.2	54.3
7.001	72.24	4.72	64.250	0.721	0.0	0.0	0.0	1.30	367.0	159.9
7.002	69.86	5.11	64.170	1.205	0.0	0.0	0.0	1.20	340.7	258.4
7.003	68.77	5.30	64.100	1.450	0.0	0.0	0.0	1.73	489.6	306.1
7.004	68.07	5.43	64.000	1.450	0.0	0.0	0.0	1.68	474.1	306.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
7.005	19.430	0.890	21.8	0.063	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.006	6.000	0.050	120.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	4.670	0.050	93.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	80.030	0.400	200.1	0.083	4.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	47.300	0.650	72.8	0.033	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	25.000	1.650	15.2	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.012	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
7.005	67.73	5.49	63.940	1.513	0.0	0.0	0.0	5.23	1477.9	314.5
7.006	67.49	5.54	63.050	1.513	0.0	0.0	0.0	2.22	628.3	314.5
1.011	53.84	8.83	61.900	3.264	0.0	0.0	0.0	1.04	18.4«	539.3
8.000	67.96	5.45	64.430	0.083	0.0	0.0	0.0	0.92	36.6	17.3
8.001	65.27	5.96	64.030	0.116	0.0	0.0	0.0	1.53	61.0	23.2
8.002	64.66	6.09	63.380	0.166	0.0	0.0	0.0	3.38	134.3	32.9
1.012	53.32	8.99	61.730	3.430	0.0	0.0	0.0	1.00	17.8«	561.4

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.900
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.403		

Online Controls for Storm

Complex Manhole: 13, DS/PN: 1.012, Volume (m³): 6.0

Pump

Invert Level (m) 61.730

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	5.5000	1.370	5.5000	1.371	12.5000	3.560	12.5000

Weir

Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 66.110

Storage Structures for Storm

Cellular Storage Manhole: 16, DS/PN: 6.000

Invert Level (m) 62.231 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	350.0	0.0	2.001	0.0	0.0
2.000	350.0	0.0			

Cellular Storage Manhole: 11, DS/PN: 1.011

Invert Level (m) 61.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	758.0	0.0	2.010	0.0	0.0
2.000	758.0	0.0			

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.403
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	200.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30
Climate Change (%)	0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	2	+0%					64.350
1.001	2	15 Winter	2	+0%	30/15 Summer				64.013
1.002	3	15 Winter	2	+0%	30/15 Summer				63.798
1.003	4	15 Winter	2	+0%	30/15 Summer				63.692
1.004	5	15 Winter	2	+0%	30/15 Summer				63.255
1.005	5A	15 Winter	2	+0%	30/15 Summer				63.191
1.006	6	15 Winter	2	+0%	30/15 Summer				62.964
2.000	7	15 Winter	2	+0%					64.100
1.007	7	15 Winter	2	+0%	30/15 Summer				62.914
1.008	8	15 Winter	2	+0%	30/15 Summer				62.811
1.009	9	960 Winter	2	+0%	30/15 Summer				62.665
3.000	N1	15 Winter	2	+0%	30/15 Summer				64.880
4.000	N2	15 Winter	2	+0%	30/15 Summer				64.938
3.001	N3	15 Winter	2	+0%					64.485
5.000	N5	15 Winter	2	+0%					64.421
6.000	16	960 Winter	2	+0%	2/180 Winter				62.665
3.002	N6	960 Winter	2	+0%	30/15 Summer				62.665
1.010	10	960 Winter	2	+0%	30/15 Summer				62.665
7.000	11	15 Winter	2	+0%	30/15 Summer				64.602

