

RESEARCH DEPARTMENT REPORT SERIES no. 11-2011

# CURTIS'S AND HARVEY LTD EXPLOSIVES FACTORY, CLIFFE AND CLIFFE WOODS, MEDWAY ARCHAEOLOGICAL SURVEY AND ANALYSIS OF THE FACTORY REMAINS

VOLUME 2 of 2

Rebecca Pullen, Sarah Newsome, Andrew Williams and Wayne D Cocroft



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**CURTIS'S AND HARVEY LTD EXPLOSIVES FACTORY  
CLIFFE AND CLIFFE WOODS  
MEDWAY**

**ARCHAEOLOGICAL SURVEY AND  
ANALYSIS OF THE FACTORY REMAINS  
Volume 2 of 2**

Rebecca Pullen, Sarah Newsome, Andrew Williams  
and Wayne D Cocroft

2013

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## SUMMARY

Between November 2010 and January 2011 English Heritage undertook detailed archaeological survey and analysis of a former chemical explosives factory covering approximately 128 hectares of estuarine marshland in the north-west corner of the Hoo Peninsula, Medway. The study was undertaken as part of the wider Hoo Peninsula Historic Landscape Project and presents a comprehensive record and analysis of the surface remains along with the first meticulous and accurate plan of the whole site and a detailed history of the factory. Initially, in 1892 Hay, Merricks & Co set up a small-scale gunpowder storage facility here. Then in 1898, the site was acquired by Curtis's & Harvey Ltd who quickly established a new chemical explosives factory. The works grew rapidly, and during the First World War it became a government-controlled establishment manufacturing a range of propellant and blasting explosives with a primary focus on producing naval cordite. It was a short-lived enterprise, closing around 1920 due to the post-war reduction in demand for munitions. The site is on land owned by the Port of London Authority and managed by tenant farmers. There is no public access to the site.

## CONTRIBUTORS

The preliminary aerial photographic survey was carried out by Fiona Small. Fieldwork was undertaken by Sarah Newsome, Rebecca Pullen, Wayne Cocroft, Andrew Williams, Derwin Gregory, Marcus Jecock, Magnus Alexander and David McOmish. Rebecca Pullen carried out the background research, prepared the survey data and wrote the report, incorporating contributions and edits from Sarah Newsome, Wayne Cocroft and Andrew Williams. Dave Went and Laura Holland commented on the final draft. Philip Sinton produced the final survey drawings and Andrew Williams produced plan and section drawings of the standing buildings. Unless otherwise stated, ground photographs were taken by Steve Cole, and new aerial photographs were taken by Damian Grady.

## ACKNOWLEDGEMENTS

English Heritage is extremely grateful to the Port of London Authority and Keith Loveridge for allowing access to the site. Thanks are also due to Peter Kendall, Helen Winton, Edward Carpenter and Fiona Small for valuable contributions, to Lis Dyson for her support, and to Trevor Pearson for technical advice. Particular gratitude goes to Gill Moore (Cliffe and Cliffe Woods Parish Council archive), Amanda Thomas, Clifford Dowsett and various residents of Cliffe village who kindly shared family history, memories and images.

## ARCHIVE LOCATION

The English Heritage Archive, The Engine House, Fire Fly Avenue, Swindon, SN2 2EH.

## DATE OF SURVEY AND REPORTING

The ground survey was undertaken between 1 November 2010 and 25 January 2011, and the report was published in 2013.

*Cover image: Aerial view of the factory remains focussed on Area E in the middle of the site, orientated with east at the top.  
Photograph: Damian Grady, NMR 26890/013 8MAR2011 © English Heritage*

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## APPENDIX I: INDEX TO STRUCTURES

The table below provides a quick reference index to the structure number sequence used throughout this report. Specific building functions are summarised where known, or where an interpretation has been made with reasonable confidence from physical or documentary evidence, the presumed function is listed in *italics*. Where a basic description is used in place of a function, for example for the linear features, it is written in brackets.

In the fourth column, 'SS' stands for 'standing structure', and is used here to note whether the remains include significant standing elements. Unless identified as an NMR or RCZAS monument number, the 'alternative IDs' predominantly correspond to original Curtis's & Harvey building numbers identified in the 1923 sales particulars documents (MALSC 06a\_DE\_Series\_1001\_1200/DEI087\_3). Throughout the table and the report, original factory building numbers are always presented in quotation marks. The sixth and seventh columns list the factory area and report section number under which the expanded description for this structure can be found. Finally, sheet numbers given in the right-hand column refer to the 1:1000 EH survey drawing sheets presented as A3 pull-out plans in Appendix 4.

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
1	TQ 71800 78900	for gunpowder, then reused	-	'Magazine No.2'	A	6.3	2, 3
2	TQ 71769 78776	for gunpowder, then reused	-	'Blending House No. 12'	A	6.3	3
3	TQ 71529 78735	<i>cartridge filling hut?</i>	-	-	A	6.3	3
4	TQ 71526 78698	<i>cartridge filling hut?</i>	-	-	A	6.3	1, 3
5	TQ 71589 78770	<i>cartridge filling hut?</i>	-	-	A	6.3	3
6	TQ 71586 78748	<i>cartridge filling hut?</i>	-	-	A	6.3	3
7	TQ 71581 78723	<i>cartridge filling hut?</i>	-	-	A	6.3	3
8	TQ 71577 78704	<i>cartridge filling hut?</i>	-	-	A	6.3	3
9	TQ 71573 78681	<i>cartridge filling hut?</i>	-	-	A	6.3	3
10	TQ 71555 78663	<i>cartridge filling hut?</i>	-	-	A	6.3	3
11	TQ 71622 78803	<i>cartridge filling hut?</i>	-	-	A	6.3	3
12	TQ 71614 78767	<i>cartridge filling hut?</i>	-	-	A	6.3	3
13	TQ 71608 78717	<i>cartridge filling hut?</i>	-	-	A	6.3	3
14	TQ 71601 78695	<i>cartridge filling hut?</i>	-	-	A	6.3	3
15	TQ 71647 78725	<i>manufacture of blasting explosives?</i>	-	-	A	6.3	3
16	TQ 71695 78801	<i>manufacture of blasting explosives?</i>	-	-	A	6.3	3
17	TQ 71685 78727	<i>manufacture of blasting explosives?</i>	-	-	A	6.3	3
18	TQ 71700 78707	<i>manufacture of blasting explosives?</i>	-	-	A	6.3	3
19	TQ 71675 78657	<i>manufacture of blasting explosives?</i>	-	-	A	6.3	3, 4
20	TQ 71750 78654	<i>acid or glycerine store for 31?</i>	-	-	A	6.3	3
21	TQ 71598 78872	(small featureless concrete slab)	-	-	A	6.3	3
22	TQ 71687 78926	(small featureless concrete slab)	-	-	A	6.3	2
23	TQ 71672 78880	<i>office/admin building or workshop?</i>	✓	-	A	6.3	3
24	TQ 71700 78892	<i>storage bays for imported materials?</i>	✓	-	A	6.3	2, 3
25	TQ 71744 78935	(slab with circular tank/plinth)	-	-	A	6.3	2
26	TQ 71786 78930	<i>base for pair of tanks?</i>	-	-	A	6.3	2
27	TQ 71839 78806	<i>nitroglycerine mixing or processing?</i>	-	-	A	6.3	3
28	TQ 71812 78751	<i>nitroglycerine washing or processing?</i>	-	-	A	6.3	8

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
29	TQ 71812 78736	<i>drying stove?</i>	-	-	A	6.3	3
29a	TQ 71827 78740	<i>fan shed</i>	-	-	A	6.3	3
30	TQ 71761 78713	<i>nitroglycerine wash house?</i>	✓	-	A	6.3	3
31	TQ 71801 78679	<i>nitroglycerine hill</i>	✓	'No. 14'	A	6.3	3
32	TQ 71851 78698	<i>nitroglycerine wash house?</i>	✓	-	A	6.3	3, 4
33	TQ 71556 78620	<i>rifle target</i>	-	-	B	6.4	4
34	TQ 71620 78612	<i>marker for rifle target</i>	-	-	B	6.4	4
35	TQ 71590 78603	<i>relating to guncotton manufacture?</i>	-	-	B	6.4	4
36	TQ 71617 78600	<i>relating to guncotton manufacture?</i>	-	-	B	6.4	4
37	TQ 71687 78604	<i>(small featureless concrete slab)</i>	-	-	B	6.4	4
38	TQ 71720 78600	<i>relating to acid storage?</i>	-	-	B	6.4	4
39	TQ 71690 78586	<i>guncotton nitration, or washing and pressing?</i>	-	-	B	6.4	4
40	TQ 71739 78573	<i>relating to guncotton manufacture?</i>	-	-	B	6.4	4
41	TQ 71757 78567	<i>washing, spinning or wringing?</i>	-	-	B	6.4	4
42	TQ 71776 78563	<i>(partially buried concrete slab)</i>	-	-	B	6.4	4
43	TQ 71798 78589	<i>power house?</i>	-	-	B	6.4	4
44	TQ 71800 78556	<i>power house?</i>	-	-	B	6.4	4
45	TQ 71824 78557	<i>office or facilities for office staff?</i>	-	-	B	6.5	4
46	TQ 71823 78547	<i>office (main reception)?</i>	-	-	B	6.5	4
47	TQ 71866 78622	<i>guncotton store or weigh house?</i>	-	-	B	6.6	9
48	TQ 71851 78599	<i>base for two tanks?</i>	-	-	B	6.6	4, 9
49	TQ 71861 78600	<i>tank?</i>	-	-	B	6.6	9
50	TQ 71861 78593	<i>tank?</i>	-	-	B	6.6	9
51	TQ 71856 78585	<i>(concrete foundation beams)</i>	-	-	B	6.6	9
52	TQ 71854 78571	<i>processing waste water/acid?</i>	-	-	B	6.6	9
53	TQ 71848 78552	<i>(partially buried concrete slab)</i>	-	-	B	6.6	4
54	TQ 71874 78545	<i>large storage shed?</i>	-	-	B	6.6	9
55	TQ 71886 78542	<i>large storage shed?</i>	-	-	B	6.6	9
56	TQ 71898 78542	<i>large storage shed?</i>	-	-	B	6.6	9
57	TQ 71912 78519	<i>semi-detached guards' cottages?</i>	-	-	B	6.6	9
58	TQ 71601 78577	<i>(concrete foundation beams)</i>	-	-	C	6.4	4
59	TQ 71581 78569	<i>cartridge filling hut?</i>	-	-	C	6.7	4
60	TQ 71626 78562	<i>cartridge filling hut?</i>	-	-	C	6.7	4
61	TQ 71650 78558	<i>cartridge filling hut?</i>	-	-	C	6.7	4
62	TQ 71677 78562	<i>relating to guncotton manufacture?</i>	-	-	C	6.4	4
63	TQ 71714 78553	<i>guncotton nitration, or washing and pressing?</i>	-	-	C	6.4	4
64	TQ 71771 78545	<i>(small concrete slab)</i>	-	-	C	6.4	4
65	TQ 71783 78540	<i>small office/admin building?</i>	✓	-	B	6.5	4
66	TQ 71808 78528	<i>site manager's house 'The Poplars'</i>	✓	-	B	6.5	4
67	TQ 71827 78513	<i>office/admin building?</i>	✓	-	B	6.5	4
68	TQ 71838 78510	<i>(partially buried concrete slab)</i>	-	-	B	6.5	4
69	TQ 71858 78500	<i>staff mess building?</i>	-	-	B	6.5	9
70	TQ 71874 78484	<i>staff mess building?</i>	-	-	B	6.5	9
71	TQ 71867 78446	<i>(featureless concrete slab)</i>	-	-	B	6.5	9
72	TQ 71526 78557	<i>cartridge filling hut?</i>	-	-	C	6.7	1, 4
73	TQ 71583 78544	<i>cartridge filling hut?</i>	-	-	C	6.7	4
74	TQ 71618 78537	<i>cartridge filling hut?</i>	-	-	C	6.7	4
75	TQ 71645 78532	<i>cartridge filling hut?</i>	-	-	C	6.7	4
76	TQ 71677 78525	<i>cartridge filling hut?</i>	-	-	C	6.7	4
77	TQ 71710 78517	<i>cartridge filling hut?</i>	-	-	C	6.7	4
78	TQ 71741 78512	<i>cartridge filling hut?</i>	-	-	C	6.7	4
79	TQ 71764 78495	<i>(featureless concrete slab)</i>	-	-	B	6.5	4

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
80	TQ 71778 78480	(featureless concrete slab)	-	-	B	6.5	4
81	TQ 71786 78456	(small featureless concrete slab)	-	-	B	6.5	4
82	TQ 71596 78515	wharf?	-	-	C	6.7	4
83	TQ 71625 78502	cartridge filling hut?	-	-	C	6.7	4
84	TQ 71653 78497	cartridge filling hut?	-	-	C	6.7	4
85	TQ 71681 78492	cartridge filling hut?	-	-	C	6.7	4
86	TQ 71714 78482	cartridge filling hut?	-	-	C	6.7	4
87	TQ 71622 78481	cartridge filling hut?	-	-	C	6.7	4
88	TQ 71650 78474	cartridge filling hut?	-	-	C	6.7	4
89	TQ 71594 78467	wharf or bridging point?	-	-	C	6.7	4
90	TQ 71620 78458	cartridge filling hut?	-	-	C	6.7	4
91	TQ 71644 78453	cartridge filling hut?	-	-	C	6.7	4
92	TQ 71666 78447	cartridge filling hut?	-	-	C	6.7	4
93	TQ 71690 78441	cartridge filling hut?	-	-	C	6.7	4
94	TQ 71674 78421	manufacture of blasting primers and/or fuses?	-	-	C	6.7	4
95	TQ 71700 78409	(small barrel-vaulted structure) expense magazine?	✓	-	C	6.7	4
96	TQ 71683 78399	danger building with wharf - manufacture of blasting primers and/or fuses?	-	-	C	6.7	4, 5
97	TQ 71524 78451	mixing house, drying stove or magazine?	-	-	C	6.8	1, 4
98	TQ 71575 78422	magazine?	-	-	C	6.8	4
99	TQ 71628 78401	magazine?	-	-	C	6.8	4, 5
100	TQ 71583 78372	mixing house, drying stove or magazine?	-	-	C	6.8	5
101	TQ 71636 78345	(concrete slab with trapezoidal plinths)	-	-	C	6.8	5
102	TQ 71705 78310	mixing house, drying stove or magazine?	-	-	C	6.8	5
103	TQ 71847 78316	exploded nitroglycerine building?	-	-	F	6.12	5, 10
104	TQ 71902 78228	exploded nitroglycerine building?	-	-	F	6.12	10
105	TQ 71909 78255	(arrow-shaped slab – part of L5?)	-	-	F	6.12	10
106	TQ 71835 78985	relating to cordite manufacture?	-	-	D	6.9	2
107	TQ 71891 79013	relating to cordite manufacture? Possibly incorporating house?	-	-	D	6.9	7
108	TQ 71868 78966	cordite press house?	-	-	D	6.9	7
109	TQ 71859 78959	cordite press house?	-	-	D	6.9	7
110	TQ 71892 78974	pump house and hydraulic accumulator?	-	-	D	6.9	7
111	TQ 71916 79012	(H-shaped machine bed)	-	-	D	6.9	7
112	TQ 71926 78997	relating to cordite manufacture?	-	-	D	6.9	7
113	TQ 71895 78888	relating to cordite manufacture?	-	-	D	6.9	7, 8
114	TQ 71917 78874	relating to cordite manufacture?	-	-	D	6.9	8
115	TQ 72022 79110	packing or store for import/export?	-	-	D	6.9	7
116	TQ 72101 79157	packing or store for import/export?	-	-	D	6.9	6
117	TQ 72150 79187	packing or store for import/export?	-	-	D	6.9	6
118	TQ 72198 79217	packing or store for import/export?	-	-	D	6.9	6
119	TQ 72279 79202	store or wharf?	-	-	D	6.9	11
120	TQ 72103 79096	magazine?	-	-	D	6.9	7
121	TQ 71990 79056	wireless mast base, military?	-	-	D	6.9	7
122	TQ 71994 79035	U-shaped earth bank, military?	-	-	D	6.9	7
123	TQ 72027 79007	drying stove or magazine?	-	-	D	6.9	7
124	TQ 72169 79063	(featureless concrete slab)	-	-	D	6.9	7
125	TQ 72275 79084	(featureless concrete slab)	-	-	D	6.9	12
126	TQ 72132 78994	drying stove or magazine?	-	-	D	6.9	7

