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DRAINAGE STATEMENT for **Marsh Lane, Barton upon Humber**

DATE:17 April 2022
OUR REF:J693/DSt RevP0

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REPORT DETAILS

Reference/Rev	Report Type	Author/Approved	Issue Date
J693/DSt RevP0	DRAINAGE STETMENT	DSDS	17/04/2022

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As per the Flood Risk Assessment for a 'Proposed Residential Development on Land to The South of Tyson Close, Barton Upon Humber, North Lincolnshire project no. JAG/AD/JD/45736-Rp001, June 2021', submitted to North Lincolnshire County Council, and subsequently approved for planning, the site levels are required to be raised to ensure finished levels are above flood risk levels.

As per the Stormwater Flow Calculations (Appendix A) – the stormwater system has been conservatively designed not to flood for all storm events up to 100years+40% climate change, therefore we expect that there will be no pluvial flooding occurring on the site as a result of insufficient capacity in the system.

The conservative discharge rate of 3l/s was proposed, in order to avoid increasing the flood risk elsewhere. To obtain this value a system of storage crates is to be installed.

The ground is also required to be raised due to the IL's of the proposed connection point – manhole in Tyson Close is only 0.5m deep - by raising the ground it makes it possible to lift the flow control chamber cover level, and install the required storage. A lower ground level would mean there would be no sufficient cover for the crates, and the attenuation would not work.

The site has been designed to ensure there should be no surface water run off. As per drawing J693-110 Private Levels Layout Phase 3 (Appendix B) the site is formed in a way that the highest levels are on the 3 boundaries to the east, south and west and slopes in a dished pattern. The modelling results show no flooding but should any flood exceedance occur, it will be guided from all boundaries towards the middle of the site then along Plot 2 garage wall towards Tyson Close and caught by the linear drain running parallel to the roadway. Therefore neither properties on site nor the neighboring sites to the east and west or Tysons Close road itself are at an increased flood risk as a result from this development. Additionally, the site will be under a maintenance regime preventing sediments entering into the system. The regular inspection of sumps, catch-pits, inspection chambers, etc. and removal of any silt found will take place.

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Appendix A Stormwater Flow Calculations

Rainfall Methodology	FSR
Return Period (years)	1
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.400
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	x

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
MH OUT				4.750	Manhole	1200		503334.338	422227.628	1.022
SP8				4.983	Manhole	1200		503321.214	422237.339	1.146
SP7				4.673	Manhole	1200		503305.356	422241.221	0.727
SP6				4.550	Manhole	1200		503288.883	422248.289	0.485
SP5				5.050	Manhole	1200		503287.013	422244.828	0.959
SP53	0.005	5.00		5.420	Manhole	600		503283.146	422236.475	0.667
RE51	0.005	5.00		5.600	Manhole	150		503291.954	422232.178	0.782
RE52	0.006	5.00		5.150	Manhole	150		503287.128	422227.973	0.335
SP4	0.003	5.00		4.610	Manhole	600		503281.812	422247.474	0.480
SP42	0.005	5.00		5.196	Manhole	600		503276.807	422237.440	0.991
RE41	0.006	5.00		5.200	Manhole	150		503275.321	422234.460	0.973
SP3	0.005	5.00		5.050	Manhole	600		503270.074	422252.383	0.835
RE31	0.007	5.00		5.200	Manhole	600		503263.540	422238.424	0.700
SP2	0.005	5.00		4.800	Manhole	600		503267.754	422254.097	0.566
SP1				4.600	Manhole	600		503257.822	422258.265	0.294
RE0	0.005	5.00		4.800	Manhole	150		503253.151	422248.628	0.423
Aco	0.001	5.00		4.500	Manhole	150		503285.380	422247.106	0.390