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.115	0.000	0.47		18.9	OK	
1.001	2	-0.147	0.000	0.50		36.8	OK	
1.002	3	-0.122	0.000	0.65		43.8	OK	
1.003	4	-0.138	0.000	0.53		41.5	OK	
1.004	5	-0.115	0.000	0.69		41.0	OK	
1.005	5A	-0.129	0.000	0.62		41.2	OK	
1.006	6	-0.261	0.000	0.33		65.5	OK	
2.000	7	-0.200	0.000	0.24		39.5	OK	
1.007	7	-0.192	0.000	0.72		138.5	OK	
1.008	8	-0.245	0.000	0.55		137.8	OK	
1.009	9	-0.091	0.000	0.05		13.1	OK	
3.000	N1	-0.125	0.000	0.58		40.1	OK	
4.000	N2	-0.067	0.000	0.92		76.3	OK	
3.001	N3	-0.165	0.000	0.41		116.6	OK	
5.000	N5	-0.104	0.000	0.21		10.0	OK	
6.000	16	0.134	0.000	0.04		1.7	SURCHARGED	
3.002	N6	-0.071	0.000	0.05		6.9	OK	
1.010	10	-0.041	0.000	0.08		18.9	OK	
7.000	11	-0.328	0.000	0.15		44.3	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.001	12	15 Winter	2	+0%	30/15 Summer				64.576
7.002	13	15 Winter	2	+0%	30/15 Summer				64.535
7.003	14	15 Winter	2	+0%	30/15 Summer				64.445
7.004	14A	15 Winter	2	+0%	30/15 Summer				64.362
7.005	15	15 Winter	2	+0%					64.138
7.006	16	15 Winter	2	+0%	30/15 Summer				63.413
1.011	11	960 Winter	2	+0%	2/15 Summer				62.665
8.000	17	15 Winter	2	+0%					64.536
8.001	22	15 Winter	2	+0%					64.119
8.002	23	15 Winter	2	+0%					63.451
1.012	13	1440 Winter	2	+0%	2/15 Summer				62.945

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
7.001	12	-0.274	0.000	0.38		113.4	OK	
7.002	13	-0.235	0.000	0.66		180.5	OK	
7.003	14	-0.255	0.000	0.62		216.4	OK	
7.004	14A	-0.238	0.000	0.68		215.8	OK	
7.005	15	-0.402	0.000	0.24		223.1	OK	
7.006	16	-0.237	0.000	0.67		223.7	OK	
1.011	11	0.615	0.000	0.39		5.5	SURCHARGED	
8.000	17	-0.119	0.000	0.41		14.5	OK	
8.001	22	-0.136	0.000	0.33		19.1	OK	
8.002	23	-0.154	0.000	0.21		26.5	OK	
1.012	13	1.065	0.000	0.36		5.6	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.403
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	200.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30
Climate Change (%)	0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	30	+0%					64.445
1.001	2	15 Winter	30	+0%	30/15 Summer				64.223
1.002	3	15 Winter	30	+0%	30/15 Summer				64.058
1.003	4	15 Winter	30	+0%	30/15 Summer				63.938
1.004	5	15 Winter	30	+0%	30/15 Summer				63.508
1.005	5A	15 Winter	30	+0%	30/15 Summer				63.418
1.006	6	15 Winter	30	+0%	30/15 Summer				63.356
2.000	7	15 Winter	30	+0%					64.143
1.007	7	15 Winter	30	+0%	30/15 Summer				63.285
1.008	8	720 Winter	30	+0%	30/15 Summer				63.208
1.009	9	720 Winter	30	+0%	30/15 Summer				63.207
3.000	N1	15 Winter	30	+0%	30/15 Summer				65.165
4.000	N2	15 Winter	30	+0%	30/15 Summer				65.804
3.001	N3	15 Winter	30	+0%					64.549
5.000	N5	15 Winter	30	+0%					64.440
6.000	16	720 Winter	30	+0%	2/180 Winter				63.207
3.002	N6	720 Winter	30	+0%	30/15 Summer				63.207
1.010	10	720 Winter	30	+0%	30/15 Summer				63.207
7.000	11	15 Summer	30	+0%	30/15 Summer				65.275

