



PLANNING CONDITION 21 SUBMISSION

Dakota Hotel Manchester Airport

Reference	6338-JPG-XX-XX-RP-D-0624-S2-P01
Date	2 December 2025
Author	BT

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DOCUMENT HISTORY

Revision	Date	Revision Details	Status	Author(s)	Approved
P01	02.12.2025	First Issue	Information	BT	BT



1.0 INTRODUCTION

This report is to provide the details requested in Condition 21 of planning approval 140206/FO/2024. The wording of which is as follows.

"Prior to the first use of the development hereby approved details of the implementation, maintenance and management of the approved surface water drainage scheme as detailed in condition 12 of this decision notice, shall be submitted for approval in writing by the City Council, as Local Planning Authority. Those details shall include:

- *Verification report providing photographic evidence of constructed flow control and SuDS components as per design drawings of the approved surface water drainage scheme.*
- *Provide As Built construction drawings OR confirm that they align with the original design construction drawings.*
- *Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime."*

2.0 SITE DESCRIPTION

The pre-development site had an area of approximately 1.22 hectares (ha) and comprises an irregular shaped relatively level parcel of land. It measures approximately 110m along its North to South axis and 140m along its East to West axis. Vehicular access to the site is off Bailey Lane from the North West.

Most of the site was covered with crushed stone, with smaller areas of concrete hardstanding.

A shallow embankment, approximately 2m high, ran along the South-Eastern, South Western and North Western boundaries of the site.

Mature and semi-mature trees are located along the North Eastern boundary of the site.

Most of site was bound by a wooden fence, except for the entrance off Bailey Lane which comprises herras fencing secured with a combination lock. An additional fence/gate with a combination lock was located inside the site, close to the entrance off Bailey Lane.

Bailey Lane is located immediately beyond the North Western boundary beyond which are units occupied by the Razorblue Group and Etrop Grange Hotel. Woodland and houses are located beyond the site to the North East. A roundabout is located beyond the site to the South East and Enterprise Way is beyond the site to the South West.



Land beyond Enterprise Way to the South West and to the West beyond Bailey Lane are currently under construction.

3.0 DEVELOPMENT DESCRIPTION

The proposed development comprises a seven-story hotel building with associated car parking, electrical charging points, service yard and landscaping.

4.0 DRAINAGE VERIFICATION

We can confirm that the drainage has been installed in line with the approved planning documents and best practice guidance. The flow control device has been installed at SWMH-005 restricting flows to the watercourse to the agreed 3 l/s runoff rate.

An As-Built Drainage Layout drawing reference "L051-JPG-11-XX.XX-D-C-001400-CR-CR01-DRAINAGE_LAYOUT" is provided in Appendix A.

As-Built drainage calculations updated to correspond with the as-built levels are provided in Appendix B. These are in line with the calculations approved in planning, showing no surcharge in the 1 in 2-year event, no flooding in the 1 in 30-year event and minor flooding in the 1 in 100 + 45% CC event. The cumulative flooding shown in the as-built calculations is 2.127m³, this is less than 4.025m³ shown in the approved planning calculations.

All drainage maintenance is to be carried out in line with the approved JPG Drainage Maintenance and Management plan provided within in Appendix C.

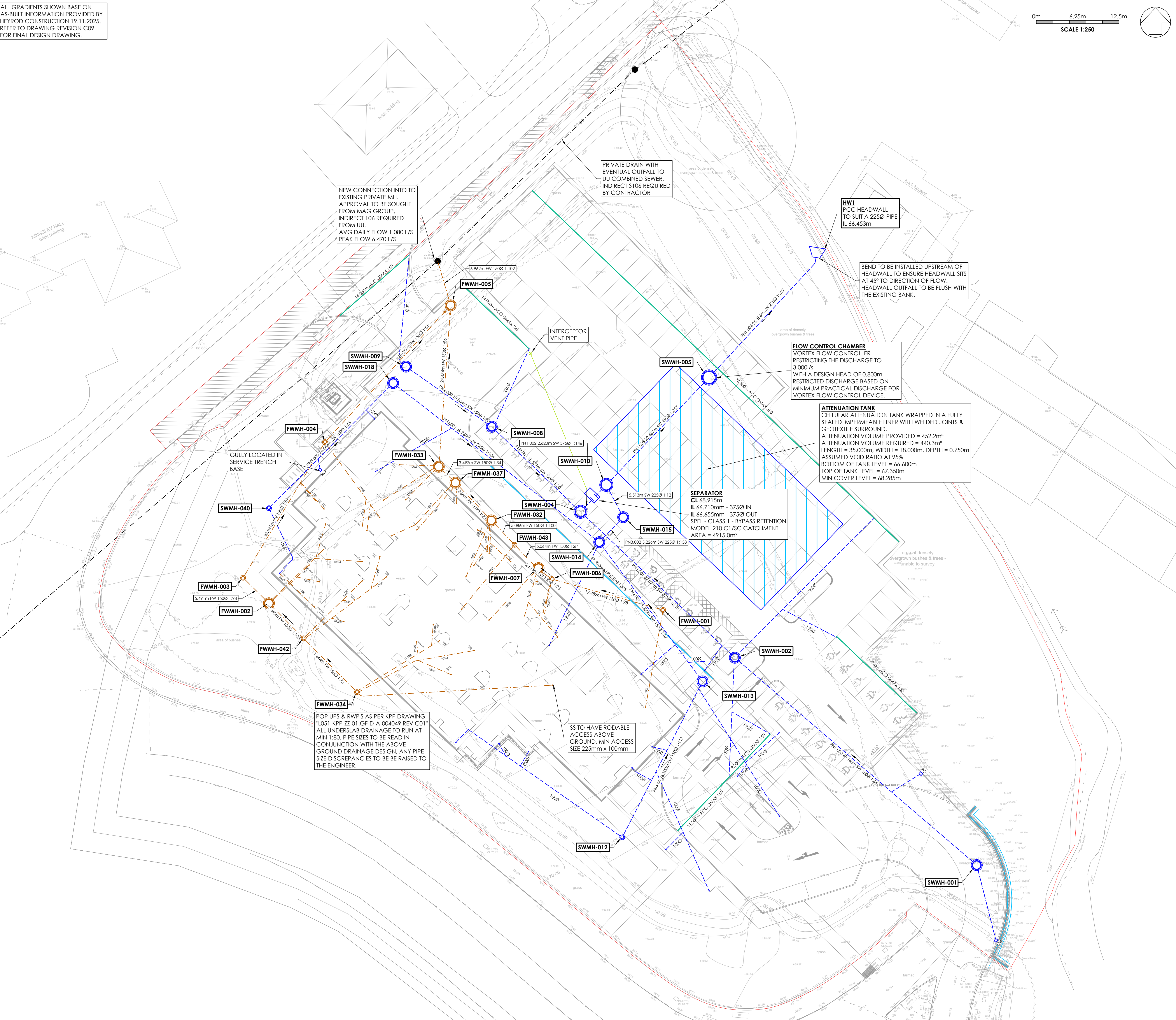
Appendix D provides supporting photographic evidence of the installation of relevant drainage elements on site.

LLFA approval has been obtained for the outfall headwall to the off-site brook, the approval email can be found in Appendix E.