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Con Offset (m)	Min DS IL (m)
1.000	RE0	SP1	10.709	0.600	Colebrook-White	4.377	4.306	0.071	150.8	150	Circular_Default Sewer Type	5.22	50.0		
1.001	SP1	SP2	10.771	0.600	Colebrook-White	4.306	4.234	0.072	149.6	150	Circular_Default Sewer Type	5.44	50.0		
1.002	SP2	SP3	2.884	0.600	Colebrook-White	4.234	4.215	0.019	151.8	150	Circular_Default Sewer Type	5.50	50.0		
1.003	RE31	SP3	15.413	0.600	Colebrook-White	4.500	4.215	0.285	54.1	150	Circular_Default Sewer Type	5.19	50.0		
1.004	SP3	SP4	12.723	0.600	Colebrook-White	4.215	4.130	0.085	149.7	150	Circular_Default Sewer Type	5.76	50.0		
1.005	RE41	SP42	3.330	0.600	Colebrook-White	4.227	4.205	0.022	151.4	150	Circular_Default Sewer Type	5.07	50.0		
1.006	SP42	SP4	11.213	0.600	Colebrook-White	4.205	4.130	0.075	149.5	150	Circular_Default Sewer Type	5.30	50.0		
1.007	SP4	SP5	5.835	0.600	Colebrook-White	4.130	4.091	0.039	149.6	150	Circular_Default Sewer Type	5.87	50.0		
1.008	RE52	SP53	9.388	0.600	Colebrook-White	4.815	4.753	0.062	151.4	150	Circular_Default Sewer Type	5.19	50.0		
1.009	RE51	SP53	9.800	0.600	Colebrook-White	4.818	4.753	0.065	150.8	150	Circular_Default Sewer Type	5.20	50.0		
1.010	SP53	SP5	9.205	0.600	Colebrook-White	4.753	4.091	0.662	13.9	150	Circular_Default Sewer Type	5.26	50.0		
1.011	SP5	SP6	3.934	0.600	Colebrook-White	4.091	4.065	0.026	151.3	150	Circular_Default Sewer Type	5.96	50.0		
1.012	SP6	SP7	17.925	0.600	Colebrook-White	4.065	3.946	0.119	150.6	150	Circular_Default Sewer Type	6.32	49.1		
1.013	SP7	SP8	16.326	0.600	Colebrook-White	3.946	3.837	0.109	149.8	150	Circular_Default Sewer Type	6.65	47.9		
1.014	SP8	MH OUT	16.326	0.600	Colebrook-White	3.837	3.728	0.109	149.8	150	Circular_Default Sewer Type	6.99	46.8		
Aco 5	Aco	SP5	2.803	0.600	Colebrook-White	4.110	4.091	0.019	147.5	150	Circular_Default Sewer Type	5.06	50.0		

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	RE0	SP1	0.816	14.4	0.7	0.273	0.144	0.144	0.273	0.005	0.0	22	0.413
1.001	SP1	SP2	0.819	14.5	0.7	0.144	0.416	0.144	0.416	0.005	0.0	22	0.415
1.002	SP2	SP3	0.813	14.4	1.4	0.416	0.685	0.416	0.685	0.010	0.0	31	0.513
1.003	RE31	SP3	1.371	24.2	0.9	0.550	0.685	0.550	0.685	0.007	0.0	20	0.662
1.004	SP3	SP4	0.819	14.5	3.0	0.685	0.330	0.330	0.685	0.022	0.0	46	0.644
1.005	RE41	SP42	0.814	14.4	0.8	0.823	0.841	0.823	0.841	0.006	0.0	24	0.440
1.006	SP42	SP4	0.819	14.5	1.5	0.841	0.330	0.330	0.841	0.011	0.0	33	0.529
1.007	SP4	SP5	0.819	14.5	4.9	0.330	0.809	0.330	0.809	0.036	0.0	60	0.740
1.008	RE52	SP53	0.814	14.4	0.8	0.185	0.517	0.185	0.517	0.006	0.0	24	0.440
1.009	RE51	SP53	0.816	14.4	0.7	0.632	0.517	0.517	0.632	0.005	0.0	22	0.413
1.010	SP53	SP5	2.715	48.0	2.2	0.517	0.809	0.517	0.809	0.016	0.0	22	1.388
1.011	SP5	SP6	0.814	14.4	7.2	0.809	0.335	0.335	0.809	0.053	0.0	75	0.813
1.012	SP6	SP7	0.816	14.4	7.1	0.335	0.577	0.335	0.577	0.053	0.0	74	0.812
1.013	SP7	SP8	0.819	14.5	6.9	0.577	0.996	0.577	0.996	0.053	0.0	73	0.809
1.014	SP8	MH OUT	0.819	14.5	6.7	0.996	0.872	0.872	0.996	0.053	0.0	72	0.803
Aco 5	Aco	SP5	0.825	14.6	0.1	0.240	0.809	0.240	0.809	0.001	0.0	10	0.251