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
I27	TQ 72211 78995	<i>cordite drying stove (4)?</i>	-	-	D	6.9	7, 12
I28	TQ 72275 78906	<i>(featureless concrete slab)</i>	-	-	D	6.9	12
I29	TQ 71972 78910	<i>acetone recovery stoves (20), formerly cordite drying stoves (10)</i>	-	'40?' (while it was still 10 cordite stoves)	D	6.9	7
I30	TQ 72112 78922	<i>acetone recovery stoves (20), formerly cordite drying stoves (20)</i>	-	-	D	6.9	7
I31	TQ 72136 78849	<i>acetone recovery stoves (20), formerly cordite drying stoves (10)</i>	-	-	D	6.9	8
I32	TQ 72079 78880	<i>acetone recovery house and blue brick yard?</i>	-	-	D	6.9	8
I33	TQ 72122 78885	<i>pump house?</i>	-	-	D	6.9	8
I34	TQ 71947 78877	<i>(small concrete slab, 2 plinths)</i>	-	-	D	6.9	8
I35	TQ 71976 78846	<i>mixing house, dying stove or magazine?</i>	-	-	D	6.9	8
I36	TQ 72040 78845	<i>mixing house, dying stove or magazine?</i>	-	-	D	6.9	8
I37	TQ 72277 78822	<i>wharf?</i>	-	-	D	6.9	13
I38	TQ 71923 78810	<i>drying stove or mixing house?</i>	-	'18?' (if a mixing house)	D	6.9	8
I39	TQ 71922 78732	<i>guncotton drying stove?</i>	-	'41' or '48'?	E	6.10	8
I40	TQ 71923 78671	<i>guncotton drying stove?</i>	-	'41' or '48'?	E	6.10	8
I41	TQ 71924 78607	<i>guncotton drying stove?</i>	-	-	E	6.10	9
I42	TQ 71929 78702	<i>fan shed (shared by I39 &amp; I40)?</i>	-	-	E	6.10	8
I43	TQ 71992 78767	<i>cordite drying stoves (4)</i>	-	-	E	6.10	8
I44	TQ 72071 78778	<i>cordite drying stoves (4)</i>	-	-	E	6.10	8
I45	TQ 72152 78774	<i>cordite drying stoves (4)</i>	-	-	E	6.10	8
I46	TQ 72103 78695	<i>cordite drying stoves (4)</i>	-	-	E	6.10	8
I47	TQ 72183 78699	<i>cordite drying stoves (4)</i>	-	-	E	6.10	8
I48	TQ 72278 78696	<i>cordite drying stoves (4)</i>	-	-	E	6.10	13
I49	TQ 71979 78691	<i>guncotton drying stove</i>	-	-	E	6.10	8
I49a	TQ 71993 78698	<i>fan shed</i>	-	-	E	6.10	8
I50	TQ 72031 78664	<i>guncotton drying stove</i>	-	-	E	6.10	8
I50a	TQ 72046 78671	<i>fan shed</i>	-	-	E	6.10	8
I51	TQ 71981 78633	<i>guncotton drying stove</i>	-	-	E	6.10	9
I51a	TQ 71997 78639	<i>fan shed</i>	-	-	E	6.10	9
I52	TQ 72071 78619	<i>guncotton drying stove</i>	-	-	E	6.10	9
I52a	TQ 72086 78626	<i>fan shed</i>	-	-	E	6.10	9
I53	TQ 72146 78625	<i>cordite drying stoves (4)</i>	✓	-	E	6.10	9
I54	TQ 72225 78627	<i>cordite drying stoves (4)</i>	✓	-	E	6.10	14
I55	TQ 71978 78568	<i>mixing house, for Cheddites?</i>	-	-	F	6.11	9
I56	TQ 72041 78558	<i>mixing house, for Cheddites?</i>	-	-	F	6.11	9
I57	TQ 72038 78487	<i>mixing house, for Cheddites?</i>	-	-	F	6.11	9
I58	TQ 71969 78490	<i>tank</i>	-	-	F	6.11	9
I59	TQ 72007 78440	<i>3 settling ponds or acid egg bases?</i>	-	-	F	6.11	9
I60	TQ 72022 78385	<i>gatehouse or guard hut?</i>	-	-	F	6.11	10
I61	TQ 72033 78352	<i>(small featureless concrete slab)</i>	-	-	F	6.11	10
I62	TQ 72027 78330	<i>gatehouse or guard hut?</i>	-	-	F	6.11	10
I63	TQ 72003 78356	<i>(small featureless concrete slab)</i>	-	-	F	6.11	10
I64	TQ 72038 78198	<i>gatehouse or associated with water main?</i>	-	-	F	6.11	10
I65	TQ 72077 78201	<i>(featureless concrete slab)</i>	-	-	F	6.11	10
I66	TQ 72184 78555	<i>nitroglycerine wash house?</i>	-	-	I	6.15	10
I67	TQ 72323 78542	<i>nitroglycerine wash house?</i>	-	-	I	6.15	10
I68	TQ 72400 78467	<i>nitroglycerine hill</i>	✓	'B2'	I	6.15	10

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
169	TQ 72246 78540	3 settling ponds or acid egg bases?	-	-	I	6.15	10
170	TQ 72352 78485	settling pond or acid egg base?	-	-	I	6.15	10
171	TQ72323 78472	(3 shaped brick bases)	-	-	I	6.15	10
172	TQ 72066 78383	possible store?	-	-	I	6.13	10
173 a	TQ 72115 78392	bridge support or wharf?	-	-	G	6.13	10
173b	TQ 72153 78388	bridge support or wharf?	-	-	G	6.13	10
174	TQ 72081 78349	'new' changing rooms	-	'96'	G	6.13	10
175	TQ 72101 78371	bale breaker house and/or motor show room	-	'84a'	G	6.13	10
176	TQ 72114 78343	drying house, picking room and willowing room with annexe and covered passages	-	'84', '85', '86'	G	6.13	10
177	TQ 72085 78273	possible acid tipping shed?	-	-	G	6.13	10
178	TQ 72112 78276	nitrating house/dipping room	-	'87'	G	6.13	10
179	TQ 72131 78255	rising corridor (part of 182)?	-	part of '88'?	G	6.13	10
180	TQ 72152 78363	with 181: washing house, settling house and press house, + corridor, annexe and adjoining store	-	'89'	G	6.13	10
181	TQ 72152 78327	with 180: washing house, settling house and press house, + corridor, annexe and adjoining store	-	'89'	G	6.13	10
182	TQ 72151 78283	boiling house, with rising corridor	-	'88'	G	6.13	10
183	TQ 72167 78302	tank	-	-	G	6.13	10
184	TQ 72187 78379	tank	-	-	G	6.13	10
185 (a-e)	TQ 72178 78362	5 furnaces, incinerators or acid tower bases?	✓	-	G	6.13	10
186	TQ 72189 78361	diesel engine house	-	'91'	G	6.13	10
187	TQ 72198 78352	office and engine man's shed	-	'91a'	G	6.13	10
188	TQ 72192 78332	soda store or wringing machines?	-	-	G	6.13	10
189	TQ 72194 78315	pump house?	-	-	G	6.13	10
190	TQ 72203 78315	hydraulic accumulator?	-	-	G	6.13	15
191	TQ 72193 78298	annexe to refrigerator house 192?	-	part of '119'?	G	6.13	10
192	TQ 72207 78296	refrigerator house, annexe, and 4 latrines	-	'119'	G	6.13	15
193	TQ 72192 78271	boiler house,+ covered way and 5 stack bases	-	'90'	G	6.13	10, 15
194	TQ 72229 78368	dressing rooms: 6 compartments and 11 earth closets	-	'110'	G	6.13	15
195	TQ 72243 78349	dressing rooms: 7 compartments	-	'110a'	G	6.13	15
196	TQ 72247 78238	(slab associated with L4?)	-	-	G	6.13	15
197	TQ 72380 79294	cordite blending house	-	'05'	K	6.17	11
198	TQ 72460 79295	cordite blending house	-	'06'	K	6.17	11
199	TQ 72540 79295	cordite blending house	-	'07'	K	6.17	11
200	TQ 72620 79295	cordite blending house	-	'08'	K	6.17	16
201	TQ 72444 79255	earth closet?	-	-	K	6.17	11
202	TQ 72601 79256	earth closet?	-	-	K	6.17	16
203	TQ 72767 79290	magazine with vestibule	-	'M11'	K	6.17	16
204	TQ 72734 79192	magazine with vestibule	-	'M12'	K	6.17	16
205	TQ 72382 79219	cordite drying stoves (4)	✓	'T111-114'	K	6.17	11
206	TQ 72462 79220	cordite drying stoves (4)	✓	'T115-118'	K	6.17	11
207	TQ 72541 79221	cordite drying stoves (4)	✓	'T119-122'	K	6.17	11
208	TQ 72621 79221	cordite drying stoves (4)	✓	'T123-126'	K	6.17	16
209	TQ 72382 79142	cordite drying stoves (4)	✓	'T127-130'	K	6.17	12
210	TQ 72462 79142	cordite drying stoves (4)	✓	'T131-134'	K	6.17	12
211	TQ 72542 79143	cordite drying stoves (4)	✓	'T135-138'	K	6.17	12

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
212	TQ 72622 79143	cordite drying stoves (4)	✓	'T139-142'	K	6.17	17
213	TQ 72443 79083	<i>earth closet?</i>	-	-	K	6.17	12
214	TQ 72603 79083	<i>earth closet?</i>	-	-	K	6.17	17
215	TQ 72382 79065	cordite blending house	-	'O9'	K	6.17	12
216	TQ 72462 79067	cordite blending house	-	'O10'	K	6.17	12
217	TQ 72542 79067	cordite blending house	-	'O11'	K	6.17	12
218	TQ 72622 79068	cordite blending house	-	'O12'	K	6.17	17
219	TQ 72761 79094	magazine	-	'M13'	K	6.17	17
220	TQ 72762 78995	magazine	-	'M14'	K	6.17	17
221	TQ 72782 78895	magazine	-	'M15'	K	6.17	17, 18
222	TQ 72384 78991	cordite drying stoves (4)	✓	'T143-146'	K	6.17	12
223	TQ 72463 78992	cordite drying stoves (4)	✓	'T147-150'	K	6.17	12
224	TQ 72543 78992	cordite drying stoves (4)	✓	'T151-154'	K	6.17	12
225	TQ 72623 78992	cordite drying stoves (4)	✓	'T155-158'	K	6.17	17
226	TQ 72384 78914	cordite drying stoves (4)	✓	'T159-162'	K	6.17	12
227	TQ 72464 78914	cordite drying stoves (4)	✓	'T163-166'	K	6.17	12
228	TQ 72544 78915	cordite drying stoves (4)	✓	'T167-170'	K	6.17	12
229	TQ 72623 78915	cordite drying stoves (4)	✓	'T171-174'	K	6.17	17
230	TQ 72385 78836	cordite drying stoves (4)	✓	'T175-178'	K	6.17	13
231	TQ 72385 78759	cordite drying stoves (4)	✓	'T179-182'	K	6.17	13
232	TQ 72463 78839	cordite blending house	-	'O13'	K	6.17	13
233	TQ 72543 78839	cordite blending house	-	'O14'	K	6.17	13
234	TQ 72623 78840	cordite blending house	-	'O15'	K	6.17	18
235	TQ 72701 78840	cordite blending house	-	'O16'	K	6.17	18
236	TQ 72464 78761	cordite blending house	-	'O17'	K	6.17	13
237	TQ 72544 78761	cordite blending house	-	'O18'	K	6.17	13
238	TQ 72623 78762	cordite blending house	-	'O19'	K	6.17	18
239	TQ 72601 78718	(small featureless concrete slab)	-	-	K	6.16	18
240	TQ 72416 78686	acetone recovery stoves (30)	-	'T239'	J	6.16	13
241	TQ 72415 78664	acetone recovery stoves (30)	-	'T269'	J	6.16	13
242	TQ 72460 78675	pump house, & loft	-	'TC1'	J	6.16	13
243	TQ 72472 78682	acetone recovery house, & adjoining blue brick yard	-	'TA2'	J	6.16	13
244	TQ 72527 78694	acetone recovery stoves (58) -remains of'	-	'T183'	J	6.16	13, 18
245	TQ 72527 78669	acetone recovery stoves (58) -remains of'	-	'T243'	J	6.16	13, 18
246	TQ 72600 78694	cordite press house (9)	-	'J4'	J	6.16	18
247	TQ 72600 78670	cordite press house (9)	-	'J5'	J	6.16	18
248	TQ 72579 78681	hydraulic accumulator	-	'106'	J	6.16	18
249	TQ 72590 78682	pump house	-	'107'	J	6.16	18
250	TQ 72623 78682	office	-	'108'	J	6.16	18
251	TQ 72682 78682	incorporating house	-	'J6 (1-34)'	J	6.16	18
252	TQ 72819 78680	expense magazine	-	'X7'	J	6.16	18
253	TQ 72872 78617	magazine	-	'X8'	J	6.16	19
254	TQ 72477 78633	fitter's shop	-	'105'	J	6.16	14
255	TQ 72581 78618	weigh house and adjoining store	-	'104'	J	6.16	19
256	TQ 72653 78617	cordite paste mixing house	-	'E4'	J	6.16	19
257	TQ 72705 78618	cordite paste mixing house	-	'E5'	J	6.16	19
258	TQ 72758 78618	cordite paste mixing house	-	'E6'	J	6.16	19
259	TQ 72810 78618	cordite paste mixing house	-	'E7'	J	6.16	19
260	TQ 72705 78557	cordite paste mixing house	-	'E8'	J	6.16	19
261	TQ 72758 78557	cordite paste mixing house	-	'E9'	J	6.16	19
262	TQ 72809 78558	cordite paste mixing house	-	'E10'	J	6.16	19

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
263	TQ 72861 78558	cordite paste mixing house	-	'E11'	J	6.16	19
264	TQ 72578 78555	magazine	-	'X9'	J	6.16	19
265	TQ 72642 78556	expense magazine	-	'X10'	J	6.16	19
266	TQ 72556 78518	(small featureless concrete slab)	-	-	H	6.14	19
267	TQ 72597 78494	guncotton drying stove	-	'N11'	H	6.14	19
267a	TQ 72603 78510	fan shed	-	'65'	H	6.14	19
268	TQ 72656 78495	guncotton drying stove	-	'N12'	H	6.14	19
268a	TQ 72662 78510	fan shed	-	'66'	H	6.14	19
269	TQ 72715 78494	guncotton drying stove	-	'N13'	H	6.14	19
269a	TQ 72720 78510	fan shed	-	'67'	H	6.14	19
270	TQ 72773 78494	guncotton drying stove	-	'N14'	H	6.14	19
270a	TQ 72779 78510	fan shed	-	'68'	H	6.14	19
271	TQ 72831 78495	guncotton drying stove	-	'N15'	H	6.14	19
271a	TQ 72837 78511	fan shed	-	'69'	H	6.14	19
272	TQ 72598 78441	guncotton drying stove	-	'N16'	H	6.14	19
272a	TQ 72603 78456	fan shed	-	'70'	H	6.14	19
273	TQ 72657 78441	guncotton drying stove	-	'N17'	H	6.14	19
273a	TQ 72662 78456	fan shed	-	'71'	H	6.14	19
274	TQ 72715 78441	guncotton drying stove	-	'N18'	H	6.14	19
274a	TQ 72721 78456	fan shed	-	'72'	H	6.14	19
275	TQ 72774 78441	guncotton drying stove	-	'N19'	H	6.14	19
275a	TQ 72780 78456	fan shed	-	'73'	H	6.14	19
276	TQ 72833 78441	guncotton drying stove	-	'N20'	H	6.14	19
276a	TQ 72838 78457	fan shed	-	'74'	H	6.14	19
277	TQ 72599 78386	guncotton drying stove	-	'N21'	H	6.14	20
277a	TQ 72603 78402	fan shed	-	'75'	H	6.14	19
278	TQ 72656 78387	guncotton drying stove	-	'N22'	H	6.14	20
278a	TQ 72663 78402	fan shed	-	'76'	H	6.14	19
279	TQ 72715 78386	guncotton drying stove	-	'N23'	H	6.14	20
279a	TQ 72720 78402	fan shed	-	'77'	H	6.14	19
280	TQ 72774 78387	guncotton drying stove	-	'N24'	H	6.14	20
280a	TQ 72779 78402	fan shed	-	'78'	H	6.14	19
281	TQ 72832 78387	guncotton drying stove	-	'N25'	H	6.14	20
281a	TQ 72838 78403	fan shed	-	'79'	H	6.14	19
282	TQ 72598 78332	guncotton drying stove	-	'N26'	H	6.14	20
282a	TQ 72603 78348	fan shed	-	'80'	H	6.14	20
283	TQ 72657 78332	guncotton drying stove	-	'N27'	H	6.14	20
283a	TQ 72663 78348	fan shed	-	'81'	H	6.14	20
284	TQ 72538 78385	store	-	'103'	H	6.14	15
<b>Linears</b>							
L1	TQ 71722 78747	(N-S paired posts) <i>elevated pipeline?</i>	✓	-	A, B	6.2	3, 4
L2	TQ 71605 78654	(E-W staggered posts)	✓	-	A	6.2	3
L3	TQ 71994 78887	(E-W post bases)	-	-	D	6.2	8
L4	TQ 71847 78290	(triangular slab alignment)	-	-	C, F, G	6.2	4, 5, 10
L5	TQ 72035 78623	(central drain)	-	-	A, E, I	6.2	3, 8, 9
<b>Jetties</b>							
J1	TQ 71650 78976	jetty (west central)	✓	NMR: TQ 77 NW 314, RCZAS: WX19102	(A)	6.2	(2)
J2	TQ 71962 79150	jetty (east central)	✓	NMR: TQ 77 NW 315, RCZAS: WX17746	(D)	6.2	(7)
J3	TQ 71400 78578	jetty (south-west)	✓	NMR: TQ 77 NW 313, RCZAS: WX17744	(C)	6.2	(1)
J4	TQ 72343 79380	jetty (north-east)	✓	NMR: TQ 77 NW 341, RCZAS: WX17747	(K)	6.2	(11)

