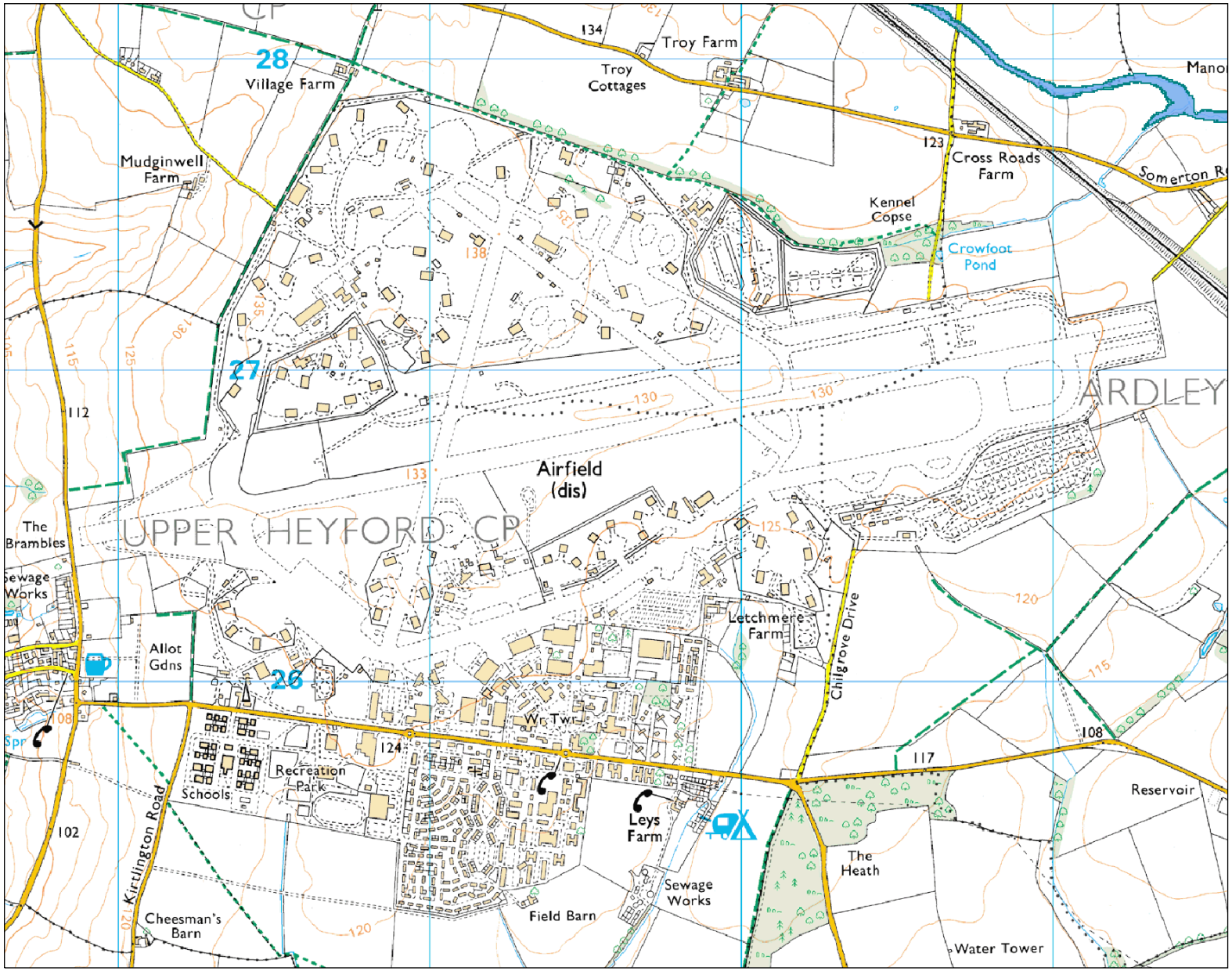
Appendix B EA Flood Maps

- Flood Map for Planning
- Surface Water Map 1 in 30
- Surface Water Map 1 in 100
- Surface Water Map 1 in 1,000
- EA Standard Notice

WT14434 Flood Map centered on 451574,226857 created by NH 20/03/2014



Environment Agency

Scale 1:19,000

N W E S

Flood Map for Planning (Rivers and Sea)