Link ID	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node ID	Dia (mm)	Width (mm)	Node Type	DS Node ID	Dia (mm)	Width (mm)	Node Type
1.000	10.709	150.8	150	Circular_Default Sewer Type	4.800	4.377	0.273	4.600	4.306	0.144	RE0	150		Manhole	SP1	600		Manhole
1.001	10.771	149.6	150	Circular_Default Sewer Type	4.600	4.306	0.144	4.800	4.234	0.416	SP1	600		Manhole	SP2	600		Manhole
1.002	2.884	151.8	150	Circular_Default Sewer Type	4.800	4.234	0.416	5.050	4.215	0.685	SP2	600		Manhole	SP3	600		Manhole
1.003	15.413	54.1	150	Circular_Default Sewer Type	5.200	4.500	0.550	5.050	4.215	0.685	RE31	600		Manhole	SP3	600		Manhole
1.004	12.723	149.7	150	Circular_Default Sewer Type	5.050	4.215	0.685	4.610	4.130	0.330	SP3	600		Manhole	SP4	600		Manhole
1.005	3.330	151.4	150	Circular_Default Sewer Type	5.200	4.227	0.823	5.196	4.205	0.841	RE41	150		Manhole	SP42	600		Manhole
1.006	11.213	149.5	150	Circular_Default Sewer Type	5.196	4.205	0.841	4.610	4.130	0.330	SP42	600		Manhole	SP4	600		Manhole
1.007	5.835	149.6	150	Circular_Default Sewer Type	4.610	4.130	0.330	5.050	4.091	0.809	SP4	600		Manhole	SP5	1200		Manhole
1.008	9.388	151.4	150	Circular_Default Sewer Type	5.150	4.815	0.185	5.420	4.753	0.517	RE52	150		Manhole	SP53	600		Manhole
1.009	9.800	150.8	150	Circular_Default Sewer Type	5.600	4.818	0.632	5.420	4.753	0.517	RE51	150		Manhole	SP53	600		Manhole
1.010	9.205	13.9	150	Circular_Default Sewer Type	5.420	4.753	0.517	5.050	4.091	0.809	SP53	600		Manhole	SP5	1200		Manhole
1.011	3.934	151.3	150	Circular_Default Sewer Type	5.050	4.091	0.809	4.550	4.065	0.335	SP5	1200		Manhole	SP6	1200		Manhole
1.012	17.925	150.6	150	Circular_Default Sewer Type	4.550	4.065	0.335	4.673	3.946	0.577	SP6	1200		Manhole	SP7	1200		Manhole
1.013	16.326	149.8	150	Circular_Default Sewer Type	4.673	3.946	0.577	4.983	3.837	0.996	SP7	1200		Manhole	SP8	1200		Manhole
1.014	16.326	149.8	150	Circular_Default Sewer Type	4.983	3.837	0.996	4.750	3.728	0.872	SP8	1200		Manhole	MH OUT	1200		Manhole
Acco 5	2.803	147.5	150	Circular_Default Sewer Type	4.500	4.110	0.240	5.050	4.091	0.809	Acco	150		Manhole	SP5	1200		Manhole

Rainfall Methodology	FSR	Return Period (years)	Climate Change (%)
FSR Region	England and Wales	1	0
M5-60 (mm)	20.000	30	0
Ratio-R	0.400	100	40
Summer CV	0.750		
Winter CV	0.840		
Analysis Speed	Normal		
Drain Down Time (mins)	240		
Additional Storage (m³/ha)	20.0		
Storm Durations (mins)	15		
	30		
	60		
	120		
	180		
	240		
	360		
	480		
	600		
	720		
	960		
	1440		
Check Discharge Rate(s)	x		
1 year (l/s)			
30 year (l/s)			
100 year (l/s)			
Check Discharge Volume	x		
100 year 360 minute (m³)			