No.	NGR (centred)	Function (or description)	SS	Alternative ID	Area	Section	Sheet
<b>Earlier features</b>							
-	TQ 72008 78317	small brick sheep wash	-	NMR: TQ 77 NW 310	F	5.4	10
-	TQ 72615 78621	small brick sheep wash & platform	-	NMR: TQ 77 NW 307	J	5.4	19
-	TQ 71905 78338	(low spread circular mound)	-	-	F	5.3	10
-	TQ 72722 78947	(low mound under ridges)	-	-	K	5.3	17
-	TQ 72346 78217	(low irregular mound) <i>saltern?</i>	-	NMR: TQ 77 NW 223	H	5.3	15
-	TQ 71542 78801	former location of CI8 Battery, Anchor & Hope and Hope House	-	NMR: TQ 77 NW 34	A	5.5	3
-	TQ 71549 78782	navigation beacon base	-	-	A	5.5	3
-	TQ 71598 78300	pond (in SW area)	-	-	C	5.2	5
-	TQ 72478 78939	pond (in NE area)	-	-	K	5.2	12

## APPENDIX 2: EXPLOSIVES AUTHORISED AT CLIFFE

Explosives authorised for manufacture at 'Factory 154', Curtis's & Harvey Ltd's explosives works at Cliffe; based on data gathered from the Annual Reports of HM Inspectors of Explosives for the years 1892 to 1914\* (Explosives Inspectorate 1893 to 1916 inclusive). See section 4 for descriptions of classes of explosives, and see section 11 for full references for the Annual Reports of HM Inspectors of Explosives.

Factory 154, Cliffe-at-Hoo: Authorised Explosives by Year		1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	
Class 1	Gunpowder	•	•	•	•	•	•	•	•	•	•														
Class 1-4	(packing & keeping only)																			•	•	•		•	
Class 3 Div 1	Blasting Gelatine																		•	•	•	•		•	
Class 3 Div 1	Blasting Gelatine (Nos. 1 & 2)									•	•	•	•	•	•	•									
Class 3 Div 1	Blasting Gelatine, Dragon Brand																	•	•	•	•	•		•	
Class 3 Div 1	Carbo-dynamite															•	•	•	•	•	•	•			
Class 3 Div 1	Cliffe Dynamite																					•		•	
Class 3 Div 1	Cliffite															•	•	•	•	•	•	•		•	
Class 3 Div 1	Cordite									•	•	•	•	•	•	•	•	•	•	•	•	•		•	
Class 3 Div 1	Cordite M.D.												•	•	•	•	•	•	•	•	•	•		•	
Class 3 Div 1	Curtis's & Harvey's Explosive No. 53																			•	•	•			
Class 3 Div 1	Curtis's & Harvey's Farmers' Dynamite																							•	
Class 3 Div 1	Dragonite											•		•	•	•	•	•	•	•	•	•		•	
Class 3 Div 1	Dynamite																•	•	•	•	•	•		•	
Class 3 Div 1	Dynamite No. 5, Dragon Brand																	•	•	•	•	•		•	
Class 3 Div 1	Dynamite Nos. 1 & 2															•	•	•	•	•	•				
Class 3 Div 1	Excellite																•	•	•	•	•	•		•	
Class 3 Div 1	Gelatine Dynamite																		•	•	•	•		•	
Class 3 Div 1	Gelatine Dynamite Nos 1 & 2									•	•														
Class 3 Div 1	Gelatine Dynamite Nos 1 & 2, or Gelnignite												•	•	•	•	•								
Class 3 Div 1	Gelatine Dynamite Nos. 1 & 2, or Gelnignite, Dragon Brand															•	•	•							
Class 3 Div 1	Gelatine Dynamite, Dragon Brand																					•		•	
Class 3 Div 1	Gelnignite																		•	•	•	•		•	
Class 3 Div 1	Gelnignite, Dragon Brand																		•	•	•	•		•	

Factory 154, Cliffe-at-Hoo: Authorised Explosives by Year		1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
		Class 3 Div 1	Kolax															•	•	•	•	•	•	•
Class 3 Div 1	Minax																		•	•	•	•		•
Class 3 Div 1	Rippite											•	•	•	•				•	•	•	•		•
Class 3 Div 1	Stonax																		•	•	•	•		•
Class 3 Div 1	Super Excellite																							•
Class 3 Div 1	Super Excellite Nos. 2 & 3																							•
Class 3 Div 1	Super Kolax																							•
Class 3 Div 1	Super Kolax No.2																							•
Class 3 Div 1	Super Rippite																							•
Class 3 Div 1	Winter Gelignite, Dragon Brand																		•	•	•	•		•
Class 3 Div 2	Cheddite PA.																					•		•
Class 3 Div 2	Curtisite															•	•	•	•	•	•	•		•
Class 3 Div 2	Curtisite T																							•
Class 3 Div 2	Nitro-cotton									•	•	•	•	•	•	•	•	•	•	•	•	•		•
Class 3 Div 2	Super-Curtisite																							•
Class 4 Div 2	Cheddite												•	•	•	•	•	•	•	•	•	•		•
Class 4 Div 2	Cheddite Na													•	•	•	•	•	•	•	•	•		•
Class 4 Div 2	Cheddite PA.																			•	•			
Class 4 Div 2	Colliery Cheddite													•	•	•	•	•	•	•	•	•		
Class 6 Div 2	Filled Shells														•	•	•	•	•	•	•	•		•
Class 6 Div 2	Fuses for Shells														•	•	•	•	•	•	•	•		•
Class 6 Div 2	Percussion Primers														•	•								
Class 6 Div 3	Fuses for Shells														•	•	•	•	•	•	•	•		•
Class 6 Div 3	Percussion Primers																•	•	•	•	•	•		•
Class 6 Div 3	Quick-Firing Ammunition - for HM Land and Sea Forces only (for private sale)																							•
<b>Total no. of explosives authorised:</b>		1	1	1	1	1	1	1	1	1	5	5	6	9	14	20	22	23	28	31	31	33		38

\*No data available for 1913 (grey), or for 1915 onwards

## APPENDIX 3: REPORTED ACCIDENTS AT CLIFFE

Direct transcription of documented accidents at 'Factory 154', Curtis's & Harvey Ltd's explosives works at Cliffe; based on the annual reports of HM Inspector of Explosives.

Date	Accident no.	Summary of events	Cause / explosive involved	Official inquiry no. / (reference)	Killed	Injured
1902 Dec 15	328/ 1902	During the operations of hand mixing the ingredients of cordite paste an explosion occurred, wrecking the building and killing the workmen employed. Probably caused by collision between two of the brass-lined boxes, or by one of the boxes falling	nitroglycerine and guncotton	CLVII  (Cooper-Key 1903; Explosives Inspectorate 1903)	2	1
1903 Oct 18	230/ 1903	An ignition took place in one of the mixing pans for cheddite during the operation of mixing. The building was burnt out but no explosion occurred. The cause appears to have been grit at the bottom of the pan. The quantity of explosive and ingredients present to about 400lbs.	cheddite	(Explosives Inspectorate 1904)	-	-
1904 Feb 04	13/ 1904	An explosion occurred in a nitro-cotton stove while two men were in the act of unloading it. One man was killed on the spot and the other succumbed to his injuries 10 days later. They had probably omitted to allow the explosive to cool and the ignition probably arose from friction when a tray was being withdrawn from the rack	guncotton	CLXVI  (Desborough 1904; Explosives Inspectorate 1905)	2	-
1904 Feb 18	42/ 1904	A charge in course of separation fumed off owing to some unascertained cause and communicated to another charge, which exploded in the adjacent pre-wash tank	nitroglycerine	CLXVII  (Cooper-Key 1904; Explosives Inspectorate 1905)	4	4
1904 Jul 05	-	Foreman of the acids department was preparing the first charge of mixed acids to be worked in the new (Nathan patent) nitrator. Diluted nitric acid reacted violently on the steel egg and dense fumes evolved. The foreman died 24hrs later from prolonged inhalation of the fumes	nitric acid	(Explosives Inspectorate 1905)	1	-
1904 Aug 16	217/ 1904	About 10 minutes after the injection of glycerine into the nitrating vessel had been started, 45lbs. of glycerine having been run in, the charge suddenly began to fume, and in less than a minute the temperature rose from 14°C to nearly 30°C, extra air only increasing the fumes, the charge was drowned, this operation taking four minutes. The suggested cause was that as the injector did not quite reach the surface of the acids, some of the glycerine might have become splashed on to a part of the apparatus and there started the decomposition	nitroglycerine	(Explosives Inspectorate 1905)	-	-
1907 Feb 08	36/ 1907	A workman was mixing cheddite, and had sifted about 5lbs. of chlorate into the mixing-vessel, when he saw a blue flame on the tray or steam-pipe, he cannot be certain which. He foolishly tried to extinguish it with his cap, and this caught fire and ignited his sleeves, and before his shirt could be torn off he was somewhat severely burnt	cheddite	(Explosives Inspectorate 1908)	-	1
1908 Apr 01	74/ 1908	A cordite store became ignited. It appeared probable that the fire was occasioned by the ignition of a piece of cordite which had accidentally fallen on to a gauze over a steam-pipe	cordite	(Explosives Inspectorate 1909)	-	-

Date	Accident no.	Summary of events	Cause / explosive involved	Official inquiry no. / (reference)	Killed	Injured
1908 Jun 05	170/ 1908	While two girls were filling cartridges with "dynamite pumps" an explosion occurred. There is little doubt that the kieselguhr in this dynamite contained large pieces of quartz, in some cases 1/10th of an inch across, and the explosion was probably due to one of these pieces being jammed between the plunger and the socket	dynamite	CLXXXIV  (Cooper-Key 1908; Explosives Inspectorate 1909)	2	-
1908 Nov 18	345/ 1908	A man was moving a bogey when two slight explosions occurred under the truck. It appeared probable that a very small quantity of explosive had fallen on the rails from a bogey which had previously been moved from the mixing house	nitroglycerine and guncotton	(Explosives Inspectorate 1909)	-	-
1909 Mar 04	68/ 1909	A fire originated in the annexe to a cartridge hut at the place where a steam-pipe entered the building; very little damage was done. The building was not in use at the time	(fire)	(Explosives Inspectorate 1910)	-	-
1909 Aug 09	269/ 1909	Whilst a Cordite Incorporating Machine was being unloaded several small flashes were observed to proceed from the lower part of the gearing. Cold water was thrown over the source of the flashes and no conflagration occurred. The cause was probably due to the blank part of a pinion not having sufficient clearance from the body of the machines, and it is presumed that the ensuing heat ignited a small portion of explosive which had lodged there	cordite	(Explosives Inspectorate 1910)	-	-
1909 Sept 20	300/ 1909	During the operation of granulating by means of a revolving copper pan, the charge ignited and flashed off without explosion. No one was injured, but the building was burnt out	cheddite	(Explosives Inspectorate 1910)	-	-
1910 Aug 02	228/ 1910	A workman was stoking a fire with sawdust when a flame flashed back and ignited a heap of waste wood lying near. This was apparently a dust explosion	(fire)	(Explosives Inspectorate 1911)	-	-
1910 Aug 19	261/ 1910	After a repair, a steam pipe to the nitroglycerine hill was left in contact with the wood casing instead of being protected by lagging. The wood seems to have ignited spontaneously and a serious accident was narrowly averted	(fire)	(Explosives Inspectorate 1911)	-	-
1910 Aug 24	337/ 1910	A chemist was grinding up a small quantity of explosive for experimental purposes, when it became ignited	experimental explosive	(Explosives Inspectorate 1911)	-	1
1911 Jul 26	260/ 1911	A runner had just left the "final wash house" pushing a bogie containing paste for cordite Mark I, when the bogie and the house both exploded it being impossible to say which went first.	nitroglycerine or cordite paste	CC  (Cooper-Key 1911; Explosives Inspectorate 1912)	3	3
1911 Jul 25	261/ 1911	A fire occurred in an incubator in which several experimental samples were being kept at a temperature of 115°F. There was no explosion and little damage was done	experimental samples	(Explosives Inspectorate 1912)	-	-
1912 Mar 11	84/ 1912	The cordite in a press cylinder took fire but burnt away without doing appreciable damage. The sieve had broken, and to facilitate removal of cordite the die was taken out. The pressure then appears to have been put on too quickly so that acetone vapour was ignited by the heat of compression	cordite paste	(Explosives Inspectorate 1912)	-	-
1912 Jun 06	156/ 1912	Whilst a sample of gelignite was being prepared for heat test purposes with a Wedgewood mortar and pestle a slight detonation took place and part of the contents of the mortar was projected on to the table. The accident was thought to be due, possibly, to a slight fracture in the surface of the pestle	gelignite	(Explosives Inspectorate 1912)	-	1

Date	Accident no.	Summary of events	Cause / explosive involved	Official inquiry no. / (reference)	Killed	Injured
1914 Jan 14	6/ 1914	A bucket partly filled with pitch caught fire in a packing house. The bucket was at once removed and the fire put out, no damage being done. The cause of the outbreak is very obscure	(fire)	(Explosives Inspectorate 1915)	-	-
1914 Apr 16	107/ 1914	Plumbers were making alterations to an anemometer which had been in use on the acetone recovery pipeline. The anemometer had been washed out with water; but not all the nitroglycerine had been got rid of, for while one man was soldering a pipe into the body of the anemometer a sharp explosion occurred. The base of the anemometer was blown to fragments and the three men were slightly injured by flying pieces of metal	nitroglycerine	(Explosives Inspectorate 1915)	-	3
1914 May	145/ 1914	A slight explosion occurred while the injured man was soldering a joint of the zinc bottom of a "jelly" box	nitroglycerine	(Explosives Inspectorate 1915)	-	1
1914 May 15	150/ 1914	A charge had been nitrated, and was settling and had cooled down to 18°C, 15°C being the recognised temperature. The man in charge stated that without warning copious red fumes came out of the top of the apparatus, and nitroglycerine boiled over. He called to his mate and left the building without turning on the drowning cock. About 15 minutes afterwards the explosion occurred. The theory of the Company is that the acid overflowed from the nitrator on to some cordite paste bags which were below. These, in time, detonated, owing to the great heat of decomposition, and communicated to the nitroglycerine which was in the filter tank. There was about 1 ton of guncotton in the house, and about 4,500lbs. of nitroglycerine, some of which was in the form of cordite paste. The damage done was not extensive outside the nitrating building, being chiefly broken windows	nitroglycerine and cordite paste	(Explosives Inspectorate 1915)	-	-
1914 Nov 07	374/ 1914	A fire occurred in one of the cannon press houses. It was due to an ignition in one of the cylinders, probably on account of the pressure having been put on too quickly. There was only about 30lb. of cordite in the room at the time. The damage done was slight	cordite	(Explosives Inspectorate 1915)	-	-
1914 Apr 29	114/ 1914	A workman was engaged in carrying out some alterations to a cordite store when an explosion occurred, whereby he was killed. The evidence showed at the time of the accident he was chipping away some Val de Travers asphalt from the platform of the compartment close to the corrugated iron sheeting, which formed the exterior of the outer wall. While doing this his chisel must have struck some nitroglycerine, possibly a film of it, which exploded and communicated the explosion to a small accumulation of nitroglycerine in a hollow space of the wall between the corrugated iron sheeting and the inner zinc lining of the compartment	nitroglycerine	CCX  (Coningham 1914; Explosives Inspectorate 1915)	1	-
1915 Dec 29	458/ 1915	Fire in cotton drier	(fire)	(Explosives Inspectorate 1916)	-	-
1916 Dec 22	610/ 1916	Explosion of nitroglycerine occurred in one of the two de-nitrating plants at Cliffe. The de-nitrating plant was the newer of the two, constructed to cope with the increase in waste acids from the manufacture of nitroglycerine; it had only been working for a few months	nitroglycerine	CCXXVI  (Crozier 1916; Explosives Inspectorate 1917)	2	7
1917 Sept 06	486/ 1917	Cordite paste in cylinders of press took fire owing to the pressure being put on too suddenly	cordite paste	(Explosives Inspectorate 1918)	-	-