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.020	0.000	0.88		35.6	OK	
1.001	2	0.063	0.000	0.98		72.1	SURCHARGED	
1.002	3	0.138	0.000	1.19		80.0	SURCHARGED	
1.003	4	0.108	0.000	0.95		73.9	SURCHARGED	
1.004	5	0.138	0.000	1.37		81.6	SURCHARGED	
1.005	5A	0.098	0.000	1.22		81.1	SURCHARGED	
1.006	6	0.131	0.000	0.58		115.9	SURCHARGED	
2.000	7	-0.157	0.000	0.46		75.0	OK	
1.007	7	0.179	0.000	1.47		282.8	SURCHARGED	
1.008	8	0.152	0.000	0.11		27.8	SURCHARGED	
1.009	9	0.451	0.000	0.11		27.6	SURCHARGED	
3.000	N1	0.160	0.000	1.11		76.4	SURCHARGED	
4.000	N2	0.799	0.000	1.73		143.6	SURCHARGED	
3.001	N3	-0.101	0.000	0.78		219.7	OK	
5.000	N5	-0.085	0.000	0.39		19.1	OK	
6.000	16	0.676	0.000	0.08		3.8	SURCHARGED	
3.002	N6	0.471	0.000	0.07		9.8	SURCHARGED	
1.010	10	0.501	0.000	0.11		27.6	SURCHARGED	
7.000	11	0.345	0.000	0.26		76.7	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
7.001	12	15 Summer	30	+0%	30/15 Summer				65.225
7.002	13	15 Winter	30	+0%	30/15 Summer				65.157
7.003	14	15 Winter	30	+0%	30/15 Summer				64.982
7.004	14A	15 Winter	30	+0%	30/15 Summer				64.744
7.005	15	15 Winter	30	+0%					64.249
7.006	16	15 Winter	30	+0%	30/15 Summer				63.818
1.011	11	720 Winter	30	+0%	2/15 Summer				63.206
8.000	17	15 Winter	30	+0%					64.590
8.001	22	15 Winter	30	+0%					64.165
8.002	23	15 Winter	30	+0%					63.486
1.012	13	1440 Winter	30	+0%	2/15 Summer				63.199

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
7.001	12	0.375	0.000	0.79		231.9	SURCHARGED	
7.002	13	0.387	0.000	1.45		398.3	SURCHARGED	
7.003	14	0.282	0.000	1.37		476.1	SURCHARGED	
7.004	14A	0.144	0.000	1.49		474.6	SURCHARGED	
7.005	15	-0.291	0.000	0.52		490.2	OK	
7.006	16	0.168	0.000	1.47		489.9	SURCHARGED	
1.011	11	1.156	0.000	0.89		12.5	SURCHARGED	
8.000	17	-0.065	0.000	0.77		27.5	OK	
8.001	22	-0.090	0.000	0.65		38.0	OK	
8.002	23	-0.119	0.000	0.44		54.0	OK	
1.012	13	1.319	0.000	0.79		12.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.403
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	200.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	1440 Winter	100	+40%	100/15 Summer	100/15 Summer		
1.001	2	1440 Winter	100	+40%	100/15 Summer	100/15 Summer		
1.002	3	1440 Winter	100	+40%	100/15 Summer			
1.003	4	1440 Winter	100	+40%	100/15 Summer			
1.004	5	1440 Winter	100	+40%	100/15 Summer			
1.005	5A	960 Winter	100	+40%	100/15 Summer			
1.006	6	960 Winter	100	+40%	100/15 Summer	100/360 Winter		
2.000	7	960 Winter	100	+40%	100/15 Summer	100/960 Winter		
1.007	7	960 Winter	100	+40%	100/15 Summer	100/360 Winter		
1.008	8	960 Winter	100	+40%	100/15 Summer			
1.009	9	960 Winter	100	+40%	100/15 Summer			
3.000	N1	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
4.000	N2	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
3.001	N3	960 Winter	100	+40%	100/15 Summer			
5.000	N5	960 Winter	100	+40%	100/360 Winter			
6.000	16	960 Winter	100	+40%	100/15 Summer			
3.002	N6	960 Winter	100	+40%	100/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	65.492	1.027	21.892	0.09		3.7	FLOOD	9
1.001	2	65.493	1.333	13.318	0.09		6.3	FLOOD	7
1.002	3	65.495	1.575	0.000	0.12		7.8	SURCHARGED	
1.003	4	65.495	1.665	0.000	0.10		7.8	SURCHARGED	
1.004	5	65.497	2.127	0.000	0.13		7.8	SURCHARGED	
1.005	5A	65.498	2.178	0.000	0.15		10.0	FLOOD RISK	
1.006	6	65.500	2.275	140.414	0.09		18.0	FLOOD	8
2.000	7	65.501	1.201	1.071	0.05		8.1	FLOOD	2
1.007	7	65.501	2.395	110.928	0.20		39.1	FLOOD	8
1.008	8	65.506	2.450	0.000	0.16		38.9	SURCHARGED	
1.009	9	65.508	2.752	0.000	0.16		38.8	SURCHARGED	
3.000	N1	66.206	1.201	0.640	1.94		133.0	FLOOD	2
4.000	N2	66.224	1.219	19.475	2.08		172.5	FLOOD	4
3.001	N3	65.509	0.859	0.000	0.09		25.2	SURCHARGED	
5.000	N5	65.505	0.980	0.000	0.04		2.0	SURCHARGED	
6.000	16	65.508	2.977	0.000	0.24		11.0	SURCHARGED	
3.002	N6	65.508	2.772	0.000	0.08		11.1	SURCHARGED	