Orifice											
Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Diameter (m)	Discharge Coefficient	
2x		Online				0.000			0.200	0.600	
4x		Online				0.000			0.200	0.600	
6x		Online				0.000			0.200	0.600	
Aco		Online				4.110			0.190	0.600	
ACO Q-Brake Vortex											
Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Min Outlet Diameter (m)	Min Node Diameter (mm)	Orifice Diameter (mm)
SP5	x	Online				4.091	0.550	3.0	0.095	1050	0.084

Soakaway											
Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Pit Width (m)	Pit Length (m)	Depth (m)	Inf Depth (m)	Number Required
SP42	0.00000	0.00000	2.0	0.95	4.205	29	9.000	4.000	0.400		1
SP5	0.00000	0.00000	2.0	0.95	4.091	119	4.000	5.000	0.200		1
9x	0.00000	0.00000	2.0	0.95	0.000		7.500	5.000	0.600		1
11x	0.00000	0.00000	2.0	0.95	0.000		7.000	4.000	0.800		1
35x	0.00000	0.00000	2.0	1.00	0.000		2.500	7.000	0.200		1
C3x	0.00000	0.00000	2.0	0.95	0.000		5.000	3.000	0.800		4
C2x	0.00000	0.00000	2.0	0.95	0.000		5.500	2.000	0.800		4
5x	0.00000	0.00000	2.0	0.95	0.000		9.000	4.000	0.400		1
Carpark											
Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Width (m)	Length (m)	Slope (1:X)	Depth (m)	Inf Depth (m)
6x	0.00000	0.00000	2.0	0.30	0.000		5.082	3.000	200.0	0.350	0.350
10x	0.00000	0.00000	2.0	0.30	0.000		34.749	4.000	45.0	0.400	0.400

Default Values		Overrides					
Entry Loss (manhole)	0.250	Link	Entry Loss	Exit Loss		Node	Flood Risk (m)
Exit Loss (manhole)	0.250						
Entry Loss (junction)	0.000						
Exit Loss (junction)	0.000						
Flood Risk (m)	0.300						

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	MH OUT	27	3.766	0.038	2.0	0.0000	0.0000	OK							
30 minute winter	SP8	27	3.876	0.039	2.0	0.0436	0.0000	OK	1.014	MH OUT	2.0	0.573	0.140	0.0575	4.4
30 minute winter	SP7	26	3.985	0.039	2.0	0.0436	0.0000	OK	1.013	SP8	2.0	0.566	0.140	0.0583	
30 minute winter	SP6	26	4.104	0.039	2.0	0.0436	0.0000	OK	1.012	SP7	2.0	0.567	0.140	0.0640	
30 minute winter	SP5	26	4.173	0.082	4.5	1.6580	0.0000	OK	ACO Q-Brake	SP6	2.0				
15 minute winter	SP53	9	4.775	0.022	2.2	0.0096	0.0000	OK	1.010	SP5	2.2	1.583	0.046	0.0454	
15 minute winter	RE51	11	4.841	0.023	0.7	0.0033	0.0000	OK	1.009	SP53	0.7	0.426	0.049	0.0161	
15 minute summer	RE52	11	4.840	0.025	0.8	0.0093	0.0000	OK	1.008	SP53	0.8	0.469	0.055	0.0162	
15 minute winter	SP4	12	4.184	0.054	3.6	0.0218	0.0000	OK	1.007	SP5	3.5	0.875	0.241	0.0376	
60 minute winter	SP42	42	4.223	0.018	0.8	0.6345	0.0000	OK	1.006	SP4	0.5	0.256	0.032	0.0274	
15 minute summer	RE41	9	4.254	0.027	0.8	0.0038	0.0000	OK	1.005	SP42	0.8	0.733	0.057	0.0042	
15 minute winter	SP3	11	4.263	0.048	3.0	0.0192	0.0000	OK	1.004	SP4	3.0	0.585	0.208	0.0656	
15 minute winter	RE31	10	4.521	0.021	1.0	0.0099	0.0000	OK	1.003	SP3	1.0	0.355	0.040	0.0478	
15 minute winter	SP2	11	4.269	0.035	1.4	0.0162	0.0000	OK	1.002	SP3	1.4	0.352	0.096	0.0115	
15 minute winter	SP1	11	4.328	0.022	0.7	0.0063	0.0000	OK	1.001	SP2	0.7	0.296	0.048	0.0257	
15 minute winter	RE0	10	4.400	0.023	0.7	0.0058	0.0000	OK	1.000	SP1	0.7	0.430	0.049	0.0178	
30 minute winter	Aco	25	4.165	0.055	0.1	0.0038	0.0000	OK	Orifice	SP5	0.2				