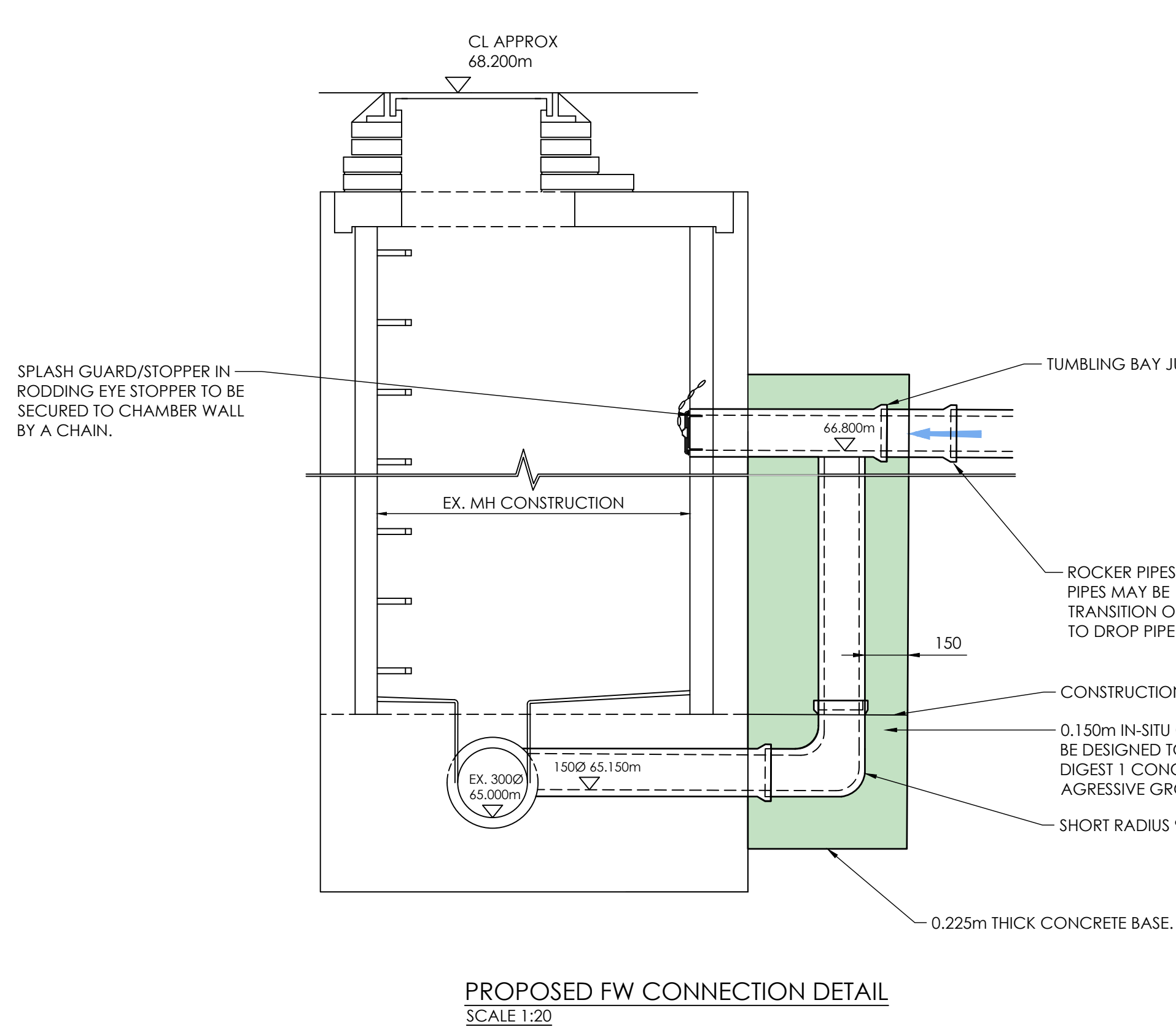
Appendix A As-Built Drainage Layout

ALL GRADIENTS SHOWN BASE ON
AS-BUILT INFORMATION PROVIDED BY
HEYROD CONSTRUCTION 19.11.2025.
REFER TO DRAWING REVISION C09
FOR FINAL DESIGN DRAWING.



Chamber Ref	As built Easting	As Built Northing	As Built IL
FWMH001	381966.184	386033.097	68.237
FWMH002	381906.682	386034.278	67.963
FWMH003	381903.037	386038.421	67.907
FWMH004	381934.057	386058.451	67.613
FWMH005	381934.017	386079.144	66.218
FWMH006	381949.413	386037.932	68.014
FWMH007	381947.519	386039.275	67.921
FWMH008	381940.438	386046.517	67.790
FWMH033	381932.355	386055.499	67.342
FWMH034	381920.126	386020.764	68.189
FWMH037	381934.847	386052.503	67.445
FWMH042	381911.771	386029.207	68.033
FWMH043	381943.872	386043.060	67.842
SWMH001	382013.598	385994.520	67.961
SWMH002	381976.989	386025.872	66.979
SWMH004	381953.333	386048.271	66.728
SWMH005	381973.122	386068.225	66.517
SWMH008	381927.288	386069.863	67.507
SWMH009	381927.309	386069.864	67.782
SWMH010	381957.567	386051.995	66.580
SWMH012	381959.646	385998.936	68.077
SWMH013	381972.124	386022.285	67.852
SWMH014	381956.606	386043.502	67.317
SWMH015	381960.162	386046.967	67.283
SWMH018	381925.357	386048.456	67.696
SWMH040	381907.027	386048.641	68.180