Date	Accident no.	Summary of events	Cause / explosive involved	Official inquiry no. / (reference)	Killed	Injured
1917 Oct 24	554/ 1917	A nitrator-separator house exploded probably due to friction or a blow on film of nitroglycerine	nitroglycerine	(Explosives Inspectorate 1918)	2	11
1917 Dec 08	656/ 1917	Explosion in machine for breaking up and heating ammonium perchlorate, probably due to perchlorate getting into the bearings of the machine	R.D. Composition B	(Explosives Inspectorate 1918)	-	-
1918 Mar 08	105/ 1918	Fire broke out in one compartment of a recovery stove, in which no one was working at the time. The whole range and an adjacent one were burnt out	cordite	(Explosives Inspectorate 1919)	1	3
1918 Jun 08	242/ 1918	Wax scrapings and waxed paper were being burnt by being thrown into a destructor instead of in the open	-	(Explosives Inspectorate 1919)	1	-
1918 Aug 02	326/ 1918	A fire took place in a cannon press room	cordite	(Explosives Inspectorate 1919)	-	-
1919 Mar 03	54/ 1919	Spontaneous ignition of wood-meal in or about a drying machine which communicated with perchlorate of ammonium dust which had collected behind match-boarding in the building	Ammonium Perchlorate and wood-meal (nitrate mixture)	(Explosives Inspectorate 1920)	-	-
1919 Aug 07	264/ 1919	Top of nitrator found broken after holidays*, probably caused by decomposition or explosion of a small film or scum of explosive	nitroglycerine	(Explosives Inspectorate 1920)	-	-
1919 Aug 11	266/ 1919	While removing bung of an acid drum by means of a chisel a slight explosion occurred which blew out the end of the drum, and the escaping acid ran over and burnt the foot of one of the men	sulphuric acid	(Explosives Inspectorate 1920)	-	1
1921 May 05	83/ 1921	While soldering up a crack in the seam of a case containing tonite the explosive fired and burnt away quietly, as did another case in the building	tonite	(Explosives Inspectorate 1922)	-	1
1921 May 07	91/ 1921	While soldering on the end of a case containing 1 lb. of tonite the charge caught fire	tonite	(Explosives Inspectorate 1922)	-	1

\*suggests the factory closed for a holiday around the first week of August.

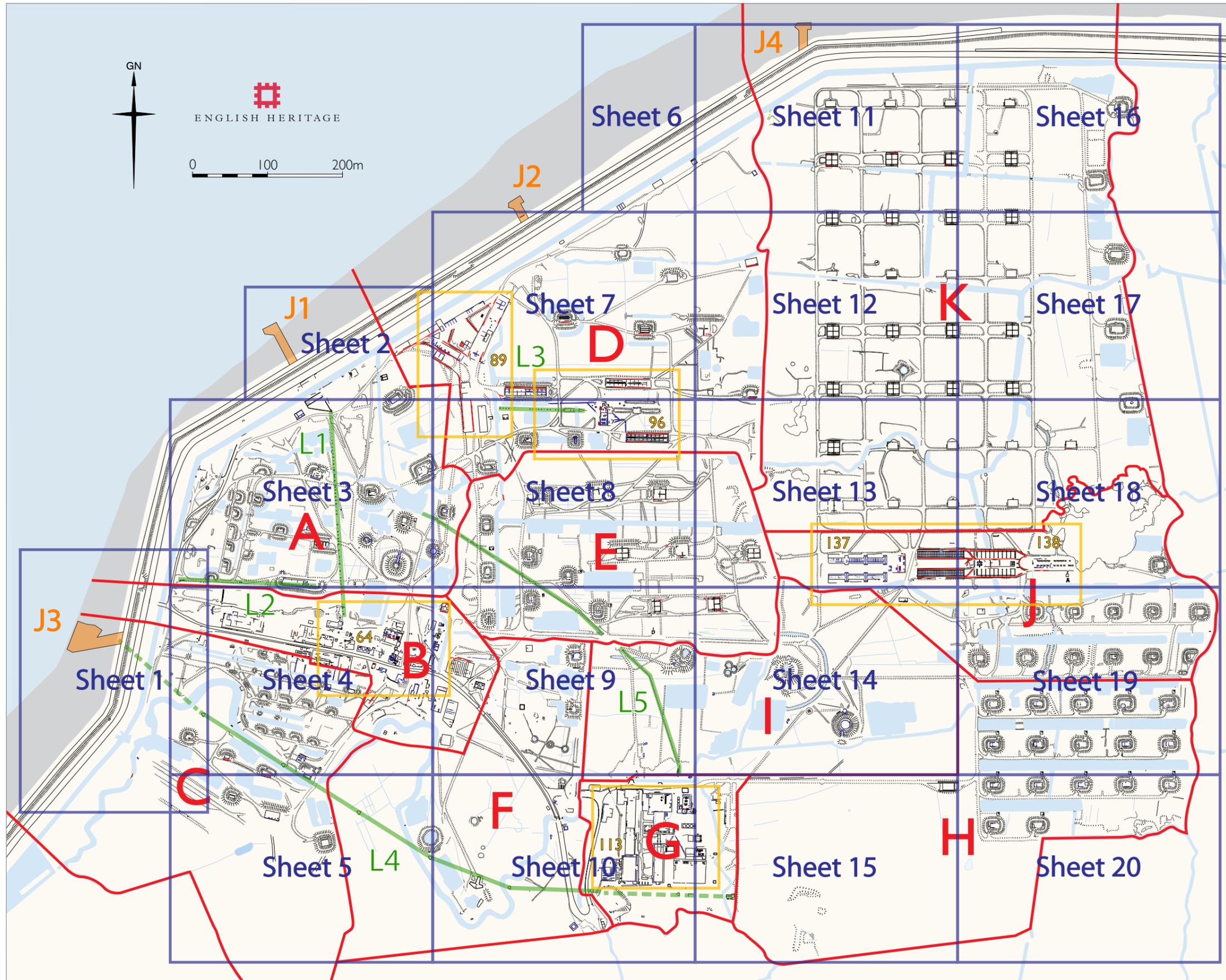
## APPENDIX 4: COMPLETE ENGLISH HERITAGE 1:1000 SCALE SURVEY

The detailed analytical earthwork survey of the factory remains was undertaken at scale 1:1000 in a period of fieldwork spanning November 2010 to January 2011. The resultant hachure plan was prepared by Philip Sinton, and is presented here in full at the surveyed scale. Due to the extensive footprint of the site the survey has to be presented across a number of sheets. Presentation of the survey is prefaced with a key to the drawing conventions and a diagram of the whole site to aid orientation through the subsequent map sheets. In addition, grid lines correct to Ordnance Survey coordinates have been applied at 100m intervals to provide accurate scale and location. A complete single-sheet version of the survey drawing will be made publically available as a PDF download via English Heritage's online Research Report Series database (<http://research.english-heritage.org.uk/>).

### Key to the 1:1000 survey:

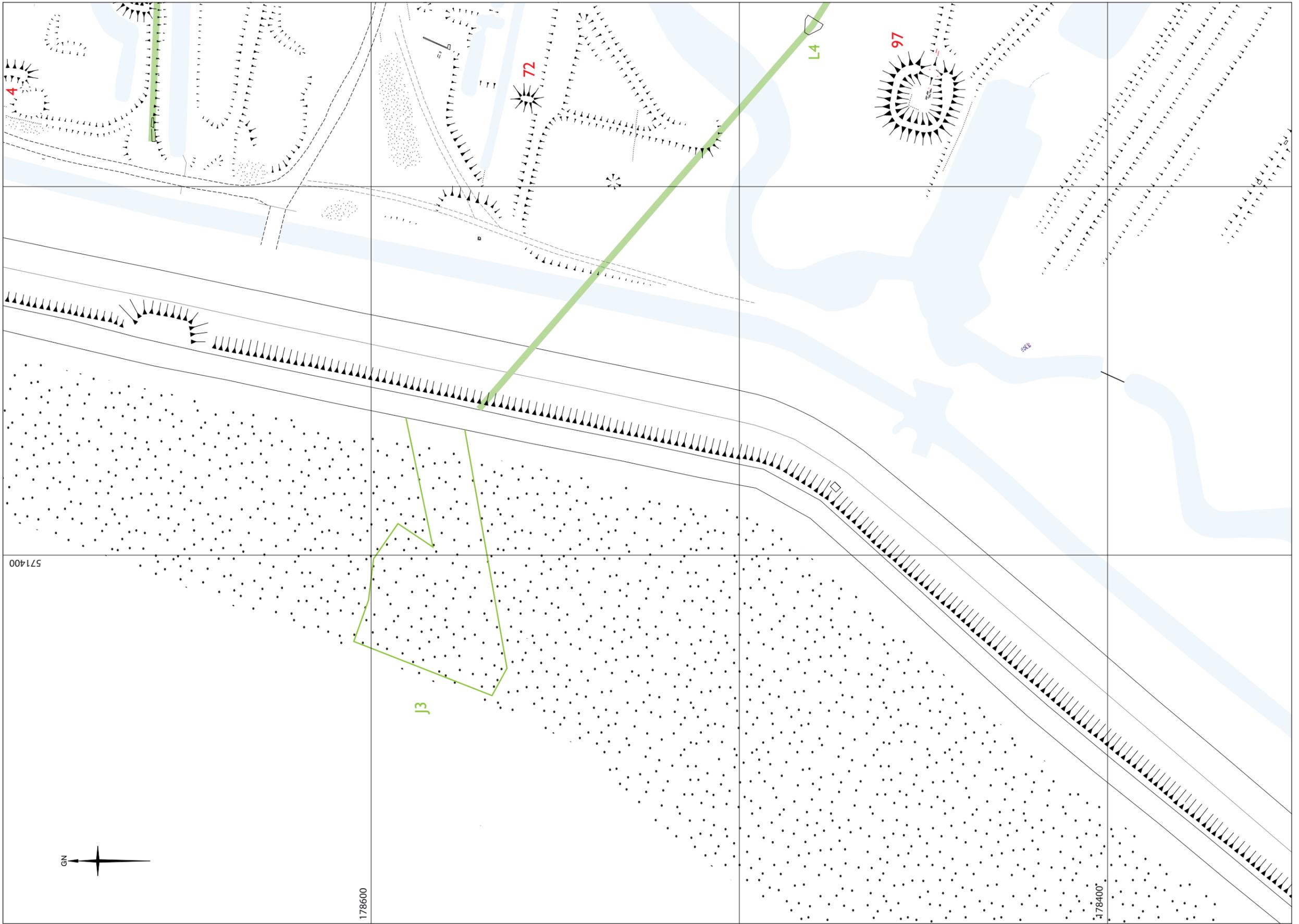
<b>34</b>	structure number	•	wooden post
	earthwork		metal feature
	water		metal tram rail
	drain or gully		tram rail scar
	blast crater		foreshore
	concrete		demolition dump (rubble)
	concrete post or post base		spoil dump (earth or organic)
	brick		track edge (hard)
	projected feature (for example, vegetation mark)		track edge (soft)
			modern boundary feature