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map for Planning (Rivers and Sea) (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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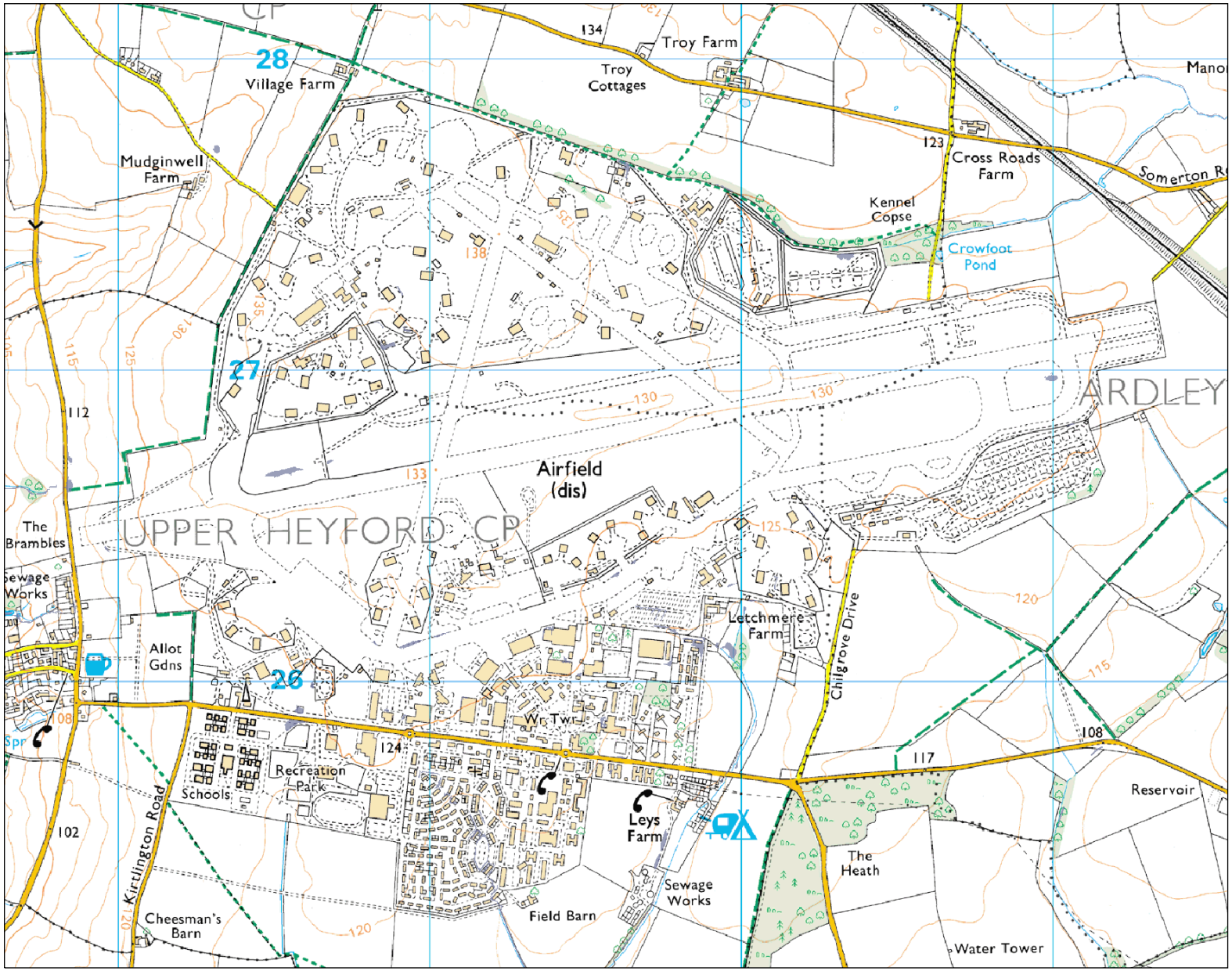
WT14434 Surface Water Map (1 in 30) created by NH 20/03/2014



Environment Agency

Scale 1:19,000

N W E S

Likelihood of Flooding from Rivers and the Sea

uFMfSW (2013) – 1 in 30 chance rain

Likelihood of Flooding from Rivers and the Sea (taking into account defences)