AS-BUILT MANHOLE INFORMATION
PROVIDED BY HEYROD CONSTRUCTION 19.11.2025

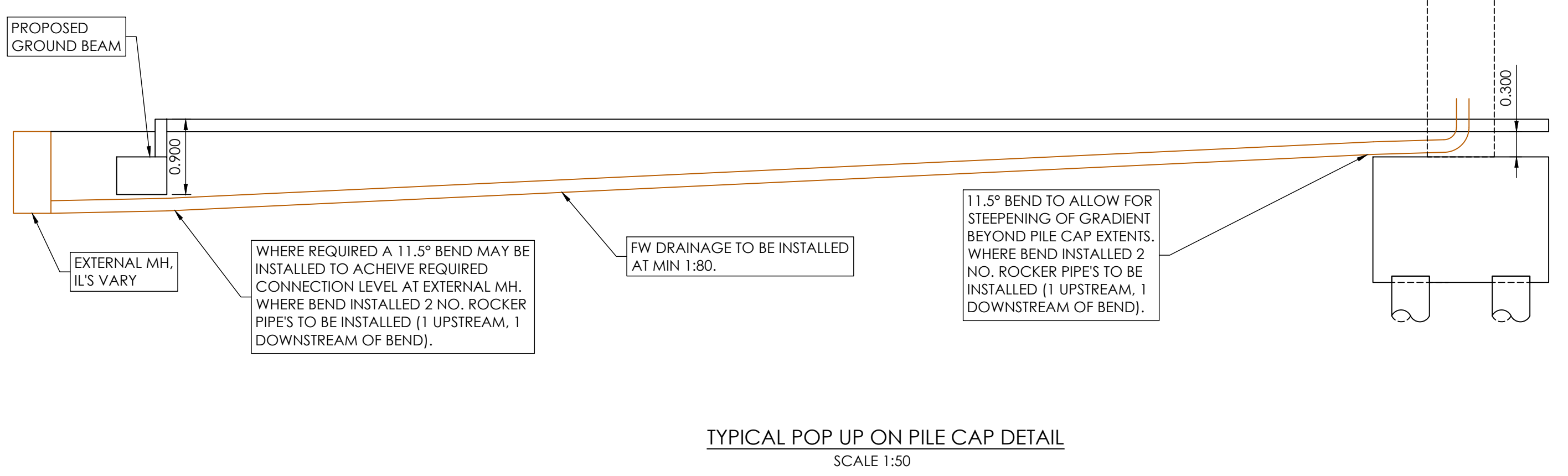


PROPOSED FW CONNECTION DETAIL
SCALE 1:20

6338-SW-NETWORK MANHOLE SCHEDULE										
REF.	COVER LEVEL	INVERT LEVEL	SUMP DEPTH	DEPTH	EASTING	NORTHING	DIAMETER	TYPE	COVER	NOTES
001	69.495m	67.950m - 1500 OUT	0.000m	1.545m	382013.577	385994.533	1200mm	TYPE E	600x600 - CLASS D400	-
002	68.985m	67.189m - 1500 IN 66.944m - 3750 OUT	0.000m	2.020m	381977.002	386025.877	1200mm	TYPE B	600x600 - CLASS D400	-
004	68.990m	66.770m - 3750 IN 66.920m - 2250 IN 66.770m - 3750 OUT	0.000m	2.220m	381953.671	386047.922	1500mm	TYPE B	600x600 - CLASS D400	-
005	68.203m	66.583m - 4500 IN 66.583m - 2250 OUT	0.500m	2.120m	381973.113	386068.216	1800mm	TYPE B	1220x675 - CLASS D400	-
008	68.990m	67.567m - 1500 IN 67.492m - 2250 OUT	0.000m	1.498m	381940.257	386060.773	1200mm	TYPE E	600x600 - CLASS D400	-
009	68.890m	67.752m - 1500 OUT	0.000m	1.138m	381927.290	386069.862	1200mm	TYPE E	600x600 - CLASS D400	-
010	68.842m	66.703m - 3750 IN 66.853m - 2250 IN 66.626m - 4500 OUT	0.000m	2.214m	381957.570	386051.992	1500mm	TYPE B	600x600 - CLASS D400	-
012	69.283m	68.097m - 1500 OUT	0.000m	1.186m	381959.977	385998.733	450mm	PPIC	450x450 - CLASS B125	-
013	69.141m	67.849m - 1500 IN 67.849m - 1500 OUT	0.000m	1.293m	381922.115	386022.290	1200mm	TYPE E	600x600 - CLASS D400	RECESSED COVER
014	69.024m	2 x 67.423m - 1500 IN 67.348m - 2250 IN 67.348m - 2250 OUT	0.000m	1.676m	381956.505	386043.331	1200mm	TYPE B	600x600 - CLASS D400	-
015	68.892m	67.274m - 2250 IN 67.274m - 2250 OUT	0.000m	1.618m	381940.119	386047.105	1200mm	TYPE B	600x600 - CLASS D400	-
018	69.040m	67.800m - 1500 IN 67.725m - 2250 OUT	0.000m	1.315m	381925.343	386067.376	1200mm	TYPE E	600x600 - CLASS D400	-
040	69.193m	68.200m - 1500 OUT	0.000m	0.993m	381906.575	386048.467	450mm	PPIC	450x450 - CLASS B125	-
HW1	66.438m - 2250 IN				381990.030	386087.144		HEADWALL		-

DESIGN STAGE MANHOLE INFORMATION

6338 FW NETWORK MANHOLE SCHEDULE										
REF.	COVER LEVEL	INVERT LEVEL	SUMP DEPTH	DEPTH	EASTING	NORTHING	DIAMETER	TYPE	COVER	NOTES
001	69.042m	68.160m - 1500 IN 68.160m - 1500 OUT	0.882m	0.882m	381966.171	386033.091	450mm	PPIC	450x450 - CLASS D400	-
002	69.436m	2 x 67.944m - 1500 IN 68.014m - 1000 IN 67.944m - 1500 OUT	1.472m	1.472m	381906.563	386034.097	1200mm	TYPE E	600x600 - CLASS B125	-
003	69.269m	67.895m - 1500 IN 67.895m - 1500 OUT	1.374m	1.374m	381902.662	386037.960	450mm	PPIC	450x450 - CLASS B125	-
004	69.215m	2 x 67.604m - 1500 IN 67.604m - 1500 OUT	1.611m	1.611m	381915.038	386058.454	450mm	PPIC	450x450 - CLASS B125	-
005	68.575m	67.059m - 1500 IN 67.059m - 1500 IN 65.324m - 1500 OUT	3.251m	3.251m	381934.039	386079.124	1200mm	TYPE E	600x600 - CLASS D400	2 NO. BACKDROPS
006	69.240m	67.941m - 1500 IN 2 x 67.991m - 1000 IN 67.941m - 1500 OUT	1.299m	1.299m	381949.323	386037.757	450mm	PPIC	450x450 - CLASS C250	RECESSED COVER
007	69.244m	3 x 67.908m - 1500 IN 67.908m - 1500 OUT	1.336m	1.336m	381947.196	386039.274	1200mm	TYPE E	600x600 - CLASS C250	RECESSED COVER
032	69.239m	67.781m - 1500 IN 3 x 67.831m - 1000 IN 67.781m - 1500 OUT	1.458m	1.458m	381940.196	386046.623	1200mm	TYPE E	600x600 - CLASS C250	RECESSED COVER
033	69.235m	2 x 67.382m - 1500 IN 2 x 67.432m - 1000 IN 67.382m - 1500 OUT	1.853m	1.853m	381932.243	386054.736	1200mm	TYPE B	600x600 - CLASS C250	-
034	69.534m	2 x 68.250m - 1000 IN 68.200m - 1500 IN 68.200m - 1500 OUT	1.334m	1.334m	381919.870	386020.670	450mm	PPIC	450x450 - CLASS B125	-
037	69.235m	67.549m - 1500 IN 2 x 67.599m - 1000 IN 67.549m - 1500 OUT	1.684m	1.684m	381934.772	386052.321	1200mm	TYPE B	600x600 - CLASS C250	-
042	69.499m	68.057m - 1500 IN 68.057m - 1500 OUT	1.442m	1.442m	381911.815	386028.798	450mm	PPIC	450x450 - CLASS B125	-
043	69.241m	67.845m - 1500 IN 67.895m - 1000 IN 67.845m - 1500 OUT	1.397m	1.397m	381943.704	386042.941	450mm	PPIC	450x450 - CLASS C250	RECESSED COVER



TYPICAL POP UP ON PILE CAP DETAIL
SCALE 1:50

RECORD DRAWING

THIS DRAWING IS THE LAST CONSTRUCTION
ISSUE ALSO INDICATING AS BUILT
INFORMATION THAT HAS BEEN RECEIVED
FROM THE CONTRACTOR.

THIS DRAWING IS THE PROPERTY OF JPG (LEADS) LIMITED
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DO NOT SCALE (A0)

NOTES

GENERAL NOTES

- ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL & E.C. CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

LEGEND

- PROPOSED SURFACE WATER PIPE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER PIPE
- PROPOSED FOUL WATER MANHOLE
- EXISTING SURFACE WATER PIPE
- EXISTING SURFACE WATER MANHOLE
- EXISTING FOUL WATER PIPE
- EXISTING FOUL WATER MANHOLE
- PROPOSED DRAINAGE CHANNEL
- PROPOSED KERB DRAIN
- PROPOSED ROAD GULLY
- RWP
- RWP
- PROPOSED SYNPHONIC RAINWATER PIPE
- PROPOSED WASTE POINT CONNECTION

1. ALL BUILDING DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BS EN 752:2008 DRAINAGE AND SEWER SYSTEMS OUTSIDE BUILDINGS, THE CURRENT BUILDING REGULATIONS AND THE LOCAL AUTHORITY BUILDING CONTROL SPECIFICATIONS AND REQUIREMENTS.

2. ANY DRAINAGE TO BE PUT FORWARD FOR ADOPTION EITHER WITHIN THE SITE OR OUTSIDE SHALL BE CONSTRUCTED TO SEWERS FOR ADOPTION LATEST EDITION AND ANY SPECIFIC REQUIREMENTS OF THE ADOPTING SEWERAGE/WATER AUTHORITY.

3. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINAGE/SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE, AND DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

4. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD ANY EXISTING LIVE DRAINAGE BE FOUND WITHIN THE SITE BOUNDARY SERVING ADJACENT PROPERTIES.

5. ALL EXISTING DRAINAGE WITHIN THE SITE NOT REQUIRED FOR THE NEW DEVELOPMENT SHALL BE ABANDONED. DRAINS AND SEWERS LESS THAN 1.50m DEEP WHICH ARE IN OPEN GROUND SHOULD AS FAR AS IS PRACTICABLE BE FULLY REMOVED. ALL OTHER PIPES SHOULD BE SEALED AT BOTH ENDS AND AT ANY POINT OF CONNECTION, AND BE GROUT FILLED TO ENSURE THAT RAS CANNOT GAIN ACCESS. JARNG PIPES 225mm OR ABOVE SHOULD BE GROUT FILLED TO PREVENT SUBSIDENCE OR DAMAGE TO BUILDINGS OR SERVICES IN THE EVENT OF COLLAPSE.

6. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE UTILITY COMPANIES.

7. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN OFF INTO EXCAVATIONS AND FROM GROUNDWORK BY MEANS OF PUMPS, PIPING AND DE WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.

8. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT PRACTICE WHEN WORKING IN NEAR CONFINED SPACES, DEEP EXCAVATIONS AND MACHINERY.

9. THE CONTRACTOR SHALL ALLOW FOR OBTAINING ALL APPROVALS FROM THE RELEVANT AUTHORITIES WHEN WORKING IN THE PUBLIC HIGHWAY AND ON THE SEWERAGE SYSTEM.

10. THE CONTRACTOR SHALL SUITABLY PROTECT PEDESTRIANS AND VEHICLES FROM WORKING AREAS.

11. ALL MANHOLE/CHAMBER COVER LEVELS ARE APPROXIMATE AND SHALL BE ADJUSTED ON SITE TO SUIT THE PROPOSED FINISHED LEVELS.

12. ALL PIPES SHALL BE LAD WITH LEVEL SLOTTED AND ALL MANHOLE/INSPECTION CHAMBER INVERT LEVELS SHOWN ARE FOR THE OUT GOING PIPE UNO. ON THE DRAWING NOTE THAT ALL PIPE GRADIENTS INDICATED ON THE DRAWINGS ARE APPROXIMATE ONLY.

13. ALL PIPE CONNECTION FROM DRAINAGE CHANNELS AND GULLIES SHALL BE 150mm PIPES AT A MINIMUM GRADIENT OF 1:100 WITH CLASS 2 BEDDING UNO. ON THE DRAWING.

14. ALL PIPE CONNECTIONS FROM RWPS TO BE 100mm AT 1:40 MIN. AND ALL PIPE CONNECTIONS FROM RWPS TO FIRST CHAMBER SHALL BE 100mm AT 1:40 MIN. WITH CLASS 2 BEDDING BENEATH THE BUILDING AND CLASS 1 UNDER EXTERIORS WHERE COVER IS LESS THAN 1.20m UNO. ON THE DRAWING LOCATION OF RWPS AND RWPS TO BE CONFIRMED BY THE ARCHITECT AND ARE SHOWN INDICATIVELY ONLY.

15. ALL SYNPHONIC RWP SYSTEMS TO BE DESIGNED BY OTHERS. PREWORK FROM DOWN PIPE TO FIRST MANHOLE TO BE SIZED, DESIGNED BY SYNPHONIC SYSTEM DESIGNER. THE FIRST MANHOLE TO HAVE AN OPEN GRATE COVER SAINT GORAN WATERWAY 2000 - 1040 OR SIMILAR APPROVED.

16. SUITABLY SIZED PETROL INTERCEPTORS MUST COMPLY WITH THE REQUIREMENTS OUTLINE IN PP03 THESE INCLUDE SET STORAGE CAPACITY AND HIGH LEVEL HYDROCARBON ALARM WIRRED BACK TO A MANNED OFFICE.

17. UPON COMPLETION OF THE DRAINAGE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAIN RINGS BY BRUSHING AND REMOVE ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE PUBLIC SEWER AND/OR WATERCOURSE SYSTEM. ONCE THE DRAINAGE SYSTEM HAS BEEN FULLY CLEANED OUT A CCTV CAMERA CONDITION SURVEY SHALL BE UNDERTAKEN TO ALL CONSTRUCTED DRAINAGE AND SEWER PIPES WITH THE FOOTAGE ISSUED TO THE ENGINEER FOR VIEW. THE AS BUILT INVERT AND COVER LEVELS SHALL BE RECORDED BY THE CONTRACTOR AND PASSED ON TO THE ENGINEER FOR REVIEW.

REF.	DESCRIPTION	DATE	CHK	BY
C001	CONSTRUCTION RECORD AS OF INFORMATION PROVIDED 19.11.25	02.12.25	BT	BT
C009	3278 CHANNEL OUTLET UPDATED, TRENCH GULLY ADDED	01.12.25	BT	BT
C008	INTERCEPTOR NOSE REMOVED AND HEADWALL UPDATED IN LINE WITH L1/FA COMMENTS	04.04.25	BT	BT
C007	REVISED TO SUIT LATEST SITE PLAN AND SUB-CONTRACTOR COMMENTS	15.01.25	LJB	BT
C006	REVISED TO SUIT LATEST RWP SIZES & BACKDROPS RELOCATED TO FWMH-005	17.12.24	LJB	BT
C005	CANOPY RWPS ADDED, MH LOCATIONS TWAXED AND ADDITIONAL RWP ADDED	06.12.24	LJB	BT
C004	REVISED TO SUIT LATEST POP UP ARRANGEMENT, FWAS ADDED, UNDER SLAB PIPE SIZES SHOWN, ADDED TO SCHEDULE, CONSTRUCTION DETAILS ADDED	21.11.24	LJB	BT
C003	REVISED TO SUIT LATEST POP UPS AND TO COORDINATE WITH FOUNDATIONS	01.11.24	LJB	BT
C002	REVISED FOR RELOCATION OF FW-001 AND RELOCATION OF SUB-STATION & CYCLE SHED	26.09.24	LJB	BT
C001	TANK, FW07 & FW52 RELOCATED	30.08.24	LJB	BT
P007	REVISED TO SUIT LATEST INTERNAL POP UPS, FW51 ADDED & MH5 POSITIONED AS PER LANDSCAPE ARCHITECT'S PREFERRED COVER LOCATIONS	21.06.24	LJB	BT
P006	SW OUTFALL RELOCATED	22.05.24	BT	BT
P005	RWP RE-DESIGNED	20.05.24	LJB	BT
P004	REVISED TO SUIT LATEST SITE PLAN, FOUNDATIONS & POP UPS	17.05.24	LJB	BT
P003	REVISED TO SUIT LATEST SITE PLAN & LEVELS, PIPE REFERENCES ADDED AND OUTFALL RELOCATED FOR BNG	02.05.24	LJB	BT
P002	REVISED TO SUIT LATEST SITE PLAN & LEVELS	22.04.24	LJB	BT
P001	INITIAL ISSUE	23.03.24	BT	BT
REV	DESCRIPTION	DATE	CHK	BY
Project - 6338 DAKOTA HOTEL MANCHESTER AIRPORT				
Drawing Title DRAINAGE LAYOUT				
RECORD DRAWING				
www.jpg.group E admin@jpg.group T +44 (0)113 263 1155				
L051-JPG-11-XX-XX-D-C-001-040 CR CRO1				



Appendix B As-Built Calculations

Project: Dakota Manchester As-Built Calculations		Date: 04/11/2025			
		Designed by: BT	Checked by:		Approved By:
Report Details: Type: Junctions Storm Phase: 6338-SW-NETWORK		Company Address: JPG			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Sump Depth (m)	Chamber Shape
001	Manhole	382013.577	385994.533	69.495	1.534	67.961	0.000	Circular
012	Manhole	381959.977	385998.733	69.283	1.206	68.077	0.000	Circular
040	Manhole	381906.575	386048.467	69.193	1.013	68.180	0.000	Circular
013	Manhole	381972.115	386022.290	69.141	1.290	67.851	0.000	Circular
018	Manhole	381925.343	386067.376	69.040	1.345	67.695	0.000	Circular
014	Manhole	381956.505	386043.331	69.024	1.708	67.316	0.000	Circular
004	Manhole	381953.671	386047.922	68.990	2.262	66.728	0.000	Circular
008	Manhole	381940.257	386060.773	68.990	1.483	67.507	0.000	Circular
002	Manhole	381977.002	386025.877	68.985	2.006	66.979	0.000	Circular
015	Manhole	381960.119	386047.105	68.892	1.609	67.283	0.000	Circular
009	Manhole	381927.290	386069.862	68.890	1.109	67.781	0.000	Circular
010	Manhole	381957.570	386051.992	68.842	2.262	66.580	0.000	Circular
005	Manhole	381973.113	386068.216	68.203	1.686	66.517	0.500	Circular
Simple Junction	Simple Junction	381990.030	386087.144					