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	MH OUT	29	3.774	0.046	2.9	0.0000	0.0000	OK							
30 minute winter	SP8	29	3.884	0.047	2.9	0.0529	0.0000	OK	1.014	MH OUT	2.9	0.635	0.202	0.0751	11.0
30 minute winter	SP7	29	3.993	0.047	2.9	0.0528	0.0000	OK	1.013	SP8	2.9	0.624	0.202	0.0763	
30 minute winter	SP6	28	4.112	0.047	2.9	0.0528	0.0000	OK	1.012	SP7	2.9	0.626	0.202	0.0837	
30 minute winter	SP5	28	4.281	0.190	10.8	3.8256	0.0000	SURCHARGED	ACO Q-Brake	SP6	2.9				
15 minute winter	SP53	10	4.787	0.034	5.4	0.0147	0.0000	OK	1.010	SP5	5.4	1.749	0.113	0.0935	
15 minute winter	RE51	10	4.854	0.036	1.7	0.0052	0.0000	OK	1.009	SP53	1.7	0.541	0.116	0.0303	
15 minute winter	RE52	10	4.855	0.040	2.1	0.0150	0.0000	OK	1.008	SP53	2.1	0.615	0.144	0.0317	
30 minute winter	SP4	28	4.282	0.152	7.6	0.0620	0.0000	SURCHARGED	1.007	SP5	6.6	0.777	0.458	0.1027	
30 minute winter	SP42	29	4.282	0.077	5.4	2.6623	0.0000	OK	1.006	SP4	-3.2	-0.264	-0.218	0.1497	
30 minute winter	RE41	29	4.282	0.055	1.6	0.0078	0.0000	OK	1.005	SP42	1.6	0.694	0.111	0.0249	
15 minute winter	SP3	11	4.293	0.078	7.3	0.0313	0.0000	OK	1.004	SP4	7.4	0.698	0.510	0.1513	
15 minute winter	RE31	10	4.532	0.032	2.4	0.0153	0.0000	OK	1.003	SP3	2.4	0.416	0.098	0.0918	
15 minute winter	SP2	11	4.298	0.064	3.3	0.0295	0.0000	OK	1.002	SP3	3.3	0.419	0.231	0.0237	
15 minute winter	SP1	11	4.340	0.034	1.7	0.0097	0.0000	OK	1.001	SP2	1.7	0.332	0.114	0.0550	
15 minute winter	RE0	10	4.412	0.035	1.7	0.0090	0.0000	OK	1.000	SP1	1.7	0.544	0.116	0.0329	
30 minute winter	Aco	28	4.281	0.171	0.3	0.0118	0.0000	FLOOD RISK	Orifice	SP5	0.5				