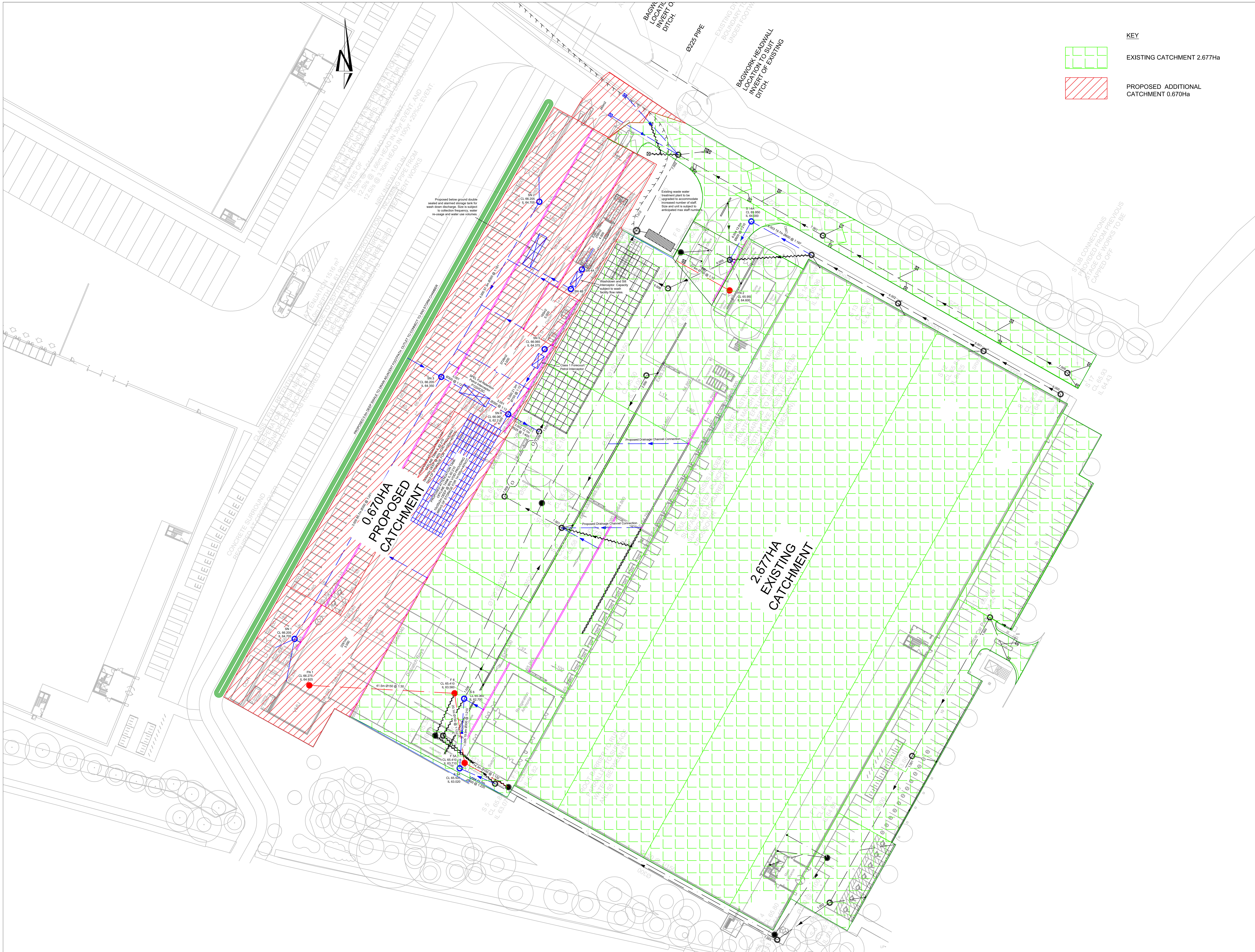
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.010	10	960 Winter	100	+40%	100/15 Summer			
7.000	11	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
7.001	12	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
7.002	13	15 Winter	100	+40%	100/15 Summer			
7.003	14	15 Winter	100	+40%	100/15 Summer			
7.004	14A	960 Winter	100	+40%	100/15 Summer			
7.005	15	960 Winter	100	+40%	100/15 Summer			
7.006	16	960 Winter	100	+40%	100/15 Summer			
1.011	11	960 Winter	100	+40%	100/15 Summer			
8.000	17	960 Winter	100	+40%	100/15 Summer			
8.001	22	960 Winter	100	+40%	100/15 Summer			
8.002	23	960 Winter	100	+40%	100/15 Summer			
1.012	13	960 Winter	100	+40%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.010	10	65.508	2.802	0.000	0.11		28.1	SURCHARGED	
7.000	11	65.910	0.980	0.000	0.53		155.6	FLOOD RISK	
7.001	12	65.881	1.031	41.245	1.29		382.1	FLOOD	4
7.002	13	65.836	1.066	0.000	1.99		547.1	FLOOD RISK	
7.003	14	65.586	0.886	0.000	1.95		678.4	SURCHARGED	
7.004	14A	65.508	0.908	0.000	0.18		57.1	SURCHARGED	
7.005	15	65.508	0.968	0.000	0.06		59.5	SURCHARGED	
7.006	16	65.507	1.857	0.000	0.18		59.1	SURCHARGED	
1.011	11	65.507	3.457	0.000	1.05		14.7	SURCHARGED	
8.000	17	65.475	0.820	0.000	0.09		3.3	SURCHARGED	
8.001	22	65.473	1.218	0.000	0.08		4.6	SURCHARGED	
8.002	23	65.471	1.866	0.000	0.05		6.5	SURCHARGED	
1.012	13	65.468	3.588	0.000	0.79		12.5	SURCHARGED	