Name	Diameter (m)	Part Family	Lock
001	1.200	Type E	All
012	0.450	PPIC	All
040	0.450	PPIC	All
013	1.200	Type E	All
018	1.200	Type E	All
014	1.200	Type B	All
004	1.500	Type B	All
008	1.200	Type E	All
002	1.200	Type B	All
015	1.200	Type B	All
009	1.200	Type E	All
010	1.500	Type B	All
005	1.800	Type B	All
Simple Junction		Headwall	

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025			
	Designed by: BT	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Storm Phase: 6338-SW-NETWORK	Company Address: JPG			



Cellular Storage

Type : Cellular Storage

Dimensions	
Exceedance Level (m)	68.285
Depth (m)	0.750
Base Level (m)	66.570
Number of Crates Long	1
Number of Crates Wide	1
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	35
Crate Width (m)	18
Crate Height (m)	0.75
Total Volume (m³)	449.840

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: 6338-SW-NETWORK	Company Address: JPG		



Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
1.000	48.168	Pipe	63.630		0.6	150	69.495	67.961
1.001	32.099	Pipe	127.883		0.6	375	68.985	66.979
1.004	25.386	Pipe	396.663		0.6	225	68.203	66.517
2.001	18.577	Pipe	29.534		0.6	225	68.990	67.507
2.000	15.834	Pipe	79.568		0.6	150	68.890	67.781
4.00	26.500	Pipe	117.257		0.6	150	69.283	68.077
4.001	26.200	Pipe	56.956		0.6	150	69.141	67.851
3.002	5.226	Pipe	158.355		0.6	225	69.024	67.316
3.003	5.513	Pipe	11.533		0.6	225	68.892	67.283
3.001	39.360	Pipe	103.851		0.6	225	69.040	67.695
3.000	26.642	Pipe	64.980		0.6	150	69.193	68.180
1.002	5.636	Pipe	77.207		0.6	375	68.990	66.728
1.003	3.504	Pipe	350.434		0.6	450	68.842	66.580
1.003 (2)	4.930	Pipe	-5.206		0.6	100	68.285	66.570

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)
1.000	68.985	67.204	Clay Pipe SI	All	
1.001	68.990	66.728	Concrete Pipe SI	All	
1.004	67.132	66.453	Clay Pipe SI	All	
2.001	68.990	66.878	Clay Pipe SI	All	
2.000	68.990	67.582	Clay Pipe SI	All	
4.00	69.141	67.851	Clay Pipe SI	All	
4.001	69.024	67.391	Clay Pipe SI	All	
3.002	68.892	67.283	Clay Pipe SI	All	
3.003	68.842	66.805	Clay Pipe SI	All	
3.001	69.024	67.316	Clay Pipe SI	All	
3.000	69.040	67.770	Clay Pipe SI	All	
1.002	68.842	66.655	Concrete Pipe SI	All	
1.003	68.285	66.570	Concrete Pipe SI	All	
1.003 (2)	68.203	67.517		None	3.3

Project: Dakota Manchester As-Built Calculations		Date: 04/11/2025			
		Designed by: BT	Checked by:		Approved By:
Report Details: Type: Inflow Summary Storm Phase: 6338-SW-NETWORK		Company Address: JPG			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (m²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (m²)
SW01-01	001		Time of Concentration	243.416	100	0	100	243.416
SW02-01	002		Time of Concentration	438.500	100	0	100	438.500
SW02-02	002		Time of Concentration	2558.358	100	0	100	2558.358
SW02-03	002		Time of Concentration	318.764	100	0	100	318.764
SW08-01	008		Time of Concentration	375.736	100	0	100	375.736
SW09-01	009		Time of Concentration	84.443	100	0	100	84.443
SW12-01	012		Time of Concentration	439.537	100	0	100	439.537
SW13-01	013		Time of Concentration	625.724	100	0	100	625.724
SW14-01	014		Time of Concentration	416.295	100	0	100	416.295
SW18-01	018		Time of Concentration	317.938	100	0	100	317.938
SW40-01	040		Time of Concentration	369.138	100	0	100	369.138
TOTAL		0.0		6187.847				6187.847

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: 6338-SW-NETWORK	Company Address: JPG		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (hrs)	0.083
Max. Travel Time (hrs)	0.50

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
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Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025			
	Designed by: BT	Checked by:	Approved By:	
Report Details: Type: Outfall Details Storm Phase: 6338-SW-NETWORK	Company Address: JPG			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Simple Junction	Free Discharge		

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025			
	Designed by: BT	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address: JPG			

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

Rainfall	
FSR	Type: FSR
Region	England And Wales
M5-60 (mm)	18.0
Ratio R	0.371
Summer	☒
Winter	☒

Return Period	
Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
100.0	45.000

Storm Durations	
Duration (hrs)	Run Time (hrs)
0.25	0.50
0.50	1.00
1.00	2.00
2.00	4.00
4.00	8.00
6.00	12.00
8.00	16.00
16.00	32.00
24.00	48.00

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





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

Inflow	Storm Event	Inflow Area (m²)	Max. Inflow (L/s)	Total Inflow Volume (m³)
SW01-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	243.42	4.4	1.917
SW13-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	625.72	11.4	4.938
SW02-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	438.50	8.0	3.459
SW02-02	FSR: 2 years: +0 %: 0.25 hrs: Summer	2558.36	46.5	20.183
SW02-03	FSR: 2 years: +0 %: 0.25 hrs: Summer	318.76	5.8	2.517
SW08-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	375.74	6.8	2.964
SW09-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	84.44	1.5	0.666
SW12-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	439.54	8.0	3.471
SW40-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	369.14	6.7	2.910
SW14-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	416.30	7.6	3.282
SW18-01	FSR: 2 years: +0 %: 0.25 hrs: Summer	317.94	5.8	2.511

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (m²)	Max. Inflow (L/s)	Total Inflow Volume (m³)
SW01-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	243.42	8.4	3.630
SW13-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	625.72	21.5	9.333
SW02-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	438.50	15.1	6.540
SW02-02	FSR: 30 years: +0 %: 0.25 hrs: Summer	2558.36	88.0	38.158
SW02-03	FSR: 30 years: +0 %: 0.25 hrs: Summer	318.76	11.0	4.758
SW08-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	375.74	12.9	5.604
SW09-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	84.44	2.9	1.263
SW12-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	439.54	15.1	6.558
SW40-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	369.14	12.7	5.505
SW14-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	416.30	14.3	6.210
SW18-01	FSR: 30 years: +0 %: 0.25 hrs: Summer	317.94	10.9	4.743

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (m²)	Max. Inflow (L/s)	Total Inflow Volume (m³)
SW01-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	243.42	15.7	6.798
SW13-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	625.72	40.3	17.480
SW02-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	438.50	28.2	12.251
SW02-02	FSR: 100 years: +45 %: 0.25 hrs: Summer	2558.36	164.7	71.459
SW02-03	FSR: 100 years: +45 %: 0.25 hrs: Summer	318.76	20.5	8.904
SW08-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	375.74	24.2	10.496
SW09-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	84.44	5.4	2.361
SW12-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	439.54	28.3	12.278
SW40-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	369.14	23.8	10.310
SW14-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	416.30	26.8	11.630
SW18-01	FSR: 100 years: +45 %: 0.25 hrs: Summer	317.94	20.5	8.880