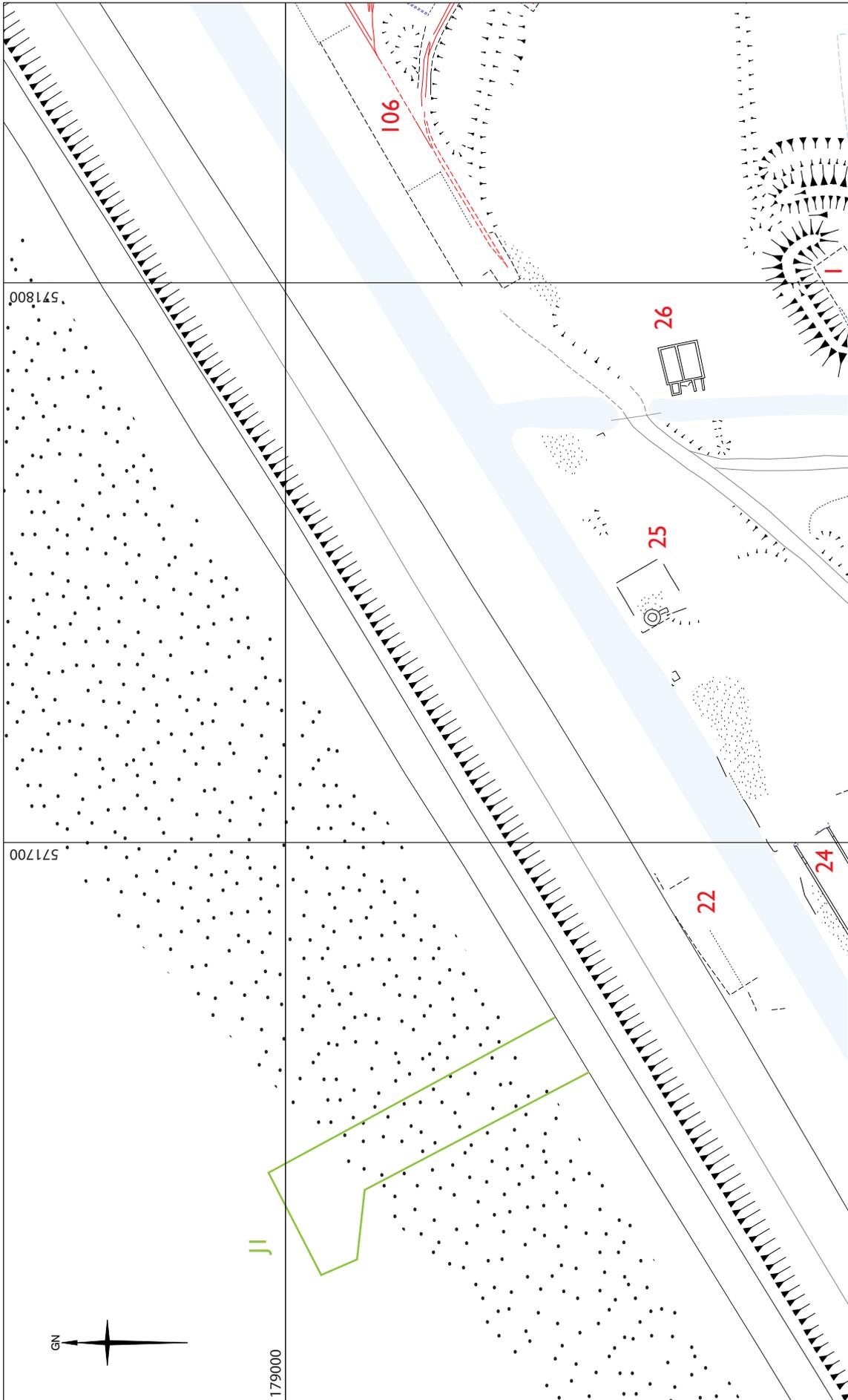




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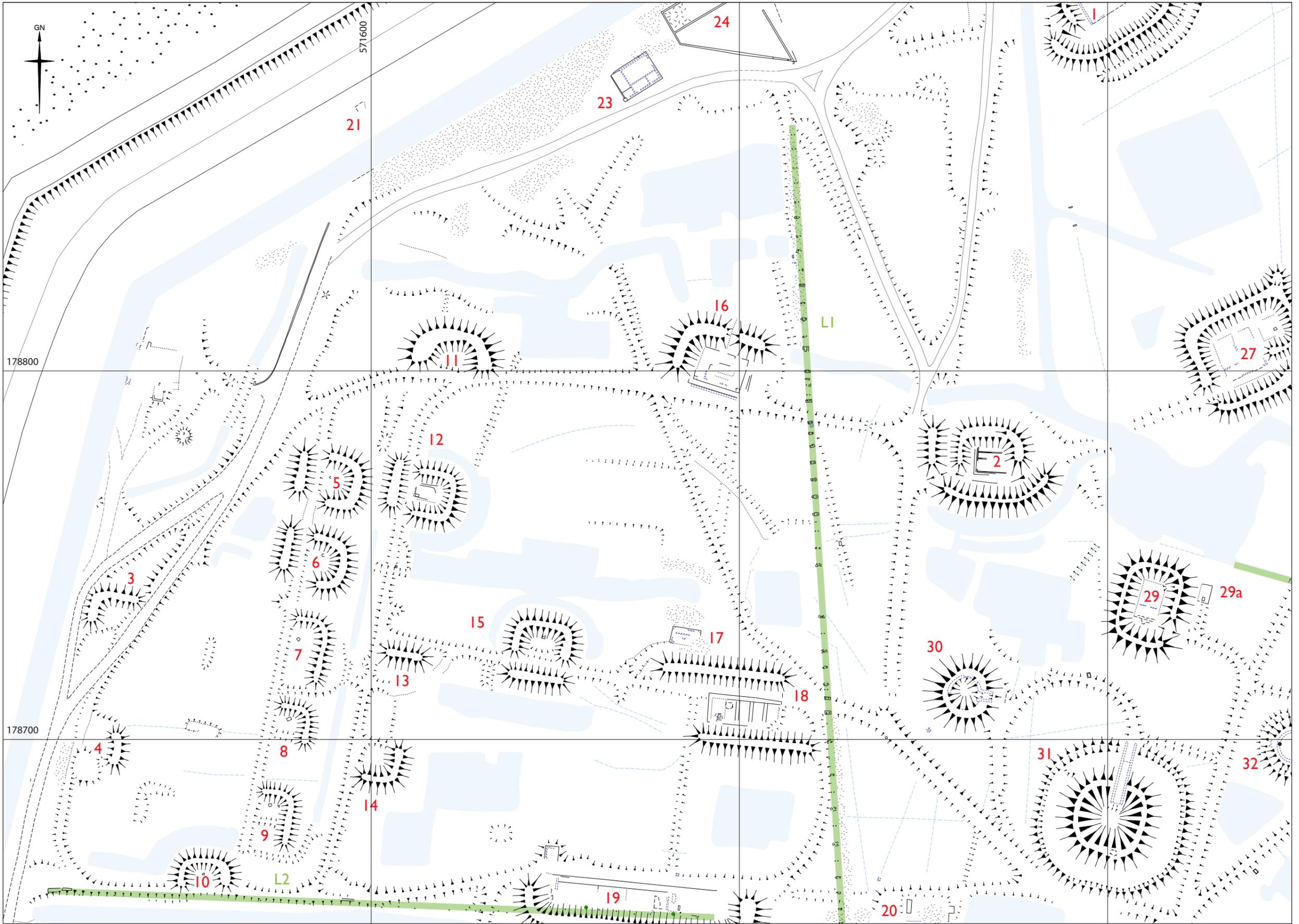
- Orientation drawing:
- B } Descriptive areas A to K
  - L4 \ Linear feature groups
  - J4 T Jetties
  - Sheet 8 1:1000 survey sheets
  - 137 1:500 survey extracts (figure numbers from volume 1, section 6)

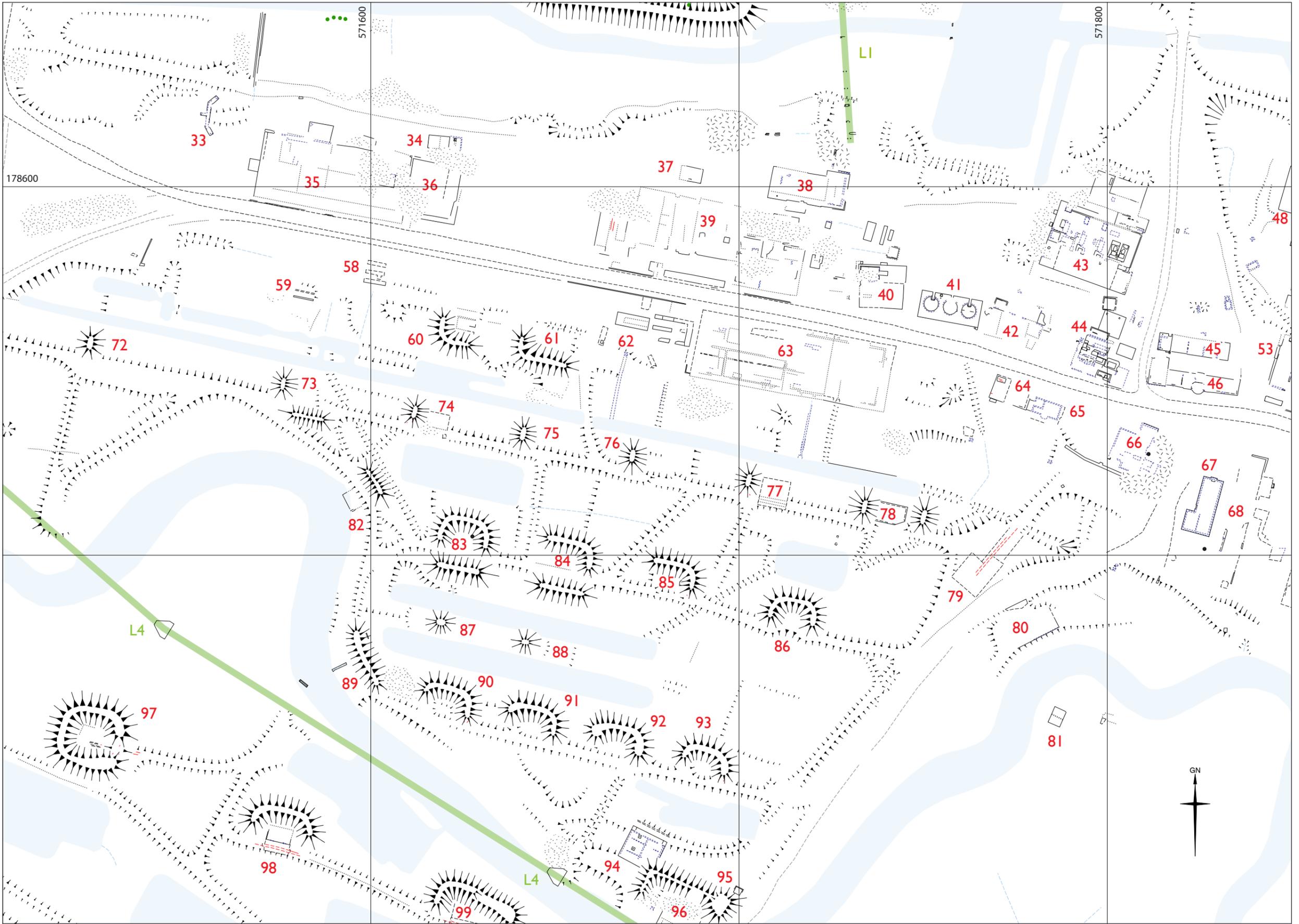


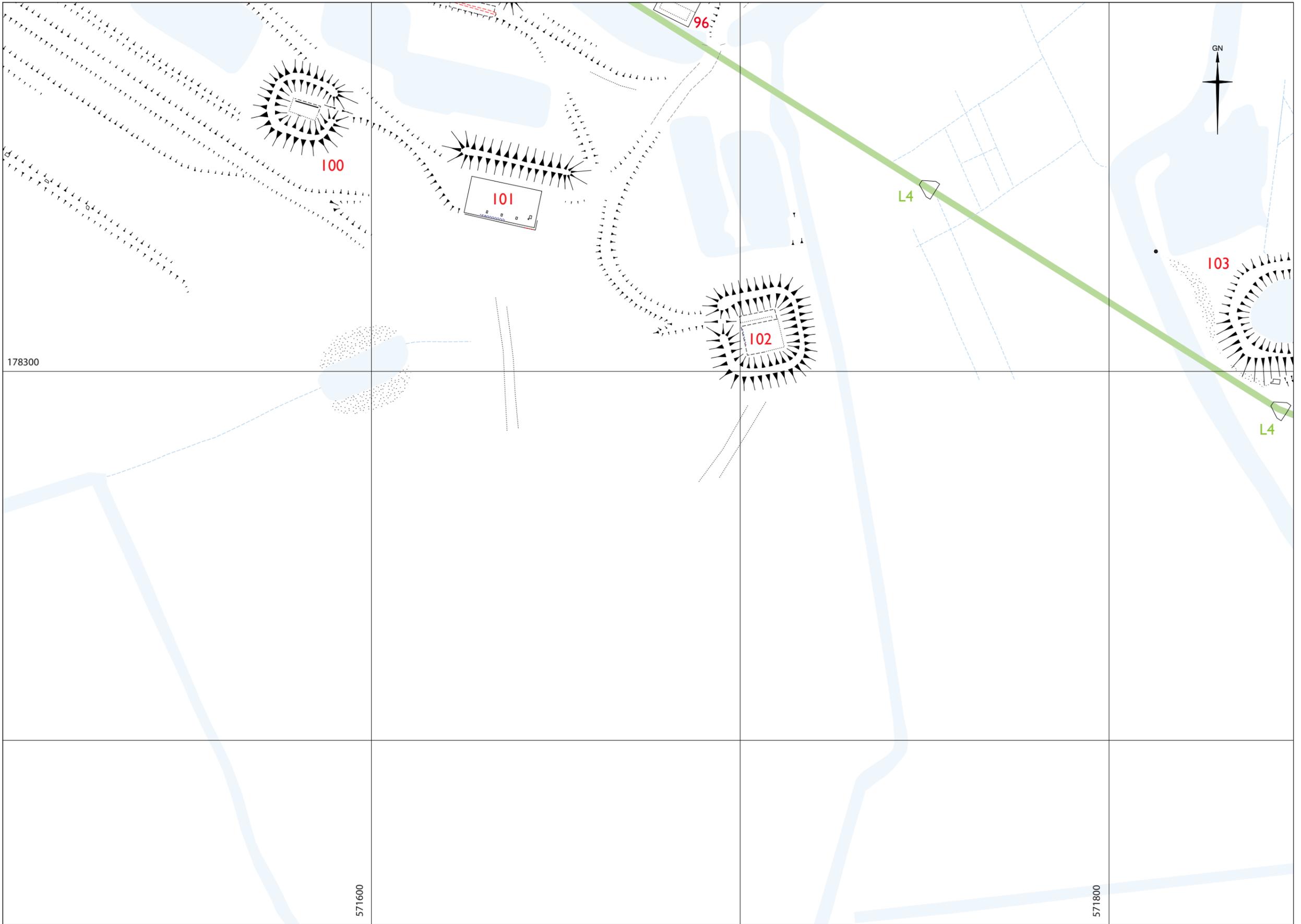


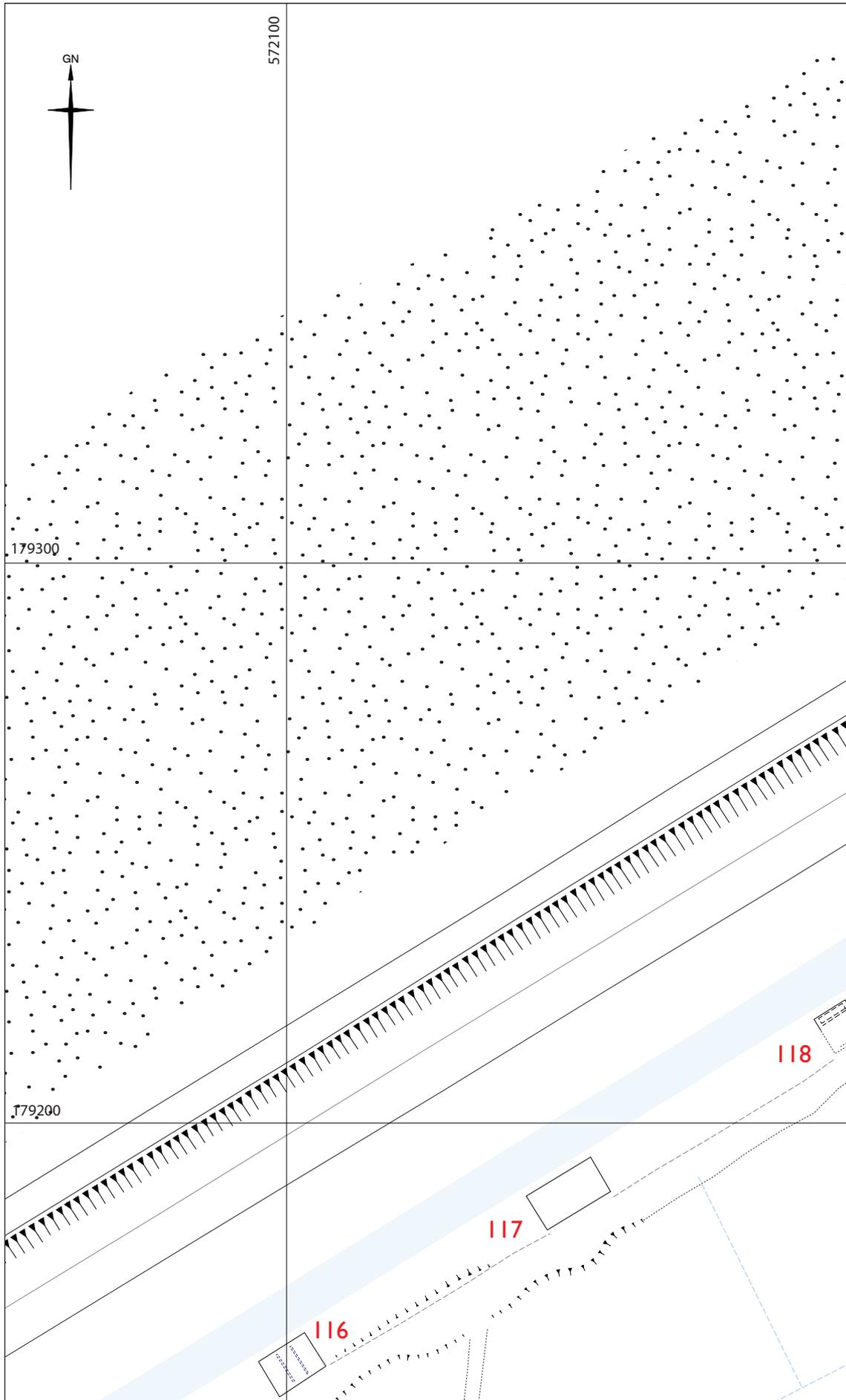
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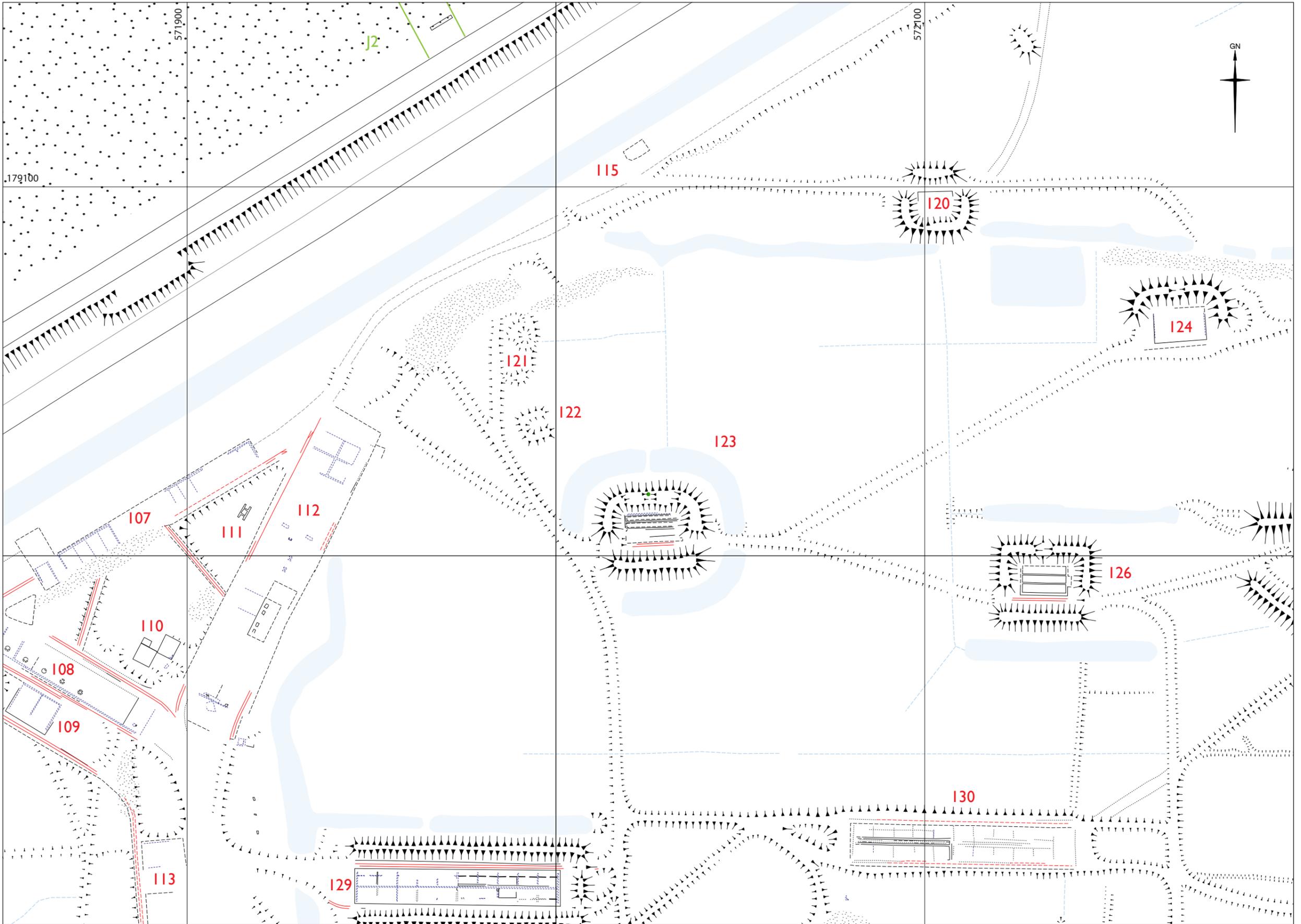