Results for 100 year +40% Critical Storm Duration. Lowest mass balance: 100.00%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	MH OUT	144	3.774	0.046	3.0	0.0000	0.0000	OK							
60 minute winter	SP8	103	3.884	0.047	3.0	0.0537	0.0000	OK	1.014	MH OUT	3.0	0.640	0.207	0.0766	25.2
120 minute winter	SP7	146	3.993	0.047	3.0	0.0536	0.0000	OK	1.013	SP8	3.0	0.629	0.207	0.0779	
60 minute winter	SP6	33	4.112	0.047	3.0	0.0536	0.0000	OK	1.012	SP7	3.0	0.630	0.208	0.0854	
60 minute winter	SP5	58	4.179	0.407	9.1	4.2701	0.0000	SURCHARGED	ACO Q-Brake	SP6	3.0				
15 minute winter	SP53	10	4.179	0.046	9.9	0.0200	0.0000	OK	1.010	SP5	9.9	1.840	0.206	0.1023	
15 minute winter	RE51	10	4.867	0.049	3.1	0.0071	0.0000	OK	1.009	SP53	3.1	0.641	0.213	0.0470	
15 minute winter	RE52	10	4.870	0.055	3.8	0.0205	0.0000	OK	1.008	SP53	3.8	0.723	0.261	0.0489	
60 minute winter	SP4	59	4.499	0.369	8.1	0.1505	0.0000	FLOOD RISK	1.007	SP5	5.4	0.785	0.376	0.1027	
60 minute winter	SP42	59	4.499	0.294	11.0	10.1750	0.0000	SURCHARGED	1.006	SP4	-7.8	-0.463	-0.542	0.1974	
60 minute winter	RE41	59	4.499	0.272	1.9	0.0384	0.0000	SURCHARGED	1.005	SP42	1.7	0.574	0.116	0.0586	
60 minute winter	SP3	58	4.500	0.285	6.3	0.1147	0.0000	SURCHARGED	1.004	SP4	5.8	0.554	0.398	0.2240	
15 minute winter	RE31	10	4.500	0.043	4.4	0.0208	0.0000	OK	1.003	SP3	4.3	0.456	0.179	0.1667	
60 minute winter	SP2	58	4.500	0.266	3.1	0.1219	0.0000	SURCHARGED	1.002	SP3	2.8	0.405	0.195	0.0508	
60 minute winter	SP1	58	4.500	0.194	1.6	0.0548	0.0000	FLOOD RISK	1.001	SP2	1.5	0.331	0.106	0.1896	
60 minute winter	RE0	58	4.500	0.123	1.6	0.0311	0.0000	OK	1.000	SP1	1.6	0.533	0.112	0.1768	
60 minute winter	Aco	58	4.496	0.386	0.3	0.0267	0.0000	FLOOD RISK	Orifice	SP5	0.6				

Circular_Default Sewer Type			
Shape	Circular		Dia (mm)
Barrels	1		100
Height (mm)			150
Width (mm)			
Side Slope (1:X)			
Auto Increment (mm)	75		
Preferred Cover (m)			
Steep Slope (1:X)			
Follow Ground	x		
Velocity	Default		
ks (mm) / n			
Short Name			
swale			
Shape	Trapezoidal		Dia (mm)
Barrels	1		7000
Height (mm)			10000
Width (mm)	500		
Side Slope (1:X)	3.0		
Auto Increment (mm)	250		
Preferred Cover (m)			
Steep Slope (1:X)	400		
Follow Ground			
Velocity	Manning		
ks (mm) / n	100.000		
Short Name			
double pipes			
Shape	Rectangular		Dia (mm)
Barrels	2		100
Height (mm)			150
Width (mm)			
Side Slope (1:X)			
Auto Increment (mm)	75		
Preferred Cover (m)			
Steep Slope (1:X)			

Follow Ground	x				
Velocity	Default				
ks (mm) / n					
Short Name					
rectang					
Shape	Rectangular		Dia (mm)		
Barrels	1		300		
Height (mm)	500				
Width (mm)					
Side Slope (1:X)					
Auto Increment (mm)	50				
Preferred Cover (m)					
Steep Slope (1:X)					
Follow Ground	x				
Velocity	Default				
ks (mm) / n					
Short Name					
fedfsf					
Shape	Closed Rectangular		Dia (mm)		
Barrels	1		3000		
Height (mm)	1000				
Width (mm)					
Side Slope (1:X)					
Auto Increment (mm)	50				
Preferred Cover (m)					
Steep Slope (1:X)					
Follow Ground	x				
Velocity	Default				
ks (mm) / n					
Short Name					
swale1					
Shape	Open User Defined		Dia (mm)	Width / Total	Depth / Total
Barrels	1		300	0.000	1.000
Height (mm)				2.000	0.500