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 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
001	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.49 5	67.96 1	68.004	0.043	4.4	0.049	0.000	3.9	1.913	OK
012	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.28 3	68.07 7	68.150	0.073	8.0	0.012	0.000	7.8	3.471	OK
040	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.19 3	68.18 0	68.237	0.057	6.7	0.009	0.000	6.4	2.909	OK
013	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.14 1	67.85 1	67.954	0.103	19.1	0.116	0.000	17.7	8.401	OK
018	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.04 0	67.69 5	67.767	0.072	12.1	0.081	0.000	11.6	5.420	OK
014	FSR: 2 years: +0 %: 0.25 hrs: Summer	69.02 4	67.31 6	67.475	0.159	36.8	0.179	0.000	34.7	17.084	OK
004	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.99 0	66.72 8	66.904	0.176	70.2	0.311	0.000	66.8	31.660	OK
008	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.99 0	67.50 7	67.552	0.045	8.2	0.051	0.000	8.0	3.627	OK
002	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.98 5	66.97 9	67.145	0.166	64.2	0.187	0.000	62.2	28.089	OK
015	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.89 2	67.28 3	67.365	0.082	34.7	0.093	0.000	34.3	17.079	OK
009	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.89 0	67.78 1	67.809	0.028	1.5	0.031	0.000	1.4	0.664	OK
010	FSR: 2 years: +0 %: 24.00 hrs: Summer	68.84 2	66.58 0	66.902	0.322	9.2	0.569	0.000	9.1	199.167	OK
005	FSR: 2 years: +0 %: 0.25 hrs: Summer	68.20 3	66.51 7	66.517	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FSR: 2 years: +0 %: 0.25 hrs: Summer		66.45 3	66.453	0.000	0.0			0.0	0.000	OK

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 30 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
001	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.495	67.961	68.022	0.061	8.4	0.070	0.000	7.5	3.625	OK
012	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.283	68.077	68.347	0.270	15.1	0.043	0.000	10.5	6.543	Surcharged
040	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.193	68.180	68.263	0.083	12.7	0.013	0.000	12.1	5.503	OK
013	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.141	67.851	68.242	0.391	32.0	0.442	0.000	27.8	15.886	Surcharged
018	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.040	67.695	67.798	0.103	23.0	0.116	0.000	22.2	10.245	OK
014	FSR: 30 years: +0 %: 0.25 hrs: Summer	69.024	67.316	67.544	0.228	64.3	0.258	0.000	60.2	32.315	Surcharged
004	FSR: 30 years: +0 %: 24.00 hrs: Summer	68.990	66.728	67.144	0.416	10.3	0.734	0.000	10.1	223.198	Surcharged
008	FSR: 30 years: +0 %: 0.25 hrs: Summer	68.990	67.507	67.568	0.061	15.6	0.069	0.000	15.4	6.855	OK
002	FSR: 30 years: +0 %: 0.25 hrs: Summer	68.985	66.979	67.233	0.254	121.5	0.288	0.000	118.2	53.097	OK
015	FSR: 30 years: +0 %: 0.25 hrs: Summer	68.892	67.283	67.399	0.116	60.2	0.131	0.000	60.0	32.318	OK
009	FSR: 30 years: +0 %: 0.25 hrs: Summer	68.890	67.781	67.820	0.039	2.9	0.044	0.000	2.7	1.261	OK
010	FSR: 30 years: +0 %: 24.00 hrs: Summer	68.842	66.580	67.144	0.564	15.7	0.996	0.000	15.6	344.155	Surcharged
005	FSR: 30 years: +0 %: 0.25 hrs: Summer	68.203	66.517	66.517	0.000	0.0	0.000	0.000	0.0	0.000	OK
Simple Junction	FSR: 30 years: +0 %: 0.25 hrs: Summer		66.453	66.453	0.000	0.0			0.0	0.000	OK

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 100 years: Increase Rainfall (%): +45: 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
001	FSR: 100 years: +45 %: 24.00 hrs: Summer	69.495	67.961	68.392	0.431	2.9	0.488	0.000	1.1	25.723	Surcharged
012	FSR: 100 years: +45 %: 0.25 hrs: Summer	69.283	68.077	69.285	1.208	28.3	1.867	1.675	15.7	12.295	Flood
040	FSR: 100 years: +45 %: 0.25 hrs: Summer	69.193	68.180	68.466	0.286	23.8	0.045	0.000	18.6	10.201	Surcharged
013	FSR: 100 years: +45 %: 0.25 hrs: Summer	69.141	67.851	69.141	1.290	53.7	1.911	0.452	41.3	29.819	Flood
018	FSR: 100 years: +45 %: 24.00 hrs: Summer	69.040	67.695	68.392	0.697	3.3	0.788	0.000	3.3	72.392	Surcharged
014	FSR: 100 years: +45 %: 24.00 hrs: Summer	69.024	67.316	68.392	1.076	10.3	1.217	0.000	10.3	226.677	Surcharged
004	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.990	66.728	68.392	1.664	18.7	2.940	0.000	18.4	413.991	Surcharged
008	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.990	67.507	68.392	0.885	2.4	1.001	0.000	2.2	49.682	Surcharged
002	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.985	66.979	68.392	1.413	16.9	1.598	0.000	16.6	369.395	Surcharged
015	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.892	67.283	68.392	1.109	10.3	1.254	0.000	10.3	226.838	Surcharged
009	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.890	67.781	68.392	0.611	1.4	0.691	0.000	0.4	9.411	Surcharged
010	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.842	66.580	68.392	1.812	28.7	3.202	0.000	28.6	636.519	Surcharged
005	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.203	66.517	66.570	0.053	3.0	0.136	0.000	3.0	185.075	OK
Simple Junction	FSR: 100 years: +45 %: 24.00 hrs: Summer		66.453	66.505	0.052	3.0			3.0	184.408	OK

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR: 2 years: +0 %: 24.00 hrs: Summer	66.902	66.902	0.332	0.332	9.1	198.647	0.000	0.000	0.0	0.418	55.841	OK

Project: Dakota Manchester As-Built Calculations		Date: 04/11/2025			
		Designed by: BT	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: 6338-SW-NETWORK		Company Address: JPG			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR: 30 years: +0 %: 24.00 hrs: Summer	67.144	67.144	0.574	0.574	15.6	343.270	0.000	0.000	0.0	0.759	23.691	OK

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR: 100 years: +45 %: 24.00 hrs: Summer	68.392	68.392	1.822	1.822	28.6	513.622	63.623	0.000	3.0	185.669	-14.179	Flood

Project: Dakota Manchester As-Built Calculations		Date: 04/11/2025			
		Designed by: BT	Checked by:		Approved By:
Report Details: Type: Connections Summary Storm Phase: 6338-SW-NETWORK		Company Address: JPG			



FSR: 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	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	001	002	69.495	68.004	0.043	1.913	0.9	0.17	3.9	OK
1.001	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	002	004	68.985	67.145	0.171	28.089	1.3	0.35	62.2	OK
1.004	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	005	Simple Junction	68.203	66.517	0.000	0.000	0.0	0	0.0	OK
2.001	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	008	004	68.990	67.552	0.044	3.627	1.4	0.08	8.0	OK
2.000	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	009	008	68.890	67.809	0.027	0.664	0.6	0.07	1.4	OK
4.00	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	012	013	69.283	68.150	0.088	3.471	0.7	0.47	7.8	OK
4.001	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	013	014	69.141	67.954	0.100	8.401	1.4	0.75	17.7	OK
3.002	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	014	015	69.024	67.475	0.121	17.084	1.6	0.84	34.7	OK
3.003	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	015	010	68.892	67.365	0.077	17.079	2.8	0.22	34.3	OK
3.001	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	018	014	69.040	67.767	0.115	5.420	0.6	0.23	11.6	OK
3.000	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	040	018	69.193	68.237	0.056	2.909	1.1	0.29	6.4	OK
1.002	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	004	010	68.990	66.904	0.173	31.660	1.3	0.29	66.8	OK
1.003	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	010	Cellular Storage	68.842	66.826	0.139	48.597	2.4	0.58	99.8	OK
1.003 (2)	FSR: 2 years: +0 %: 0.25 hrs: Summer	Pipe	Cellular Storage	005	68.285	66.651	0.040	0.000	0.0	0	0.0	OK