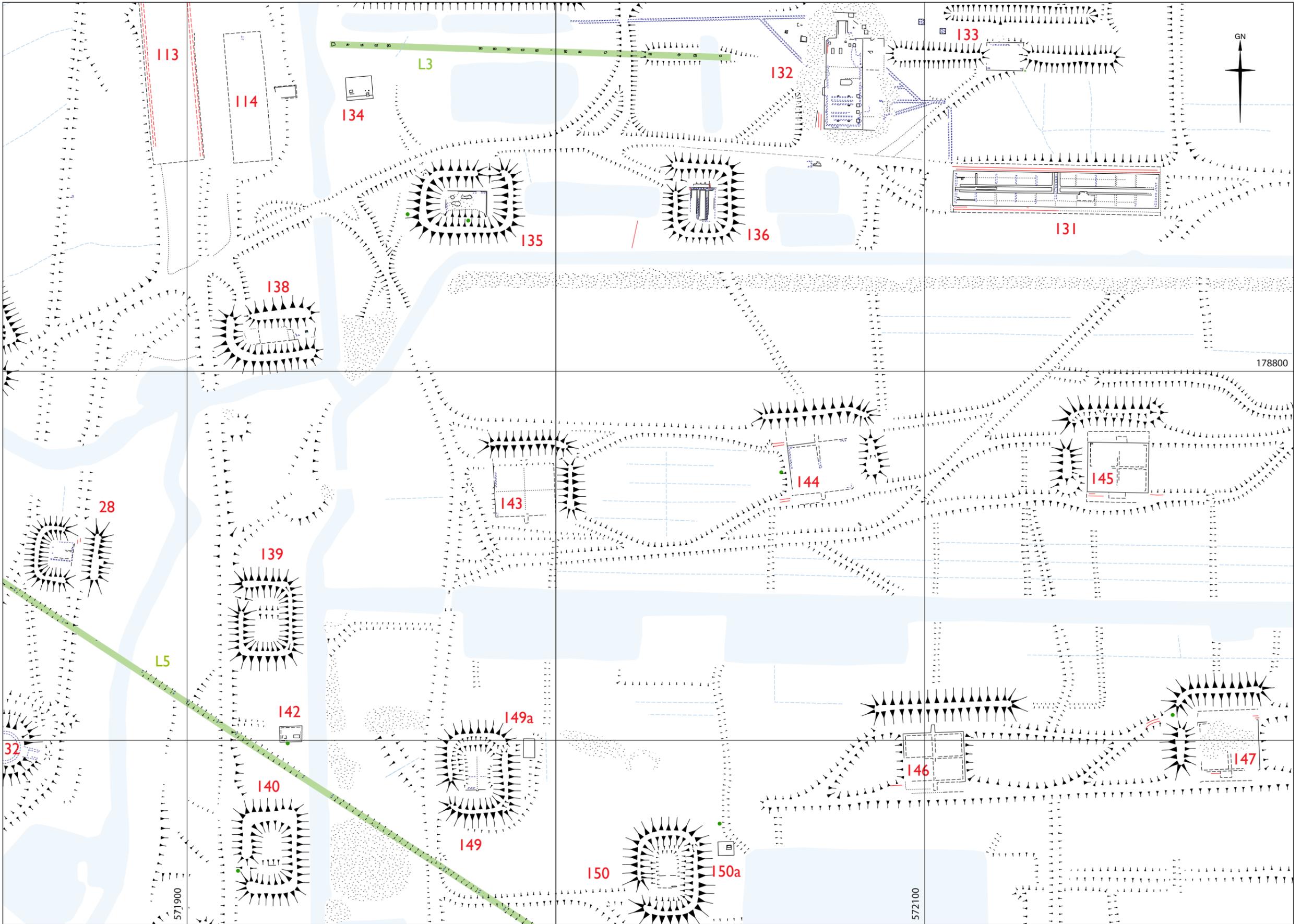


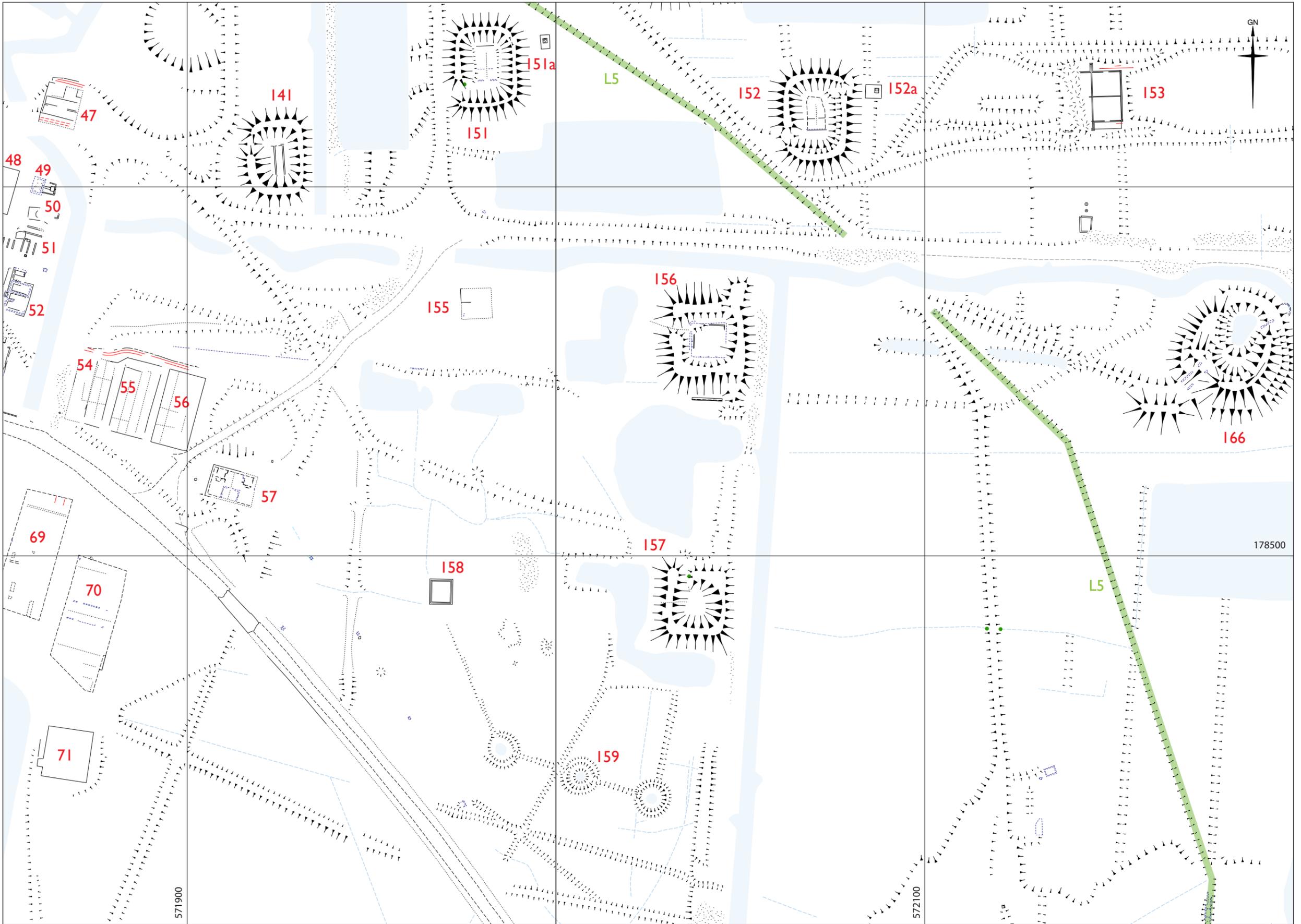


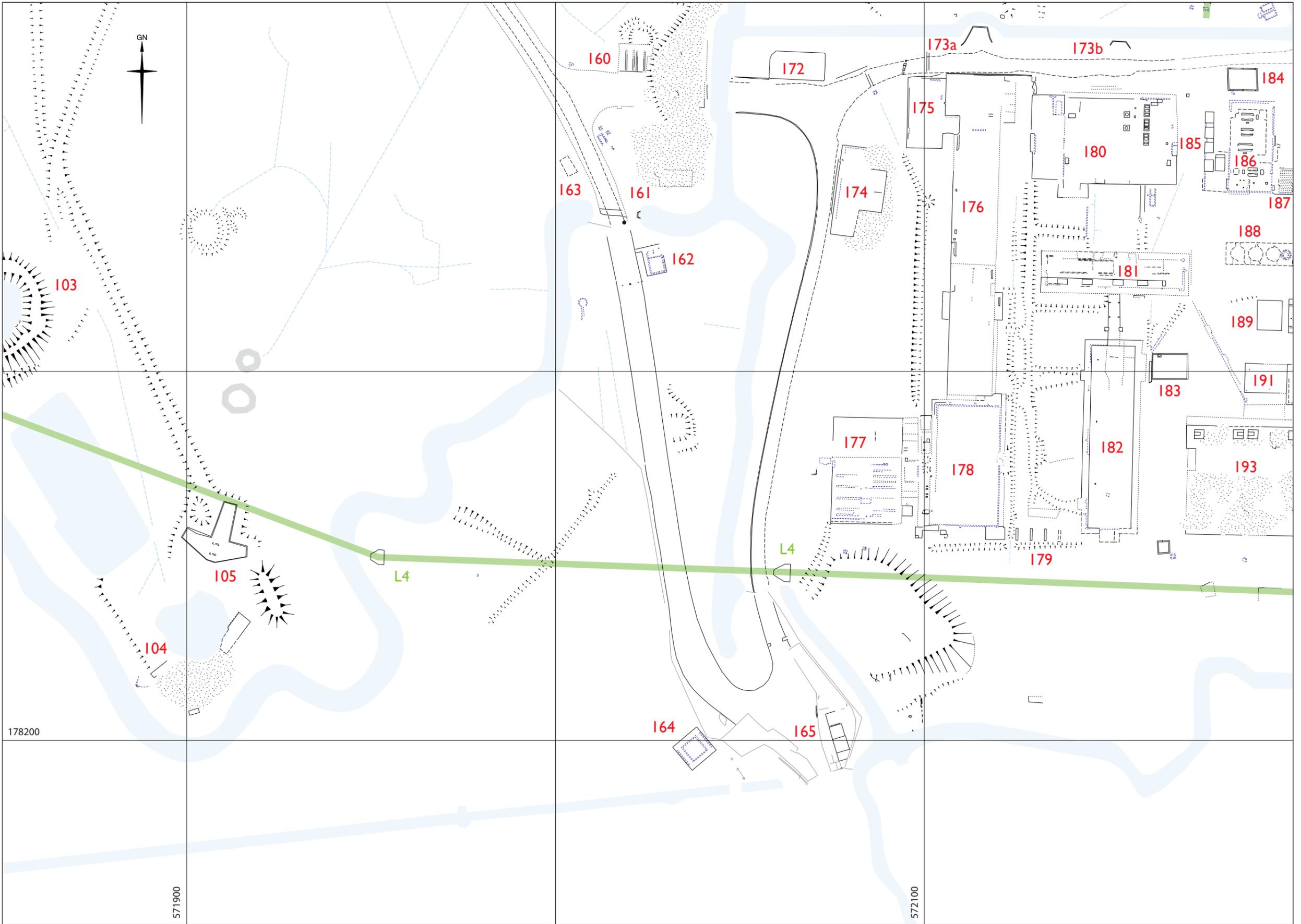
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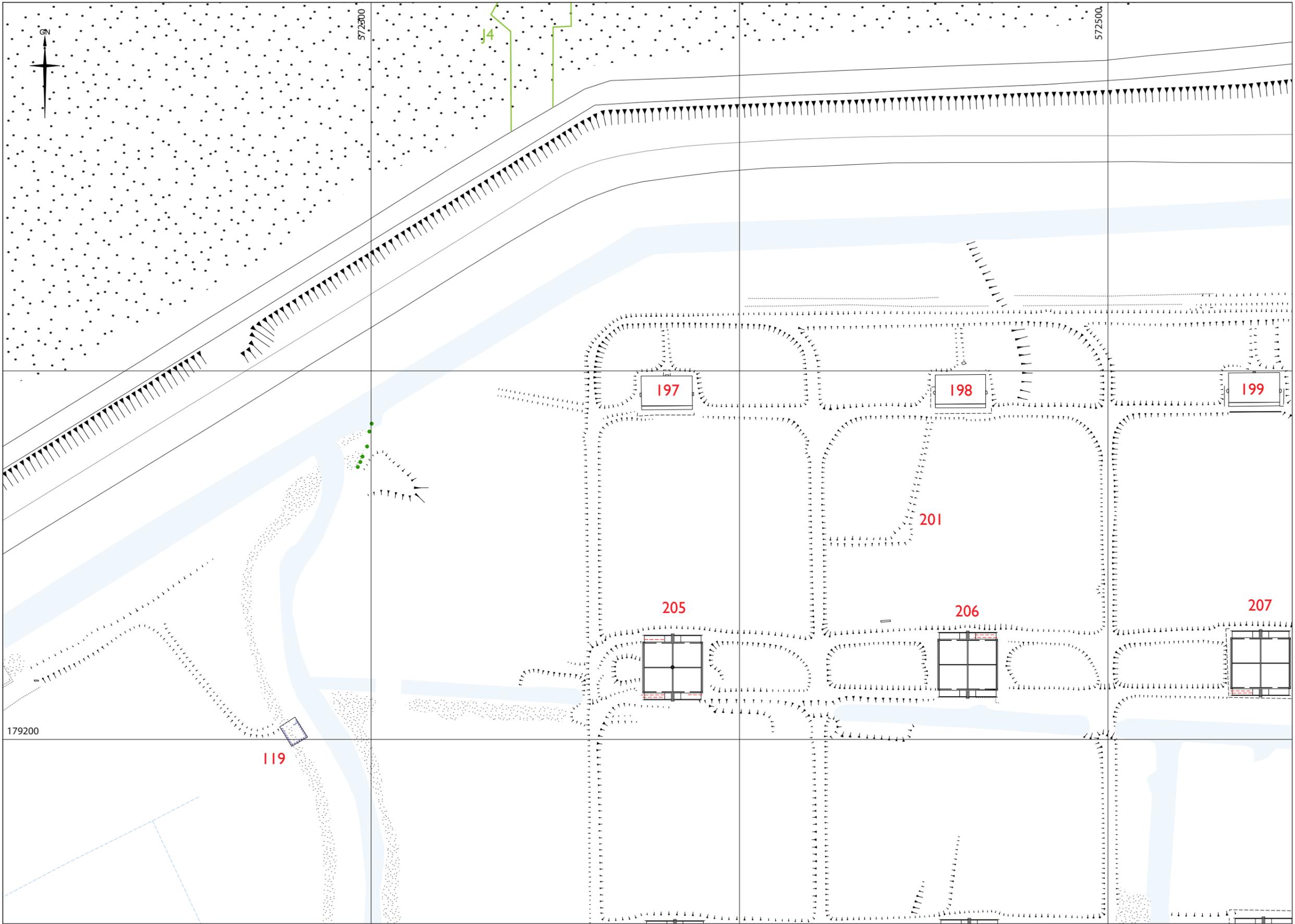