High:	Greater than or equal to 1 in 30 (3.3%) chance in any given year
Medium:	Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
Low:	Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
Very Low:	Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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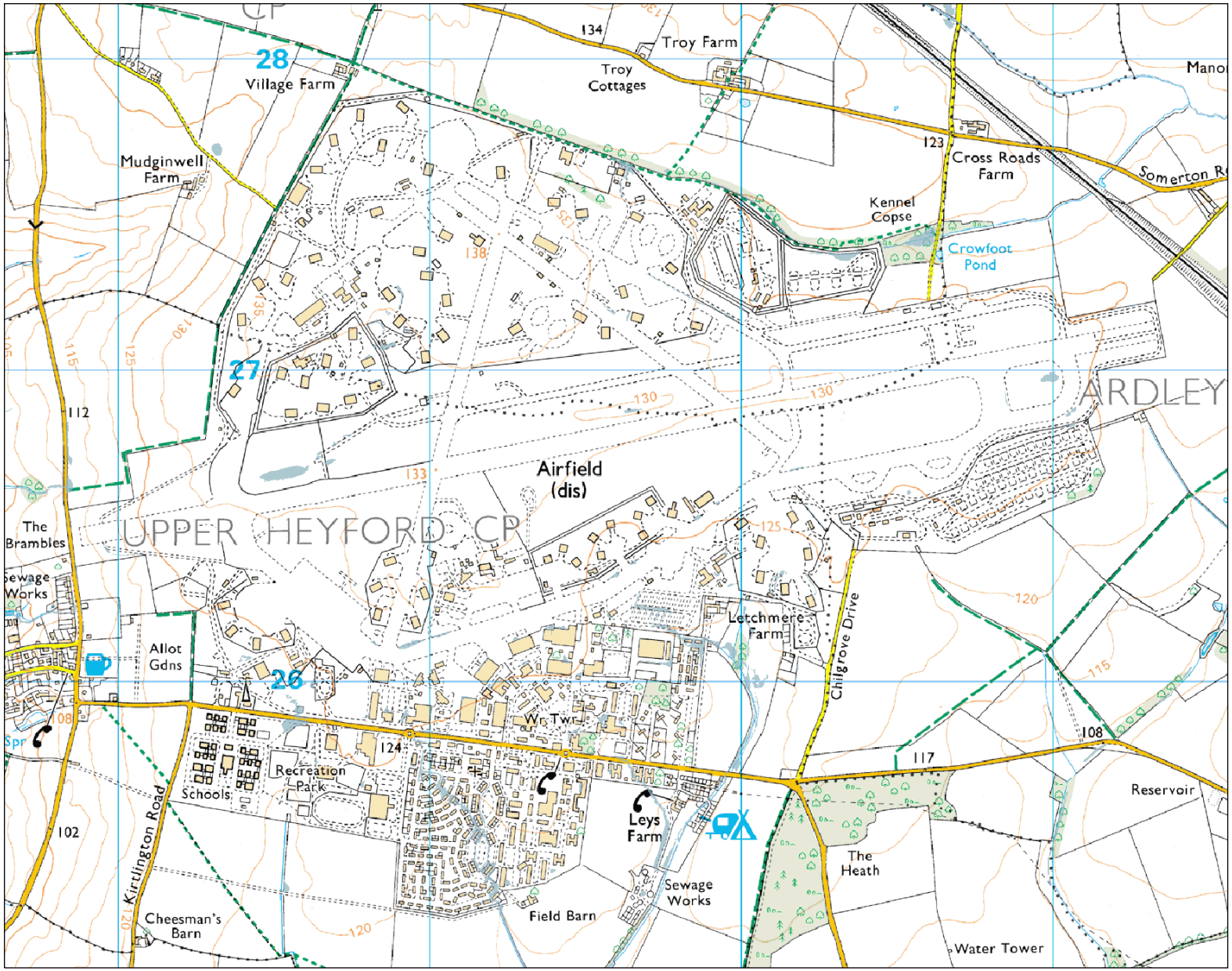
WT14434 Surface Water Map (1 in 100) created by NH 20/03/2014



Environment Agency

Scale 1:19,000

N W E S

Likelihood of Flooding from Rivers and the Sea

uFMfSW (2013) – 1 in 100 chance rain

Likelihood of Flooding from Rivers and the Sea (taking into account defences)