Width (mm)					2.001	0.000
Side Slope (1:X)					4.000	0.000
Auto Increment (mm)		50			4.001	0.500
Preferred Cover (m)					6.000	1.000
Steep Slope (1:X)						
Follow Ground	x					
Velocity	Default					
ks (mm) / n						
Short Name						
filter drain						
Shape	Rectangular		Dia (mm)			
Barrels		1		450		
Height (mm)						
Width (mm)		2000				
Side Slope (1:X)						
Auto Increment (mm)		50				
Preferred Cover (m)		0.500				
Steep Slope (1:X)		400				
Follow Ground	x					
Velocity	Default					
ks (mm) / n						
Short Name						
swale2						
Shape	Open User Defined		Dia (mm)		Width / Total	Depth / Total
Barrels		1		300	0.000	1.000
Height (mm)					2.000	0.500
Width (mm)					2.001	0.000
Side Slope (1:X)					7.999	0.000
Auto Increment (mm)		50			8.000	0.500
Preferred Cover (m)					9.990	1.000
Steep Slope (1:X)		400				
Follow Ground	x					
Velocity	Default					
ks (mm) / n						
Short Name						

swale3					
Shape	Open User Defined	Dia (mm)	Width / Total	Depth / Total	
Barrels	1	300	0.000	1.000	
Height (mm)			2.000	0.500	
Width (mm)			2.001	0.000	
Side Slope (1:X)			7.999	0.000	
Auto Increment (mm)	50		8.000	0.500	
Preferred Cover (m)			9.990	1.000	
Steep Slope (1:X)					
Follow Ground	x				
Velocity	Default				
ks (mm) / n					
Short Name					

GRISHELE LTD.