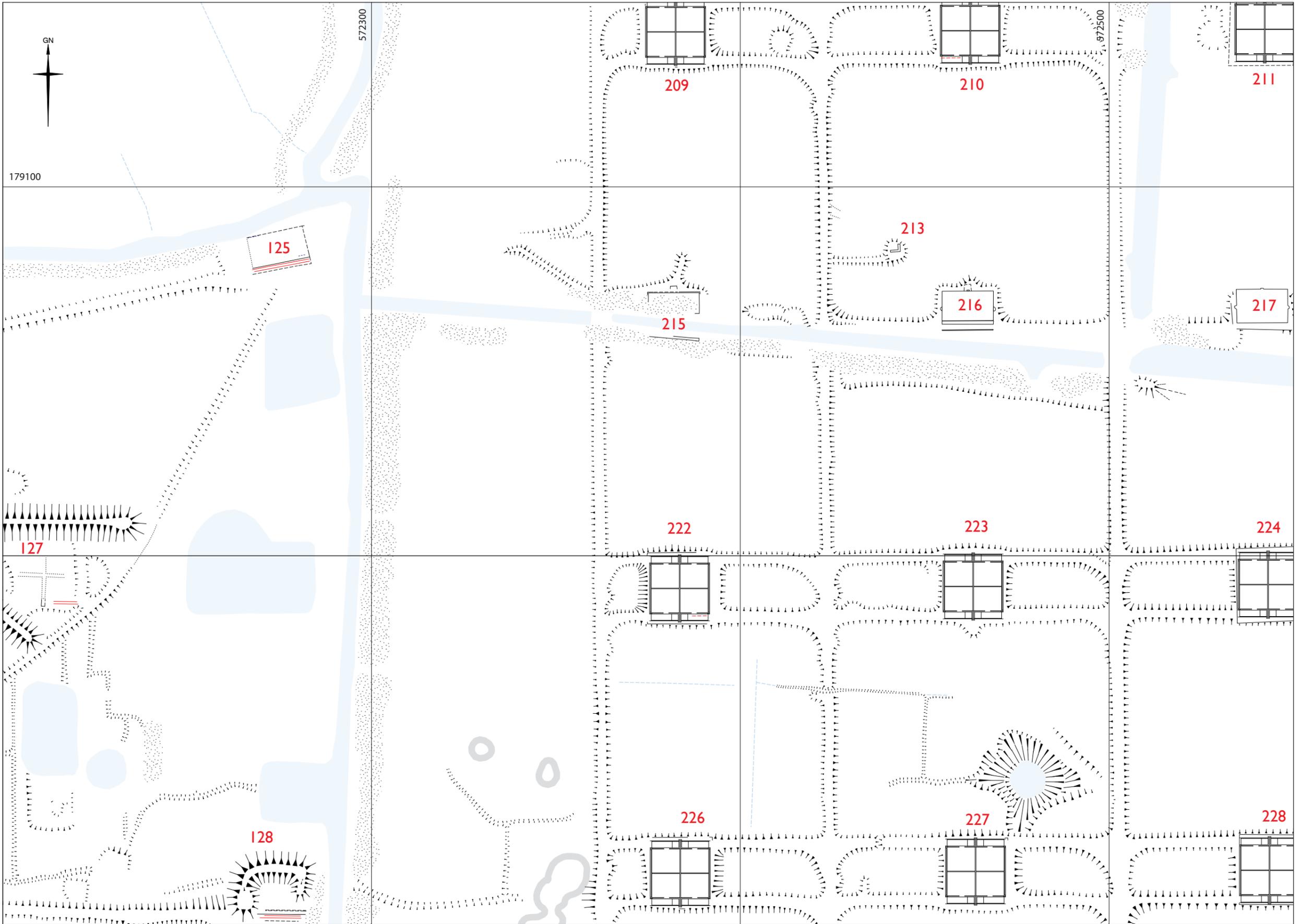




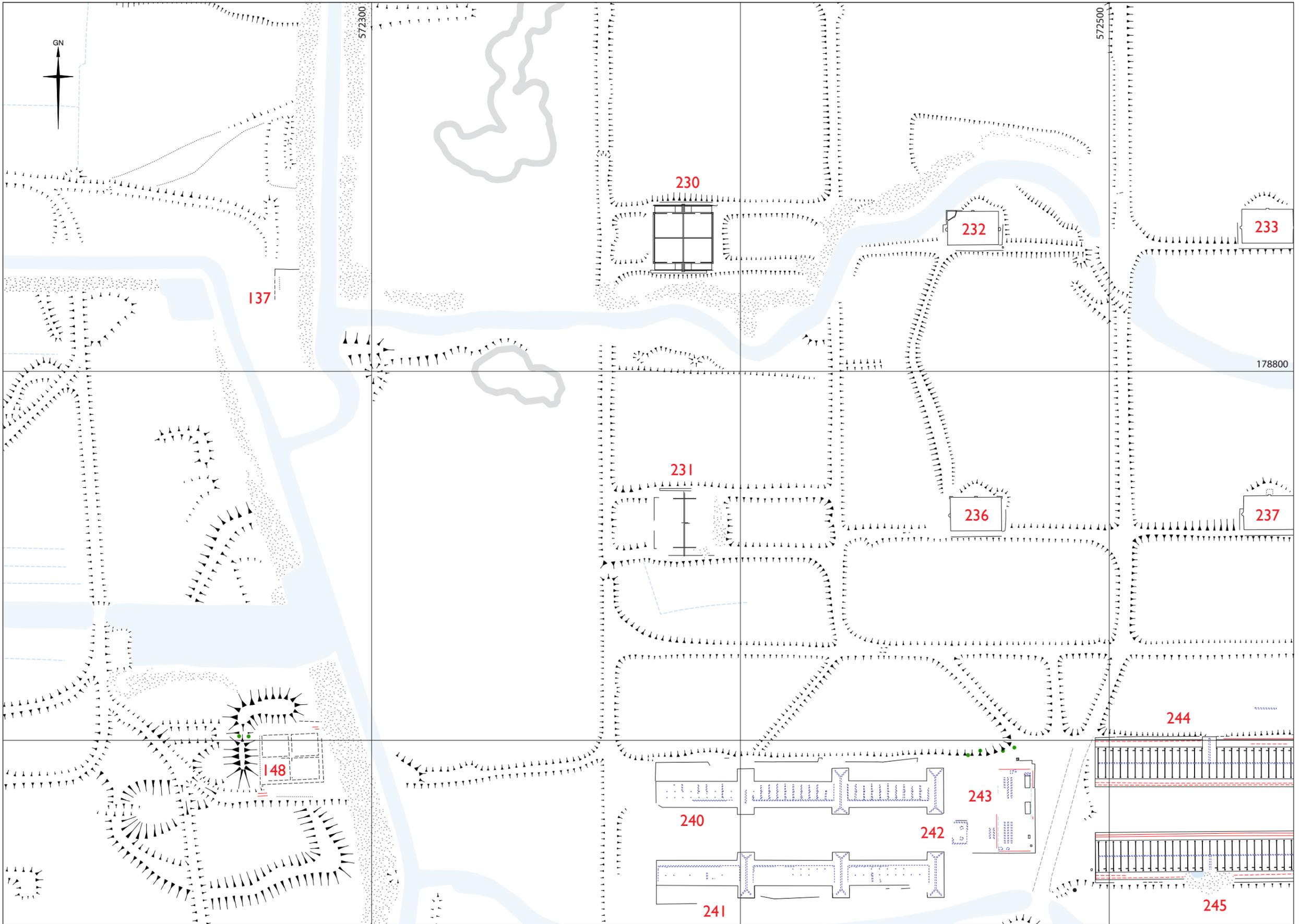
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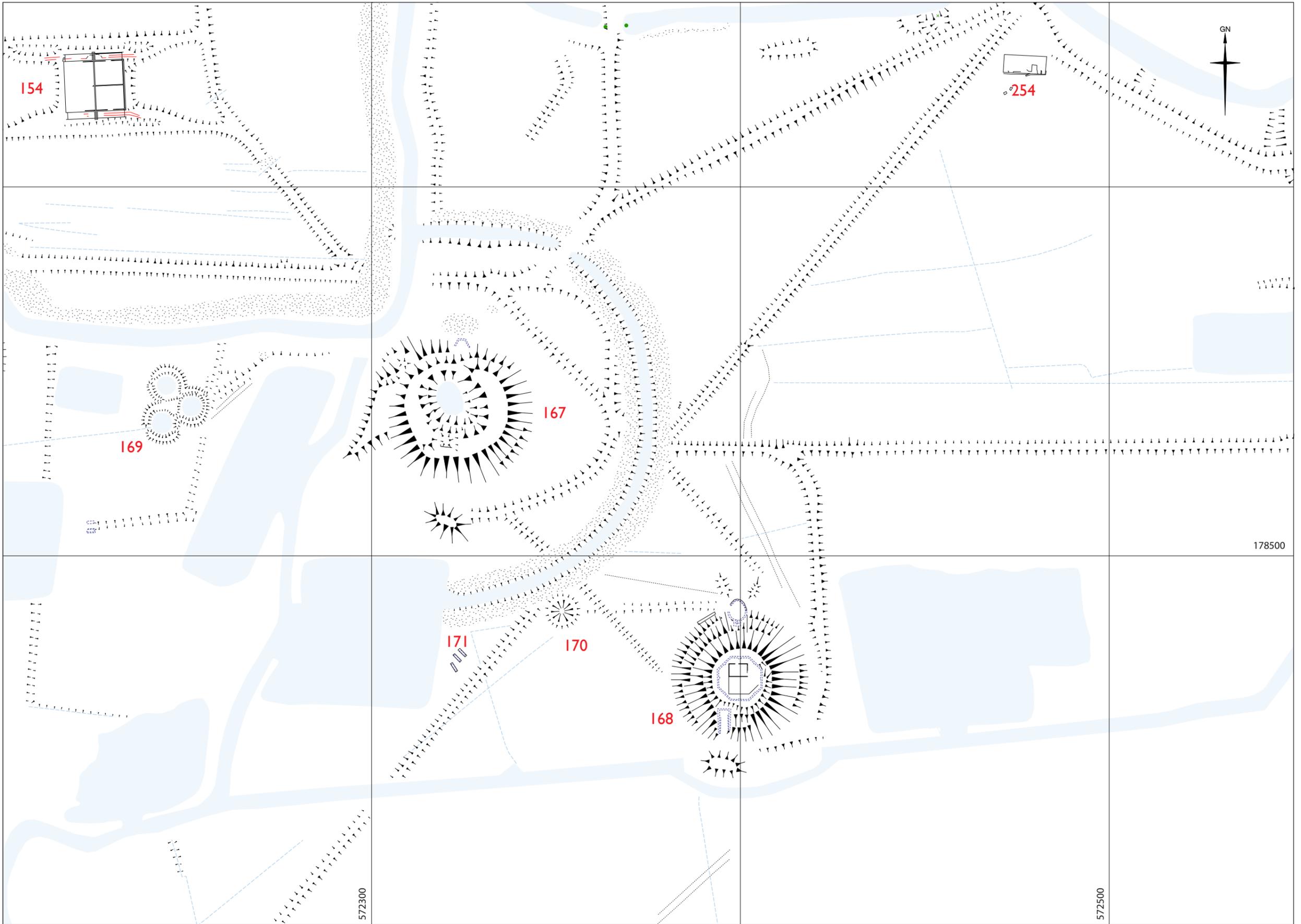


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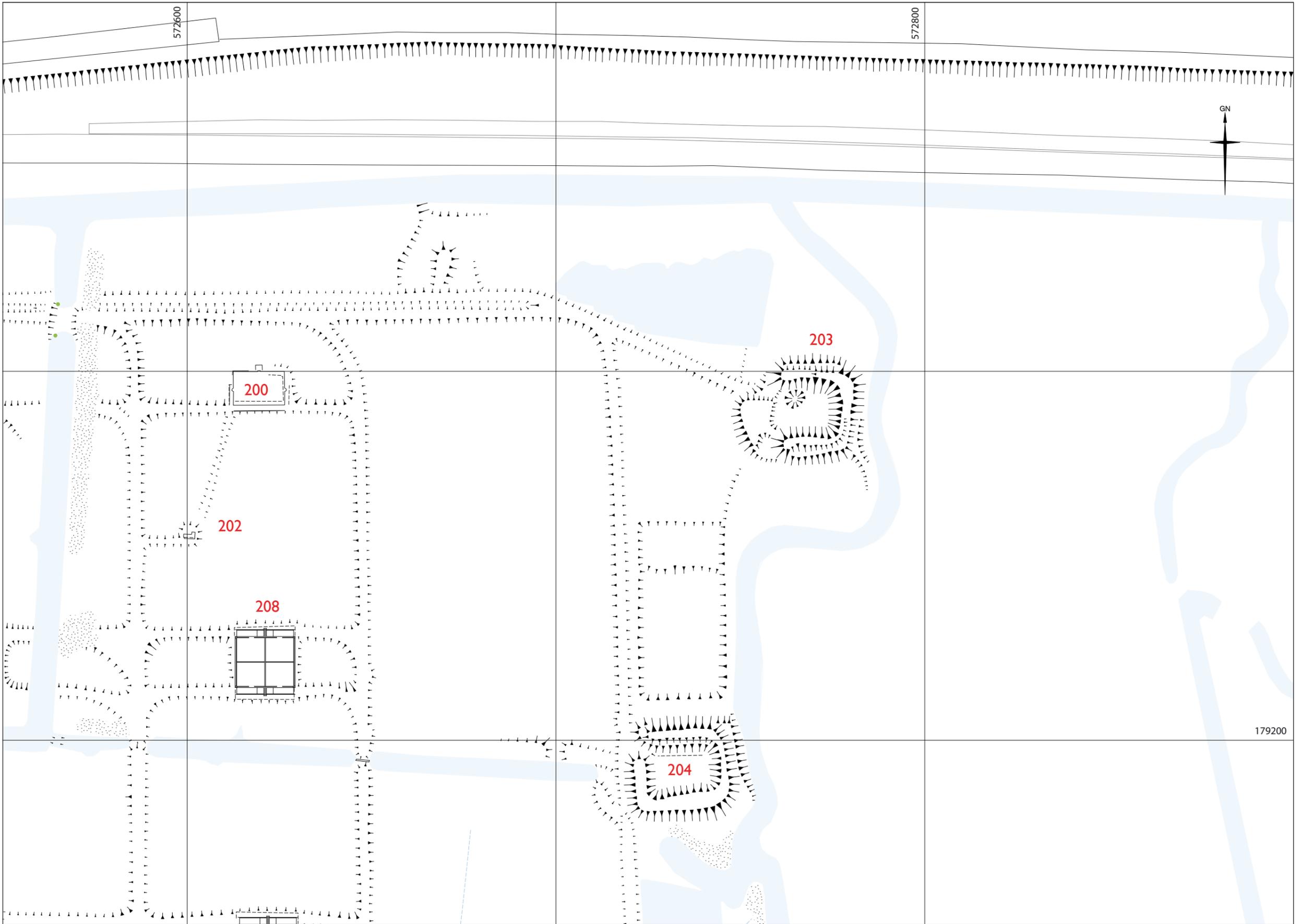