High:	Greater than or equal to 1 in 30 (3.3%) chance in any given year
Medium:	Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
Low:	Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
Very Low:	Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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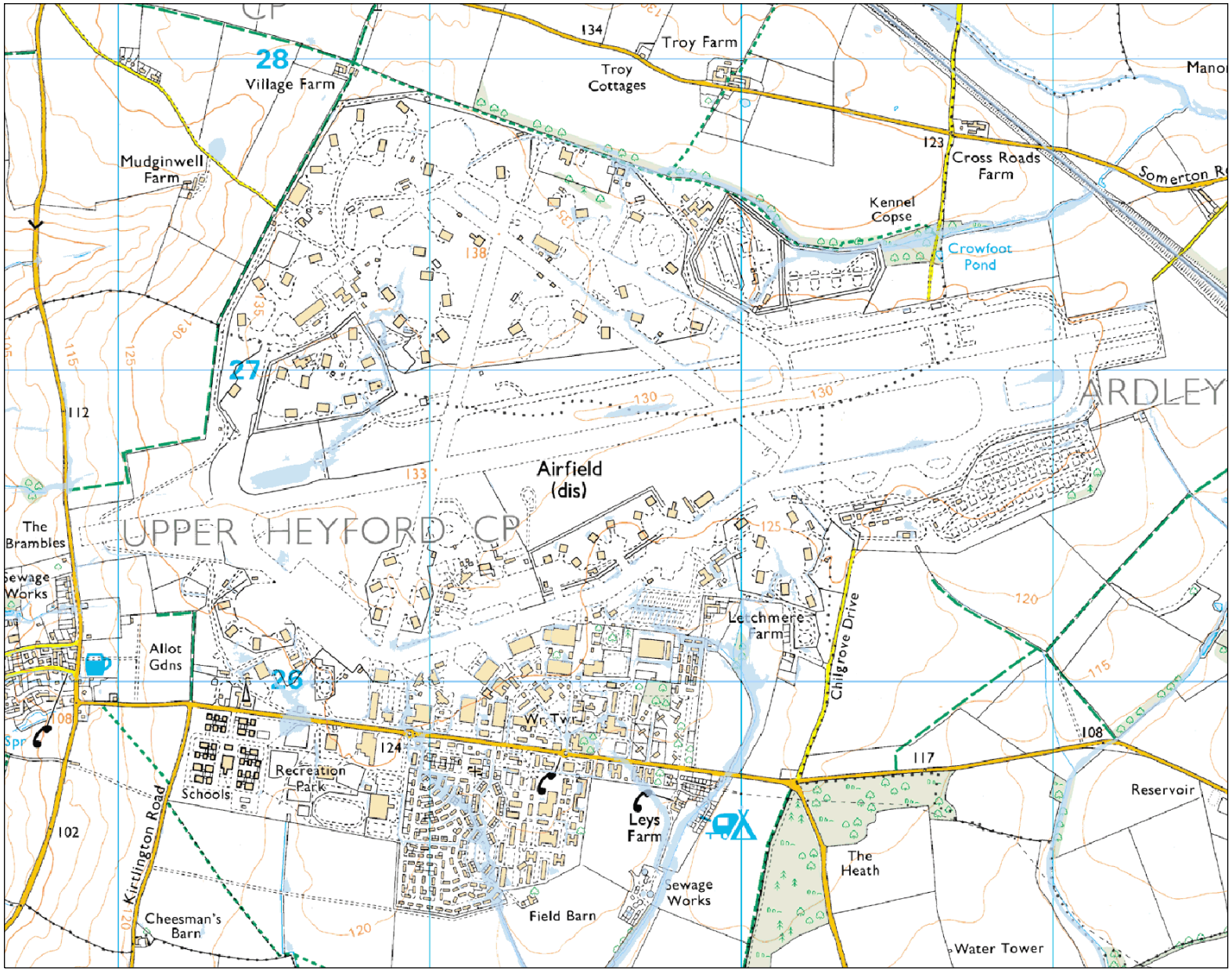
WT14434 Surface Water Map (1 in 1000) created by NH 20/03/2014



Environment Agency

Scale 1:19,000

N W E S

Likelihood of Flooding from Rivers and the Sea

uFMfSW (2013) – 1 in 1000 chance rain

Likelihood of Flooding from Rivers and the Sea (taking into account defences)

High:	Greater than or equal to 1 in 30 (3.3%) chance in any given year
Medium:	Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.
Low:	Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
Very Low:	Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

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Appendix C Calculations

- Greenfield Runoff Rate
- Attenuation Volume Requirement

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.150
Area (ha)	12.500	Urban	0.000
SAAR (mm)	696	Region Number	Region 4

Results l/s

QBAR Rural	5.0
QBAR Urban	5.0
Q100 years	12.9
Q1 year	4.2
Q30 years	9.9
Q100 years	12.9