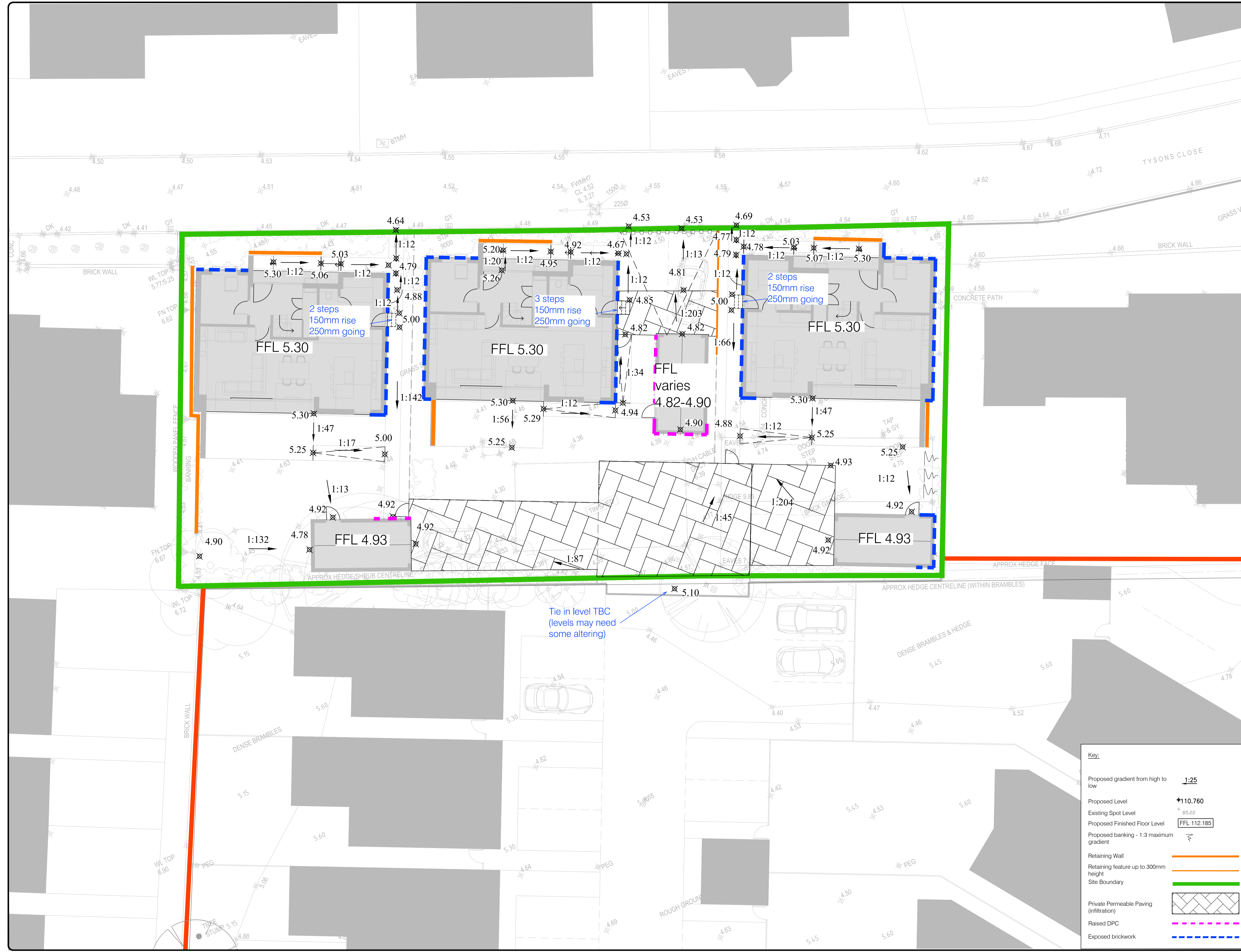
Louth Office

Tel: 01507 604216

Website:

email: info@grishele.co.uk www.grishele.co.uk

Appendix B J693-110 Private Levels



- Notes:**
- DO NOT SCALE.
 - This drawing should be read in conjunction with all other relevant drawings and details.
 - If there is any conflict between the information on this drawing and that indicated on other drawings the Engineer should be informed BEFORE commencement of construction on site.
 - It should be understood that all drawings issued are Preliminary and NOT for construction until technical approval has been obtained from the relevant Authority. If the contractor commences site work prior to such approval being given, it is solely at his own risk.
 - All dimensions are given in millimetres unless noted otherwise.
 - The Risk Assessment and Hazard Identification and information for this project must be reviewed and understood by the contractor BEFORE the commencement of any works on site.
 - The Contractor is responsible for checking all tie-ins for line and level with existing prior commencement of any works. If any errors are found The Engineer, should be notified immediately in writing.
 - Existing levels based upon topo survey received from Grishelle.
 - Prior to commencing any works on site the contractor shall check all tie ins for line and level together with the inverts and sizes of all existing drainage and inform the engineer in writing if there is any variation with the details indicated on this or any other relevant drawings.
 - All pavement construction materials placed within 450mm of finished surface levels shall be non-frost susceptible.
 - The contractor shall carry out in situ CBR tests to establish the capping/sub-base requirements prior to commencing construction.
 - The Contractor is responsible for ensuring that all works are to the satisfaction of the Engineer, and shall be deemed to have included within his rates for any necessary testing.
 - It is the responsibility of the Contractor to locate any service apparatus in the vicinity of the works. The Client will accept no claims whatsoever in respect of losses or damage caused in respect of such apparatus, however caused.
 - Damp proof membrane to be specified by others
 - All design is provisional and subject to change - dependant on confirmation of percolation test results, house internal layouts, position of ground beams and approval of drainage strategy
 - Imported fill in the area of permeable car park or private road must be of permeable nature (sand, gravel - not much fines, clay or silt) - the Contractor to remove not only Topsoil, but also 0.25-0.3m thick layer of clay if encountered down to sand and gravel, and then put imported general fill of gravelly sandy nature (no fines).

Key:

- Proposed gradient from high to low: 1:25
- Proposed Level: +110.760
- Existing Spot Level: +85.22
- Proposed Finished Floor Level: FFL 112.185
- Proposed banking - 1:3 maximum gradient: [Symbol]
- Retaining Wall: [Orange line]
- Retaining feature up to 300mm height: [Orange line]
- Site Boundary: [Green line]
- Private Permeable Paving (infiltration): [Hatched box]
- Raised DPC: [Dashed pink line]
- Exposed brickwork: [Dashed blue line]

Rev	Date	Description	By	Chk

GRISHELE

Client: **Charworth Homes**

Project: **Marsh Lane, Barton upon Humber**

Title: **Private Levels Layout Phase 3**

Drawing Status: **PRELIMINARY**

Job No.: **J693**

Drawn	Checked	Scale at A1	Date	Issue Date
PK	DS	1:100	04.01.22	04.01.22

Drawing No.: **J693-110** Revision: **P0**