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 30 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	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	001	002	69.495	68.022	0.061	3.625	1.1	0.34	7.5	OK
1.001	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	002	004	68.985	67.233	0.266	53.097	1.4	0.67	118.2	OK
1.004	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	005	Simple Junction	68.203	66.517	0.000	0.000	0.0	0	0.0	OK
2.001	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	008	004	68.990	67.568	0.094	6.855	1.2	0.16	15.4	OK
2.000	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	009	008	68.890	67.820	0.038	1.261	0.8	0.14	2.7	OK
4.00	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	012	013	69.283	68.347	0.150	6.543	0.6	0.64	10.5	Surcharged
4.001	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	013	014	69.141	68.242	0.150	15.886	1.6	1.18	27.8	Surcharged
3.002	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	014	015	69.024	67.544	0.172	32.315	1.8	1.46	60.2	Surcharged
3.003	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	015	010	68.892	67.399	0.115	32.318	2.9	0.39	60.0	OK
3.001	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	018	014	69.040	67.798	0.165	10.245	0.7	0.43	22.2	OK
3.000	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	040	018	69.193	68.263	0.081	5.503	1.2	0.55	12.1	OK
1.002	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	004	010	68.990	67.006	0.271	59.851	1.5	0.56	126.5	OK
1.003	FSR: 30 years: +0 %: 0.25 hrs: Winter	Pipe	010	Cellular Storage	68.842	66.894	0.186	86.186	2.7	0.99	170.3	OK
1.003 (2)	FSR: 30 years: +0 %: 0.25 hrs: Summer	Pipe	Cellular Storage	005	68.285	66.723	0.076	0.000	0.0	0	0.0	Surcharged

Project: Dakota Manchester As-Built Calculations	Date: 04/11/2025		
	Designed by: BT	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: 6338-SW-NETWORK	Company Address: JPG		





FSR: 100 years: Increase Rainfall (%): +45: 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	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	001	002	69.495	68.055	0.150	6.796	1.0	0.64	14.4	OK
1.001	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	002	004	68.985	67.760	0.375	99.438	2.0	1.27	223.8	Surcharged
1.004	FSR: 100 years: +45 %: 24.00 hrs: Summer	Pipe	005	Simple Junction	68.203	66.570	0.053	184.408	0.4	0.12	3.0	OK
2.001	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	008	004	68.990	67.591	0.225	12.836	1.3	0.3	29.0	OK
2.000	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	009	008	68.890	67.835	0.053	2.359	0.9	0.26	5.2	OK
4.00	FSR: 100 years: +45 %: 0.25 hrs: Winter	Pipe	012	013	69.283	69.283	0.150	11.454	1.4	1.51	24.7	Flood
4.001	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	013	014	69.141	69.141	0.150	29.819	2.3	1.75	41.3	Flood
3.002	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	014	015	69.024	67.926	0.225	60.592	2.5	2.44	100.5	Surcharged
3.003	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	015	010	68.892	67.458	0.194	60.592	3.3	0.65	99.9	OK
3.001	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	018	014	69.040	68.144	0.225	19.096	0.9	0.71	36.2	Surcharged
3.000	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	040	018	69.193	68.466	0.150	10.201	1.1	0.84	18.6	Surcharged
1.002	FSR: 100 years: +45 %: 0.25 hrs: Summer	Pipe	004	010	68.990	67.247	0.375	111.386	2.3	1.1	249.9	Surcharged
1.003	FSR: 100 years: +45 %: 0.25 hrs: Winter	Pipe	010	Cellular Storage	68.842	67.022	0.274	161.223	3.3	1.95	335.8	OK
1.003 (2)	FSR: 100 years: +45 %: 24.00 hrs: Summer	Pipe	Cellular Storage	005	68.285	68.392	0.100	0.000	0.4	0.52	3.0	Flood



Appendix C Drainage Maintenance and Management Plan – Original Report as Approved in Planning



DRAINAGE MAINTENANCE AND MANAGEMENT PLAN

Dakota Hotel Manchester Airport

Reference

6338-JPG-XX-XX-RP-D-0623-S2-P01

Date

May 2024

Author

BT

5 John Charles Way
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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Evans Dakota Hotels Limited
Millshaw
LEEDS
LS10 1AB

This report has been prepared for the sole use and reliance of the above-named parties. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

Revision	Date	Revision Details	Status	Author(s)	Approved
P01	03.05.2024	First Issue	Information	BT	LJB



1.0 INTRODUCTION

The foul and surface water drainage system proposed as part of the works is shown on JPG drawings 6338-JPG-ZZ-ZZ-DR-D-1400.

The foul and surface water drainage system form part of the proposed development and will require maintenance to ensure continued satisfactory operation for the lifetime of the development.

Pipe sizes and gradients are designed to be self-cleansing, albeit regular maintenance and inspections are required, to ensure the long-term efficiency of the systems.

Any drainage infrastructure located within the plot demise, will be the responsibility of the developer via the developer's management company. This responsibility maybe passed onto the tenant, depending upon whether the building is being rented or will be owned by the end user. This will be subject to individual lease or sale agreements between the two parties.

Where the off-plot infrastructure is to remain privately maintained, this will be the responsibility of the developer via his appointed management company.

However, where off-plot systems are maintained by third parties, the responsibility for maintenance will lay with the third party. For example, highway drainage and public sewers would be the responsibility of Manchester City Council Highways and United Utilities respectively.

No work shall be carried out on the drainage system without permission from a nominated person, who has access to information and a working knowledge of the system.

Maintenance/inspection work shall be carried out in a safe and planned manner.

All work is to be carried out by competent persons, who are suitably trained and equipped, in accordance with current statutory safe working policies.

Entry into confined spaces shall be kept to a minimum and be restricted to suitably qualified and equipped persons, working in accordance with current statutory safe working policies.

High levels of hygiene shall be maintained at all times, with adequate welfare facilities being provided for maintenance personnel.



2.0 DRAINS/SEWERS

The main objective of this maintenance document is to establish procedures to ensure the private drainage system functions appropriately in the long term within an environment of fiscal control.

Maintenance includes:

- Local repair or local replacement of damaged pipes or other structures in order to maintain the functioning of the drainage system.
- Cleaning and removal of sediments, obstructions etc. to restore hydraulic capacity.
- Jetting/vacuum of sewers to be undertaken as often as necessary to remove silts and/or ordinary debris.
- In the event that any extraordinary issues are encountered during an inspection, further information may be required such as a CCTV survey report.
- Maintenance to be undertaken on a six-monthly schedule as a minimum.

To avoid damaging the pipe, PSI pressures need to be verified before jetting of plastic twin wall sewers. Cleaning of drainage systems may require the temporary sealing of the system and careful collection of the effluent for disposal off site.

3.0 MANHOLES/ACCESS CHAMBERS

All manhole covers should be lifted, and the manholes visually inspected for silt, debris, damage to benching and signs of blockages within the drainage system.

Debris shall be removed from the benching and chamber. This shall not be removed by washing down the outgoing pipe.

Any loose benching shall be removed from the chamber and not allowed to be washed down the pipe system where it could cause a blockage. Areas of damaged benching shall be noted and procedure for repair instigated.

Should any debris or blockages be detected, the manholes should be cleaned along with associated pipe runs which should be high pressure jetted and CCTV surveyed to verify/identify that no further remedial works are required.

The manhole covers and frames shall be checked for damage and ensure correctly bolted together. This should be undertaken on a six-monthly basis.

Missing bolts and broken items shall be replaced in accordance with the manufacturer's details. Damaged cover/frames that cannot be repaired shall be completely replaced.

Before replacing the cover, suitable grease or other sealing material shall be applied to the frame as required to form an airtight seal. Bolts shall be replaced and fully tightened.



4.0 SILT TRAP MANHOLES

These chambers are designed with sumps to accumulate silt and debris at specific locations, in particular upstream of the attenuation structures, basins, and ponds. These should be checked and cleaned out on a six-monthly basis.

5.0 DRAINAGE CHANNELS AND KERB DRAINS

All drainage channels and kerb drain systems should be inspected regularly to ensure that the system continues to operate effectively and is free from damage and blockage by debris or solid objects.