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.265	0.265	0.8	241.0	O K
30 min Summer	0.347	0.347	0.8	315.4	O K
60 min Summer	0.432	0.432	0.8	392.8	O K
120 min Summer	0.518	0.518	0.8	471.6	O K
180 min Summer	0.568	0.568	0.8	517.1	O K
240 min Summer	0.602	0.602	0.8	548.1	O K
360 min Summer	0.651	0.651	0.8	592.3	O K
480 min Summer	0.686	0.686	0.8	624.6	O K
600 min Summer	0.714	0.714	0.9	649.6	O K
720 min Summer	0.736	0.736	0.9	669.7	O K
960 min Summer	0.770	0.770	0.9	700.6	O K
1440 min Summer	0.814	0.814	0.9	740.5	O K
2160 min Summer	0.849	0.849	0.9	772.9	O K
2880 min Summer	0.867	0.867	0.9	788.7	O K
4320 min Summer	0.874	0.874	0.9	795.3	O K
5760 min Summer	0.862	0.862	0.9	784.7	O K
7200 min Summer	0.844	0.844	0.9	767.7	O K
8640 min Summer	0.826	0.826	0.9	751.8	O K
10080 min Summer	0.809	0.809	0.9	736.0	O K
15 min Winter	0.297	0.297	0.8	269.9	O K
30 min Winter	0.388	0.388	0.8	353.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.843	0.0	70.4	19
30 min Summer	84.413	0.0	68.2	34
60 min Summer	52.662	0.0	128.5	64
120 min Summer	31.735	0.0	122.0	124
180 min Summer	23.281	0.0	125.8	184
240 min Summer	18.577	0.0	128.9	244
360 min Summer	13.477	0.0	132.9	364
480 min Summer	10.732	0.0	135.5	484
600 min Summer	8.987	0.0	137.1	604
720 min Summer	7.771	0.0	138.1	724
960 min Summer	6.173	0.0	139.1	964
1440 min Summer	4.456	0.0	138.3	1442
2160 min Summer	3.212	0.0	282.9	2164
2880 min Summer	2.543	0.0	281.1	2880
4320 min Summer	1.828	0.0	270.9	4320
5760 min Summer	1.445	0.0	548.3	5760
7200 min Summer	1.203	0.0	540.1	6552
8640 min Summer	1.035	0.0	527.6	7176
10080 min Summer	0.912	0.0	511.5	7960
15 min Winter	128.843	0.0	69.9	19
30 min Winter	84.413	0.0	65.7	34

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.484	0.484	0.8	440.1	O K
120 min Winter	0.581	0.581	0.8	528.5	O K
180 min Winter	0.637	0.637	0.8	579.7	O K
240 min Winter	0.675	0.675	0.8	614.7	O K
360 min Winter	0.730	0.730	0.9	664.6	O K
480 min Winter	0.771	0.771	0.9	701.4	O K
600 min Winter	0.802	0.802	0.9	729.8	O K
720 min Winter	0.827	0.827	0.9	752.9	O K
960 min Winter	0.866	0.866	0.9	788.5	O K
1440 min Winter	0.918	0.918	1.0	835.3	O K
2160 min Winter	0.962	0.962	1.0	875.0	O K
2880 min Winter	0.985	0.985	1.0	896.2	O K
4320 min Winter	1.001	1.001	1.0	910.7	O K
5760 min Winter	0.996	0.996	1.0	906.1	O K
7200 min Winter	0.980	0.980	1.0	891.7	O K
8640 min Winter	0.958	0.958	1.0	871.9	O K
10080 min Winter	0.935	0.935	1.0	850.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.662	0.0	123.1	64
120 min Winter	31.735	0.0	127.3	124
180 min Winter	23.281	0.0	132.6	182
240 min Winter	18.577	0.0	135.9	242
360 min Winter	13.477	0.0	140.0	362
480 min Winter	10.732	0.0	142.6	480
600 min Winter	8.987	0.0	144.1	598
720 min Winter	7.771	0.0	145.1	716
960 min Winter	6.173	0.0	145.9	954
1440 min Winter	4.456	0.0	144.6	1428
2160 min Winter	3.212	0.0	297.2	2124
2880 min Winter	2.543	0.0	294.6	2824
4320 min Winter	1.828	0.0	282.6	4192
5760 min Winter	1.445	0.0	578.6	5536
7200 min Winter	1.203	0.0	568.9	6840
8640 min Winter	1.035	0.0	555.0	8040
10080 min Winter	0.912	0.0	537.7	8272

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.405	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 1.000

Time (mins) From:	To:	Area (ha)
0	4	1.000

Model Details

Storage is Online Cover Level (m) 1.200

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	910.0	1.200	910.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0047-1000-1000-1000
Design Head (m)	1.000
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	47
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.0
Flush-Flo™	0.205	0.8
Kick-Flo®	0.415	0.7
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.1	3.000	1.6	7.000	2.4
0.200	0.8	1.400	1.2	3.500	1.8	7.500	2.5
0.300	0.8	1.600	1.2	4.000	1.9	8.000	2.6
0.400	0.7	1.800	1.3	4.500	2.0	8.500	2.7
0.500	0.7	2.000	1.4	5.000	2.1	9.000	2.7
0.600	0.8	2.200	1.4	5.500	2.2	9.500	2.8
0.800	0.9	2.400	1.5	6.000	2.3		
1.000	1.0	2.600	1.5	6.500	2.3		