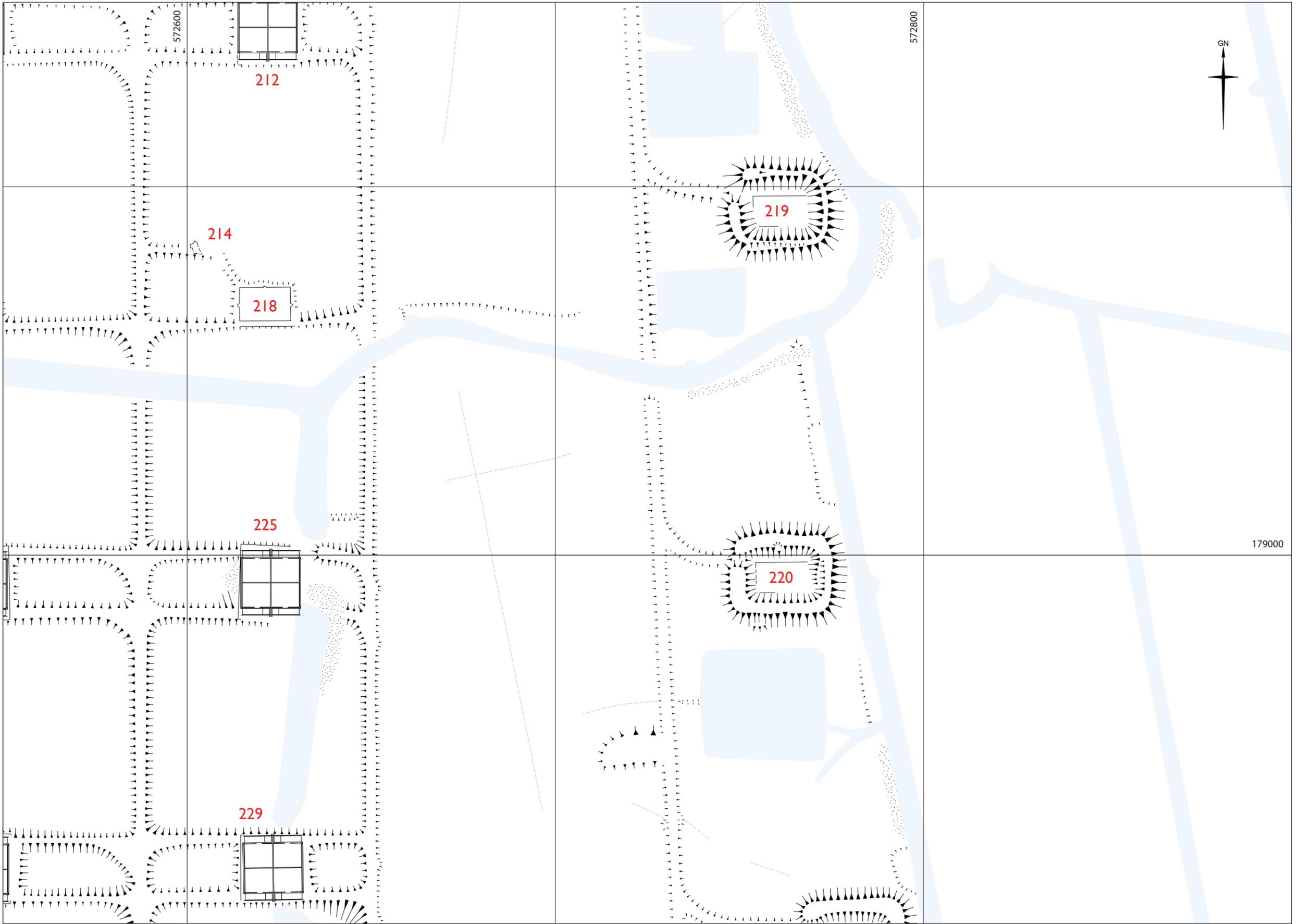
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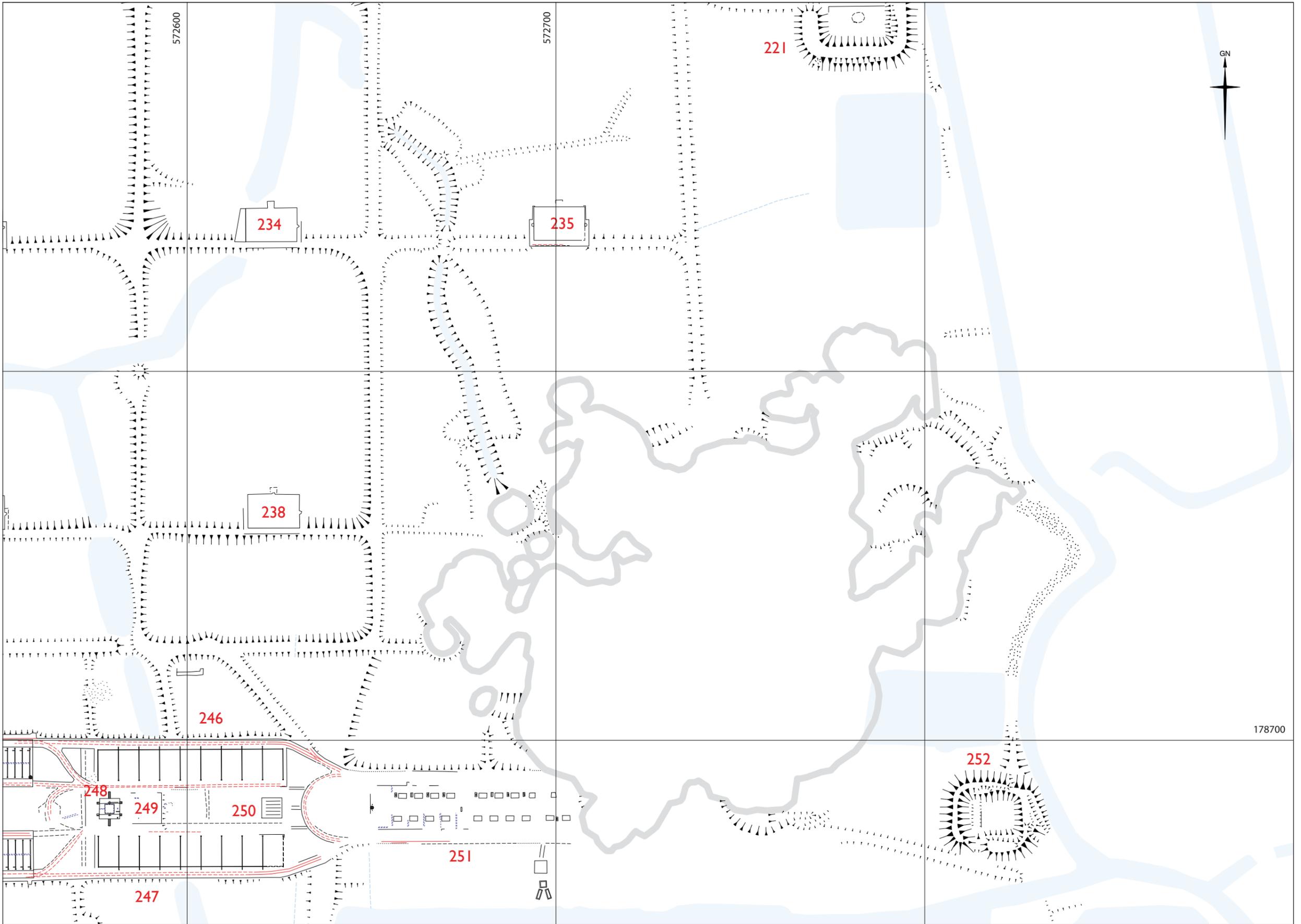




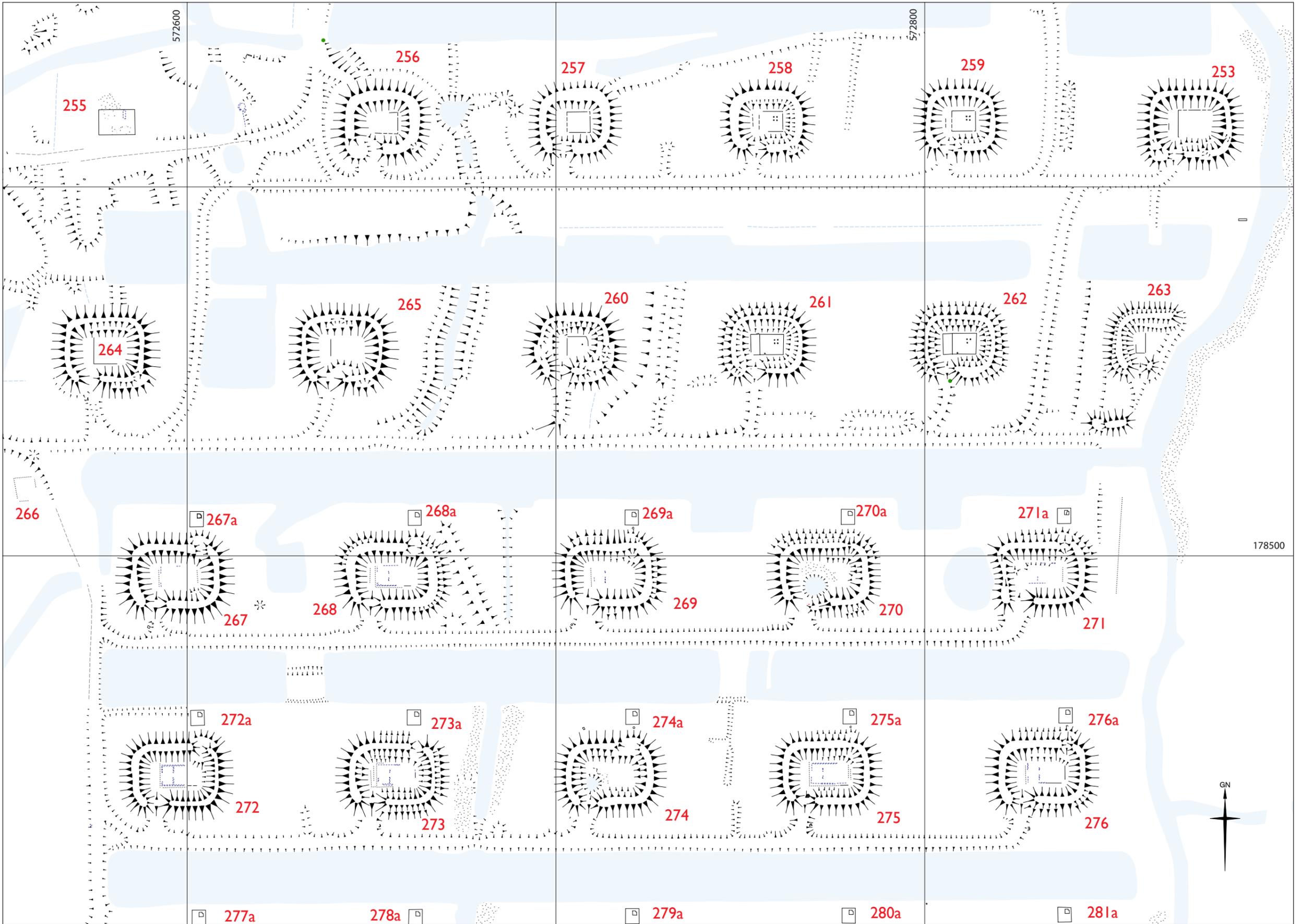


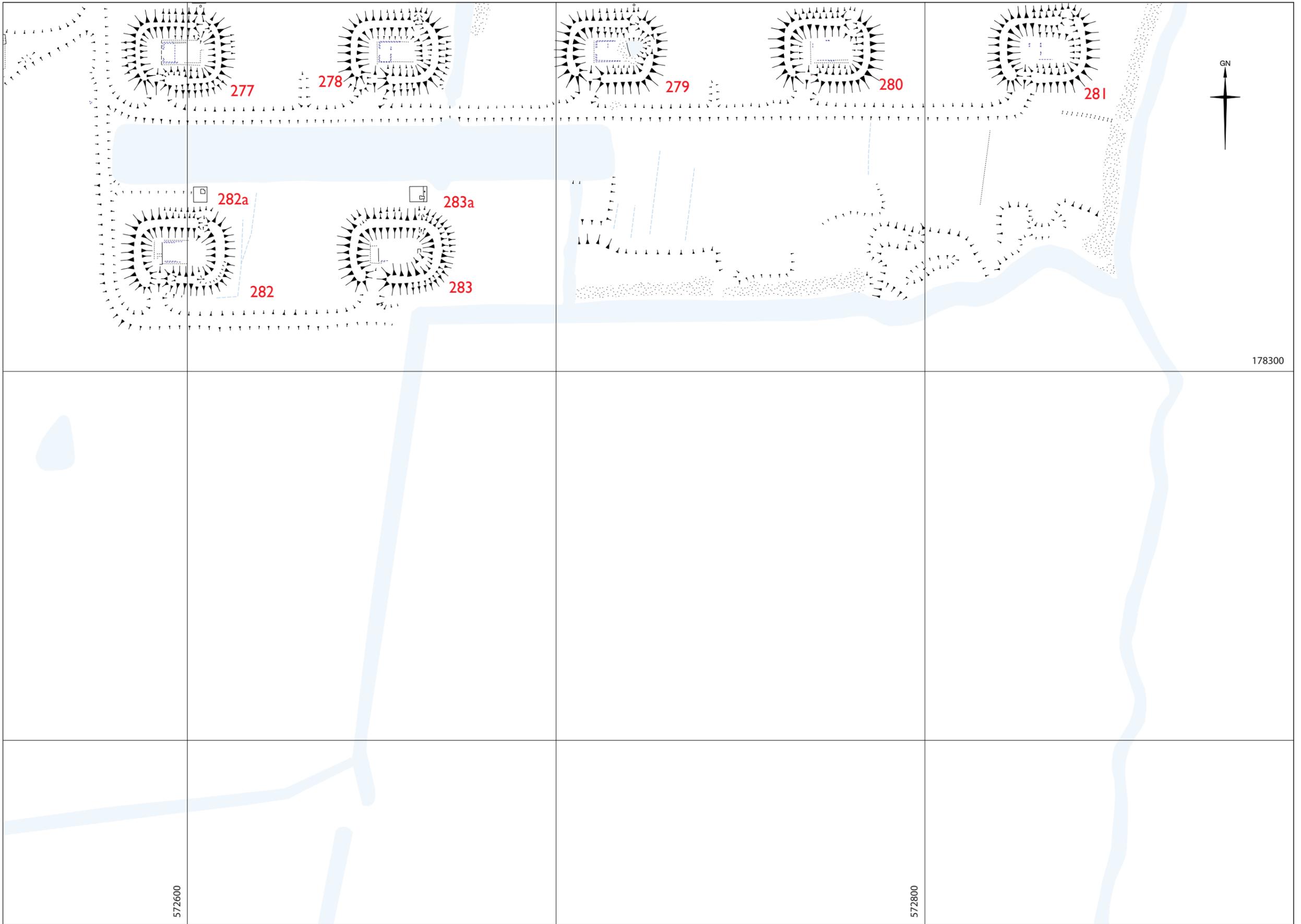


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## ENGLISH HERITAGE RESEARCH AND THE HISTORIC ENVIRONMENT

English Heritage undertakes and commissions research into the historic environment, and the issues that affect its condition and survival, in order to provide the understanding necessary for informed policy and decision making, for the protection and sustainable management of the resource, and to promote the widest access, appreciation and enjoyment of our heritage. Much of this work is conceived and implemented in the context of the National Heritage Protection Plan. For more information on the NHPP please go to <http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/>.

The Heritage Protection Department provides English Heritage with this capacity in the fields of building history, archaeology, archaeological science, imaging and visualisation, landscape history, and remote sensing. It brings together four teams with complementary investigative, analytical and technical skills to provide integrated applied research expertise across the range of the historic environment. These are:

- \* Intervention and Analysis (including Archaeology Projects, Archives, Environmental Studies, Archaeological Conservation and Technology, and Scientific Dating)
- \* Assessment (including Archaeological and Architectural Investigation, the Blue Plaques Team and the Survey of London)
- \* Imaging and Visualisation (including Technical Survey, Graphics and Photography)
- \* Remote Sensing (including Mapping, Photogrammetry and Geophysics)

The Heritage Protection Department undertakes a wide range of investigative and analytical projects, and provides quality assurance and management support for externally-commissioned research. We aim for innovative work of the highest quality which will set agendas and standards for the historic environment sector. In support of this, and to build capacity and promote best practice in the sector, we also publish guidance and provide advice and training. We support community engagement and build this in to our projects and programmes wherever possible.

We make the results of our work available through the Research Report Series, and through journal publications and monographs. Our newsletter *Research News*, which appears twice a year, aims to keep our partners within and outside English Heritage up-to-date with our projects and activities.

A full list of Research Reports, with abstracts and information on how to obtain copies, may be found on [www.english-heritage.org.uk/researchreports](http://www.english-heritage.org.uk/researchreports)

*For further information visit [www.english-heritage.org.uk](http://www.english-heritage.org.uk)*

