DRAINAGE STRATEGY

PROPOSED DEVELOPMENT AT BANBURY CLOSE, SPALDING.

Introduction

A planning application is due to be submitted to South Holland District Council to construct ten dwellings and an associated access road at Banbury Close, Spalding. The planning authority requires a drainage strategy to be submitted with the application.

Foul Water

The existing properties on the west side of Banbury Close discharge their foul water into a 150mm diameter Anglian Water (AW) sewer which is located within the gardens of these properties. This flows into the 150mm diameter AW sewer beneath West Elloe Avenue. An application will be submitted to Anglian Water to either connect to the sewer in Banbury Close or to construct a sewer under Banbury Close and connect to the sewer under West Elloe Avenue.

Surface Water

Surface water discharge from the site can be divided into the following:-

1) Surface water from roofs of buildings
2) Surface water drainage from hardstandings alongside houses and the access roads

1) Surface Water from roofs of buildings

The surface water from the roofs of the houses and garages will be discharged into a piped system which will discharge into a storage facility possibly located under the IDB access. Flow from this storage facility will discharge through a flow limiter at a rate of 2.0 litres/second into the IDB drain on the western side of the site. The design will allow for flows from a 1 in 100 year event with an allowance of 30% for future increased flows due to climate change.

The lowest possible discharge rate that can be controlled by Hydrobrake apparatus is 2.0 litres/sec. An informal request has been sent to Welland and Deepings IDB for approval of this proposal. The calculations (Appendix A) show that a storage volume of approximately 35 cu metres is required. This could be provided either with 900mm diameter pipes or polystorm units placed under the IDB easement in the south west corner of the site.

A larger volume of storage than 35 cu metres may be required to ensure the system is capable of discharging when the IDB drain is at full capacity. This aspect of the design will be agreed with Welland and Deepings IDB before an application for consent to discharge is submitted.

2) Surface Water Drainage from hardstandings and roads

Hardstandings alongside and in front of houses will be constructed of permeable block paving or with a suitable gravel sub base. The access road will be constructed with permeable tarmac. Percolation tests will be carried out to ensure that the base of the sub base is adequate to receive the flow from a 1 in 100 year event with an allowance of 30% for future increased flows due to climate change.

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6th December 2015.

APPENDIX A

DESIGN OF SURFACE WATER DISPOSAL FROM HOUSES

Area of each house:

Plot	1	2	3	4	5	6	7	8	9	10
Area	91.9	91.9	91.9	99.5	99.5	50.1	45.8	45.8	45.4	45.4

Total area of houses = 707.2 sq metres

Total area of the site = 3280 square metres.

Welland and Deepings IDB have stated that they will allow a discharge into their system at greenfield rates, which are 1.4 cumecs/1000ha.

Therefore allowable discharge = 0.3280/1000 x 1.4 x 1000 litres / second

= 0.46 litres /second.

The lowest discharge possible with a Hydrobrake is 2.0 litres/second

(Reference E mail from Nicola Clarke of Hydro International 13th August 2015).

Work out discharges from houses in 1 in 100 year storm with 30% increase for climate change.

Duration	M5_60min	Z1	M5-D	Z2	M100-D	Intensity mm/hour	Areal Factor	Areal Intensity mm/hour	Area (ha)	Volume cum/hr	Vol + 30% climate Change cum/hr	Total Volume cu m climate	Total Volume cu m
15	24	0.64	15.36	1.98	30.41	121.65	0.94	114.35	0.071	81.190	105.55	26.4	20.30
30	24	0.81	19.44	1.97	38.30	76.59	0.95	72.76	0.071	51.662	67.16	33.6	25.83
60	24	1	24	1.93	46.32	46.32	0.96	44.47	0.071	31.572	41.04	41.0	31.57
120	24	1.2	28.8	1.89	54.43	27.22	0.97	26.40	0.071	18.744	24.37	48.7	37.49
240	24	1.42	34.08	1.86	63.39	15.85	0.97	15.37	0.071	10.914	14.19	56.8	43.66
360	24	1.57	37.68	1.83	68.95	11.49	0.98	11.26	0.071	7.996	10.40	62.4	47.98
600	24	1.74	41.76	1.81	75.59	7.56	0.98	7.41	0.071	5.259	6.84	68.4	52.59
1440	24	2.16	51.84	1.81	93.83	3.91	0.98	3.83	0.071	2.720	3.54	84.9	65.29
2880	24	2.5	60	1.81	108.60	2.26	0.98	2.22	0.071	1.574	2.05	98.2	75.56

If an outfall of 2.0 litres / second is allowed into the IDB watercourse the following volumes of storage will be required.

Duration	Total Volume cu m	Maximum Outflow cumecs	Outflow in storm duration	Total Volume in Storage Pipes	Equivalent Rainfall mm	Time to Empty hours
15	26.4	0.00200	1.80	24.6	2.1	3.7
30	33.6	0.00200	3.60	30.0	2.7	4.7
60	41.0	0.00200	7.20	33.8	3.2	5.7
120	48.7	0.00200	14.40	34.3	3.9	6.8
240	56.8	0.00200	28.80	28.0	4.5	7.9
360	62.4	0.00200	43.20	19.2	4.9	8.7
600	68.4	0.00200	72.00	-3.6	5.4	9.5
1440	84.9	0.00200	172.80	-87.9	6.7	11.8
2880	98.2	0.00200	345.60	-247.4	7.8	13.6

Try 32 metres of 1.2 metre diameter pipe under access for IDB:

Volume = 3.142 x 0.6 x 0.6 x 32 = 36.2 cu m.

Alternately use polystorm units. Each polystorm unit is 1.0metres long x 500mm wide x 400mm deep, and each can store 0.19 cu metres.

No of units required = 34.3 / 0.19 = 180 units.

It is suggested that units are placed two deep and in a length of 30 metres with 1.5 metre width. A check will need to be made to ensure that the units are capable of withstanding any vehicle loading that may occur if Welland and Deepinjgs bring heavy vehicles along this access strip. If necessary a concrete slab would need to be constructed above the units or a similar alternative solution would need to be found.