Appendix D

Drawings



Notes:
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Rev	Date	Description	By	Ckd
P01	19.01.21	PRELIMINARY ISSUE	JH	CB

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Client :
TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY

Project Title:
OCADO BICESTER

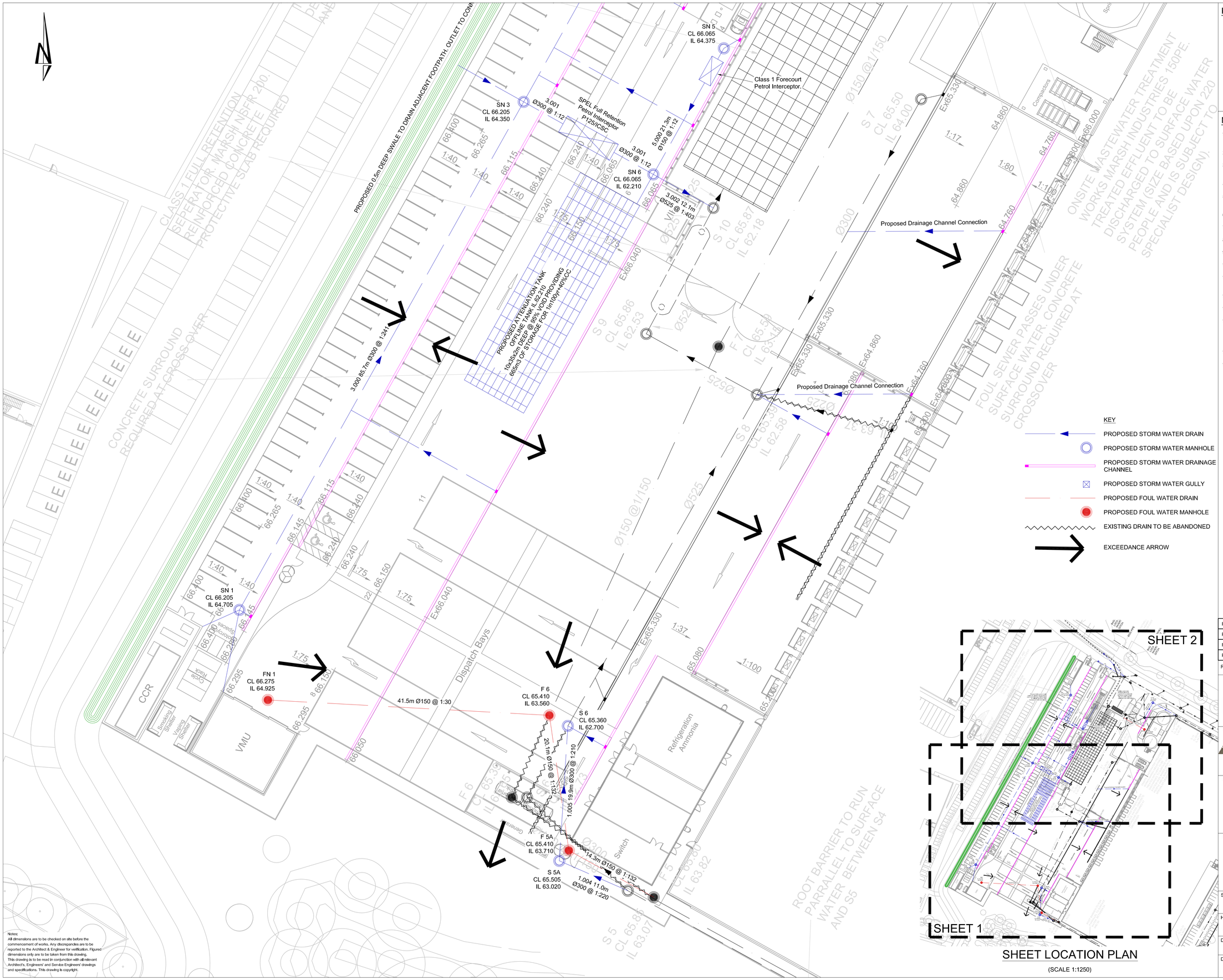
Drawing Title:
DRAINAGE CATCHMENTS

Status:	Purpose Of Issue:
S2	PRELIMINARY

Hydrock Project No:
C-13482

Drawn	Checked	Scale @ A1	Date
JH	CB	1:500	19/01/2021

Drawing Number: (Project Code-Originator-Zone-Level-Type-Role-Number)	Revision:
C-13482-HYD-00-ZZ-DR-C-7003	P01



KEY

- PROPOSED STORM WATER DRAIN
- PROPOSED STORM WATER MANHOLE
- PROPOSED STORM WATER DRAINAGE CHANNEL
- PROPOSED STORM WATER GULLY
- PROPOSED FOUL WATER DRAIN
- PROPOSED FOUL WATER MANHOLE
- EXISTING DRAIN TO BE ABANDONED
- EXCEEDANCE ARROW

SHEET LOCATION PLAN

(SCALE 1:1250)

Keyplan:

Notes:

1. This drawing is to be read in conjunction with relevant Architects, Engineers and specialist manufacturers drawings, reports and specifications.
2. All levels are shown in metres above Ordnance Datum (m AOD) unless otherwise shown.
3. Any ambiguities or discrepancies within this drawing and any other information given elsewhere must be reported to Hydrock for clarification.
4. All dimensions to be checked on site and any discrepancies reported to Hydrock before pricing / works commence.
5. It is recommended that all drains be laid starting from the downstream connection to the outlet and working upstream to the new development.
6. All private drainage to comply with current Building Regulations and relevant British Standards and Codes of Practices.
7. Connections to existing sewers in accordance with the Local Water Authority guidelines & approval.
8. Sewers and drains of different diameters should be laid soffit to soffit unless shown otherwise in the drawing.
9. All access chambers covers and frames to be installed to BS EN 124.
10. Private drainage pipe material and bedding to be agreed with Building control.
11. Foul drainage pipe connection to public sewer to be clay otherwise plastic twin-walled/ribbed pipe constructed to Water Industry Standard (WIS)-4-35-01.
12. Drainage Pipe work routes under building footprint will require installation prior to foundations.
13. The pipe diameters cover and invert levels of any existing manholes are to be verified on site prior to the commencement of the works.
14. All external drainage within trafficked areas with less than 1.2m cover to have type Z concrete bed and surround. All external drainage within landscaped areas with cover less than 0.6m to have type Z concrete bed and surround. All drainage with greater cover than the minimum required to have type S bed and surround.
15. All drainage to be installed in accordance with Sewers for Adoption 7th Edition.
16. All drainage to be installed in accordance with Civil Engineering Specification for the Water industry 7th Edition.

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Rev	Date	Description	By	Ckd
P04	19.01.21	Attenuation updated, exceedance arrows shown	JH	CB
P03	16.11.20	TITLE BLOCK UPDATED	JH	CB
P02	30.09.19	Wash down tank added	JW	CB
P01	20.09.19	PRELIMINARY ISSUE	JW	CB

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A TRITAX BIG BOX COMPANY

Project Title:

OCADO BICESTER

Drawing Title:

Proposed Drainage Strategy
(Sheet 1 of 2)

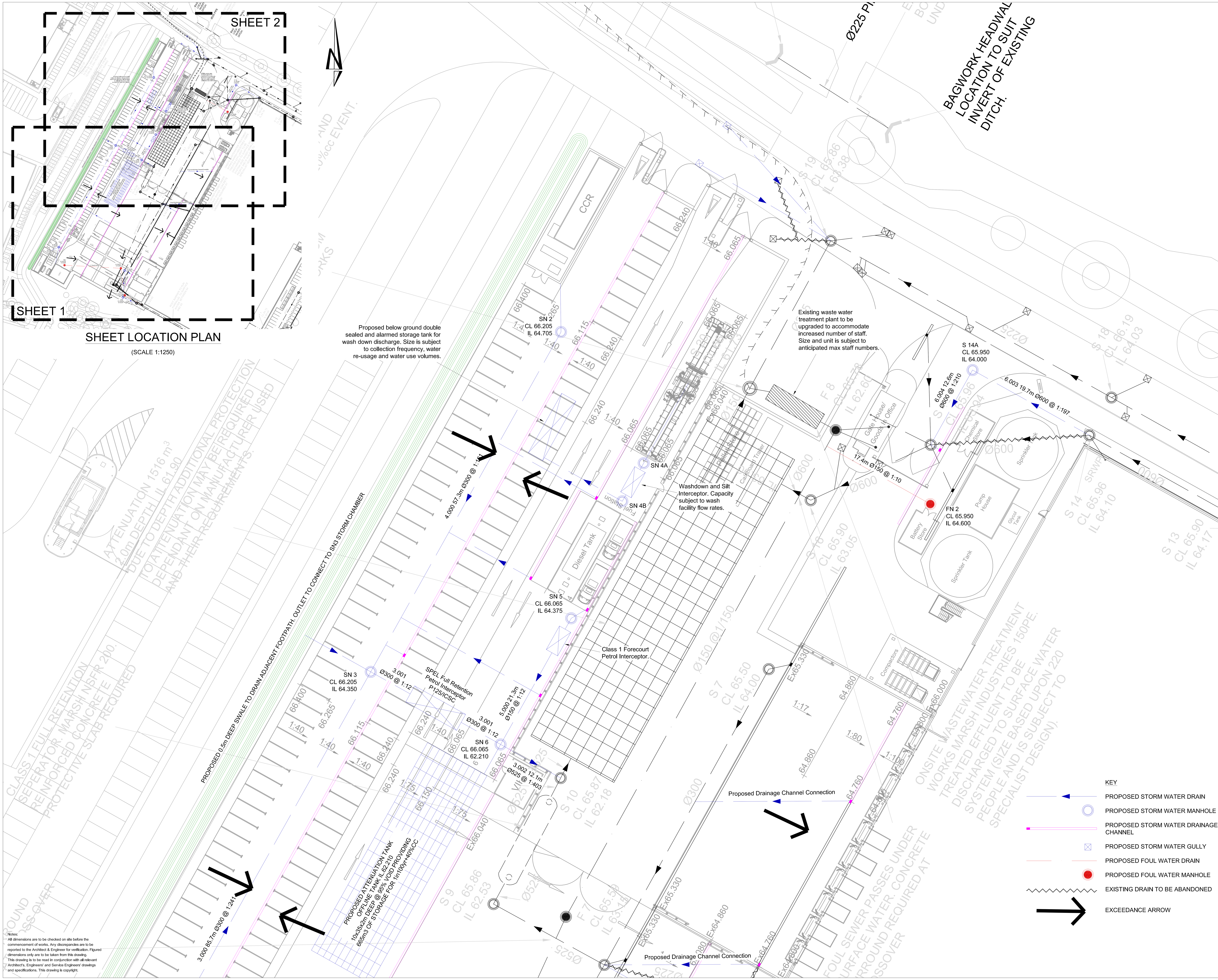
Status:	Purpose Of Issue:
S2	PRELIMINARY