The systems should be cleaned at least once a year and incorporated into a planned maintenance schedule. The frequency of inspection and maintenance depends on the local environment and conditions.

Channel units/kerb drains can be cleaned using a high-pressure hose. This can be fed into the system through access units.

The throat section of channel units and aperture of the kerb drains should be kept clear at all times to ensure uninterrupted flow of surface runoff into the drainage channel. Any debris should be removed.

The seating areas for covers and grates should be cleaned before they are replaced. The covers and grates should be locked into position to prevent these being removed, stolen, or dislodged by traffic. Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If grates/covers are allowed to move within their frame, this may cause damage to the frame or seating or surrounding paving.

Broken or damaged sections for channel and/or grating should be replaced where practical to do so and to avoid further deterioration of the system.

During prolonged periods of dry weather, traps shall be checked and replenished as necessary in order to maintain the seal and preventing the escape of odours.

6.0 ROAD GULLIES

Road gullies should be inspected regularly to ensure that the system continues to operate effectively and is free from damage or blockage by debris or solid objects.

The gullies should be cleaned at least once a year and incorporated into a planned maintenance schedule. The frequency of inspection and maintenance depends on the local environment and conditions.

The gully grating should be kept clear at all times to ensure uninterrupted flow of surface runoff into the gully. Any debris should be removed.



The seating areas for the grate should be cleaned before they are replaced. The covers and grates should be locked into position to prevent these being removed, stolen, or dislodged by traffic.

During prolonged periods of dry weather, traps shall be checked and replenished as necessary in order to maintain the seal and preventing the escape of odours.

7.0 FLOW CONTROL CHAMBERS

Where surface water runoff needs to be restricted a flow-control device will be required. This could be a simple orifice plate or a proprietary vortex flow controller.

Regular inspections of the flow control chamber should be carried out to ensure debris does not obstruct the inlet to the flow control.

Debris and any silt that has accumulated in the sump should be removed.

The frequency of inspection will depend on the catchment size and location of the unit. It is recommended initial inspections should be on a three-month basis for the first year of operation followed by a six-monthly basis thereafter.

In the event that the inlet to a vortex type flow controller becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance.

Note that the bypass door should be reset to the closed position once the blockage is cleared.

8.0 ATTENUATION TANKS

There are several different types of attenuation tanks from large diameter pipe systems to precast concrete tanks, box culverts and geo-cellular storage units and all have different maintenance requirements depending upon the system and manufacturer.

Inspection and maintenance of the attenuation tank shall be in accordance with the manufacturer's recommendations for the installed system.

Attenuation tanks shall be inspected at least twice a year (every six months) or if the tank and/or drainage system does not appear to be fully draining down as there may be a problem.

Inspection shall be visually from ground level and only as a last resort should a person enter the tank using appropriate safety equipment (where man access to a tank is possible).

Where further investigation and internal inspection is required, this should be carried out via a CCTV survey. Only tank systems which allow for internal inspection should be installed.



Sumps shall be checked and cleaned on a six-monthly basis and silt removed to a licenced facility.

Where a vortex flow control is located in the attenuation tank these shall be maintained in accordance the relevant sections in this document.

9.0 OIL SEPARATORS

Where petrol/oil separators are to be installed as part of the storm water drainage system these shall be maintained as follows:

In order to prevent pollution, the separators need to be regularly maintained. This should be carried out on a six-monthly basis or as required if the alarm is triggered by suitably qualified personnel and in accordance with details in EN858-2:2003 section 6.

Maintenance should be as follows:

- Determine sludge/silt volume in upstream catchpits and remove.
- Assess the depth of accumulated oil and silt in the separator.
- Check the condition of any coalescing device and replace as necessary.
- Service any electrical equipment i.e. alarms or management systems.
- Physically inspect the integrity of the separator and any mechanical parts.

The separator should be emptied when oil/silt levels have significantly built up. All retained waste, including silt must be removed and the separator refilled with clean water. In the event of a spillage, the separator should be emptied. Emptying should be undertaken by a registered waste removal company, experienced in separator emptying.

Every five years, the separator should be emptied and given a general inspection to test its integrity and performance, after which the separator must be refilled with clean water.

A detailed log should be kept up when the separator has been inspected, maintained, emptied and serviced, along with records of any specific events relating to the system such as cleaning, spillages. Failure to carry out the maintenance may result in pollution of the environment.

10.0 PROPRIETARY TREATMENT SYSTEMS/DEVICES

Where a proprietary treatment system is employed, these shall be installed and maintained in accordance with the manufacturer's instructions and recommendations to ensure they continue to operate effectively and as designed.



11.0 HEALTH AND SAFETY

Employers shall, so far as is reasonably practical, provide and maintain systems of work that are safe and without risks to health. The systems of work shall cover all aspects of the works including above-ground operations (for example manhole location and traffic control), access to the sewer system and all operations in the confined space of the sewer system.

12.0 RECORD HISTORY

The site manager shall be responsible for recording and updating details of prior maintenance and operations, which can be made available for future reference.

The site manager shall also be responsible for scheduling future maintenance in accordance with the necessary requirements of each component, create a fixed timetable of routine checks and ensure that the maintenance is undertaken appropriately.

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Appendix D Site Installation Photographs



Photograph 1 Attenuation Installation



Photograph 2 Attenuation Installation



Photograph 3 Flow Control Installation



Photograph 4 Headwall Installation.



Photograph 5 Interceptor Installation.



Appendix E LLFA Headwall Approval

Ben Terry

From: James Moore <james.moore@gmi.co.uk>
Sent: 15 October 2025 11:14
To: Marc Banks; Phil Buckley
Cc: Steve Shields; Daniel Murphy; L051 - Dakota Hotel, Manchester Airport; Ben Terry; Joe Horne
Subject: FW: BAI-M22-A-LDC: Site off Bailey Lane, Wythenshawe, Manchester M90 4AD [Filed 15 Oct 2025 11:25]
Categories: Filed by Mail Manager

Marc/Phil,

Please see below the Land Drainage approval from Flood Risk Management for the surface water connection to the brook.

Thanks,
James

Kind Regards

James Moore
Senior Project Manager

07581 074360 | james.moore@gmi.co.uk



 gmi.co.uk	YORKSHIRE Middleton House Westland Road Leeds, LS11 5UH 0113 276 0505	NORTH WEST Carvers Warehouse 77 Dale Street Manchester, M1 2HG 0161 302 4503	MIDLANDS Crosby Court 28 George Street Birmingham, B3 1QG 0121 389 2519	NORTH EAST Cavendish House Prince's Wharf, Thornaby Stockton on Tees, TS17 6QY 01642 044 797
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From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 15 October 2025 10:50
To: James Moore <james.moore@gmi.co.uk>
Subject: Re: BAI-M22-A-LDC: Site off Bailey Lane, Wythenshawe, Manchester M90 4AD

CAUTION: This email originated from outside of the organization. DO NOT open attachments or click links from unknown senders or unexpected emails. If unsure, click the 'Report Phishing' button in outlook.

Good Morning James,

Thank you for providing the photographic evidence of headwall installation, the construction issue drawing, and the compliance letter.

I can confirm we accept these with thanks. No further information is required for the Land Drainage Consent ref BAI-M22-A-LDC.

Kind Regards,
Laura

Laura Peacock

Flood Risk Team (LLFA) Manager

Email: laura.peacock@manchester.gov.uk

Highways Service

Neighbourhoods Directorate

Manchester City Council

PO Box 532

Town Hall

Manchester

M60 2LA

Web: <http://www.manchester.gov.uk>

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From: James Moore <james.moore@gmi.co.uk>

Sent: Tuesday, October 7, 2025 2:10 PM

To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>

Cc: L051 - Dakota Hotel, Manchester Airport <L051@gmi.co.uk>; Phil Buckley <p.buckley@rpp.co.uk>; Rob Hurst <Rob.Hurst@gmi.co.uk>

Subject: RE: BAI-M22-A-LDC: Site off Bailey Lane, Wythenshawe, Manchester M90 4AD

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Tom,

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