Hydrock Project No:
C-13482

Drawn	Checked	Scale @ A1	Date
JW	CB	1:250	16/11/2020

Drawing Number: (Project Code-Orginator-Zone-Level-Type-Role-Number)
C-13482-HYD-00-ZZ-DR-C-7000

Revision:
P04


SHEET 2
SHEET 1
SHEET LOCATION PLAN
(SCALE 1:1250)
Notes:
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BAGWORK HEADWALL LOCATION TO SUIT INVERT OF EXISTING DITCH.
Proposed below ground double sealed and alarmed storage tank for wash down discharge. Size is subject to collection frequency, water re-usage and water use volumes.
Existing waste water treatment plant to be upgraded to accommodate increased number of staff. Size and unit is subject to anticipated max staff numbers.
Washdown and Silt Interceptor. Capacity subject to wash facility flow rates.
Class 1 Forecourt Petrol Interceptor.
SPEL Full Retention Petrol Interceptor P125/ICSC
PROPOSED 0.5m DEEP SWALE TO DRAIN ADJACENT FOOTPATH. OUTLET TO CONNECT TO SN3 STORM CHAMBER
PROPOSED ATTENUATION TANK OFFLINE TANK IL 62.210 10x35x2m DEEP @ 95% VOID PROVIDING 665m3 OF STORAGE FOR 1in100yr+40%CC
Proposed Drainage Channel Connection
SN 2
CL 66.205
IL 64.705
SN 3
CL 66.205
IL 64.350
SN 4A
SN 4B
SN 5
CL 66.065
IL 64.375
SN 6
CL 66.065
IL 62.210
S 14A
CL 65.950
IL 64.000
FN 2
CL 65.950
IL 64.600
CCR
Diesel Tank
Pump House
Sprinkler Tank
Battery Store
Compactors
KEY
PROPOSED STORM WATER DRAIN
PROPOSED STORM WATER MANHOLE
PROPOSED STORM WATER DRAINAGE CHANNEL
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EXISTING DRAIN TO BE ABANDONED
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Keyplan:

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A TRITAX BIG BOX COMPANY

Project Title:
OCADO BICESTER

Drawing Title:
Proposed Drainage Strategy (Sheet 2 of 2)

Status:	Purpose Of Issue:
S2	PRELIMINARY

Hydrock Project No: C-13482

Drawn	Checked	Scale @ A1	Date
JW	CB	1:250	16/11/2020

Drawing Number: (Project Code-Originator-Zone-Level-Type-Role-Number)	Revision:
C-13482-HYD-00-ZZ-DR-C-7001	P04