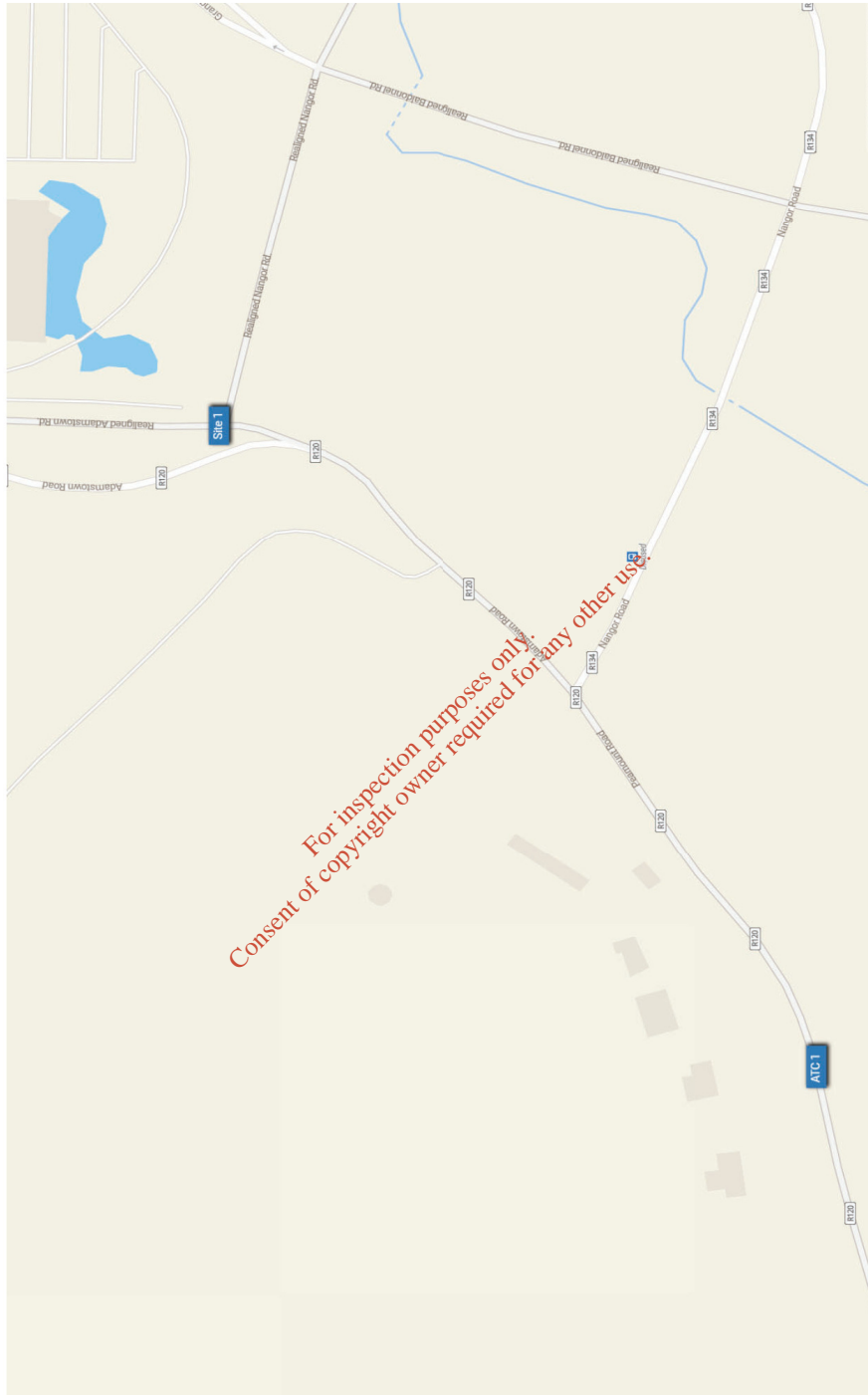


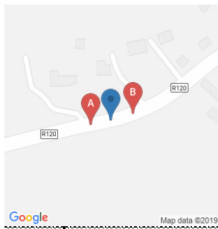
CHAPTER 12 TRAFFIC AND TRANSPORTATION

Appendix 12.1 Traffic movement counts

IDASO

Survey Name: 221 19328 EIA/Grange Castle ATC & MCC Data
Date: Tue 01 Oct 2019





IDASO

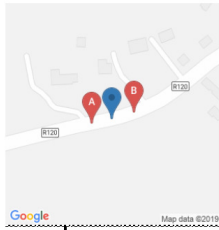
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Tue 01-Oct-2019

TIME	A => B							B => A								
	H/C	CAR	LEV	OCV1	OCV2	SV(BU)	TOT	PCU	M/C	CAR	LEV	OCV1	OCV2	SV(BU)	TOT	PCU
00:00	0	1	0	0	0	0	1	1	0	3	0	1	0	0	4	4.5
00:15	0	1	0	1	0	0	2	2.5	0	1	0	0	1	0	2	3.3
00:30	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0
00:45	0	2	0	0	0	0	2	2	0	1	1	0	0	0	2	2
H/TOT	0	6	0	1	0	0	7	7.5	0	5	1	1	1	0	8	9.8
01:00	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
01:15	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
01:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
01:45	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	0	1	0	0	0	0	1	1	0	7	0	0	0	0	7	7
02:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
02:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
02:30	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2
03:00	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
03:15	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
03:30	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2
03:45	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
H/TOT	0	2	0	0	0	0	2	2	0	6	0	0	0	0	6	6
04:00	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
04:15	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
04:30	0	0	1	0	0	0	1	1	0	3	0	0	0	0	3	3
04:45	0	5	0	0	0	0	5	5	1	1	0	0	0	0	2	1.4
H/TOT	0	7	1	0	0	0	8	8	1	4	0	0	0	0	5	4
05:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	0	0
05:15	0	2	0	1	0	0	3	3.5	0	1	0	1	0	0	2	2.5
05:30	0	8	0	0	1	0	9	10.3	0	6	0	1	0	0	7	7.5
05:45	0	13	0	0	0	0	13	13	0	10	0	3	0	0	13	14.5
H/TOT	0	24	0	1	1	0	26	27.8	0	19	0	5	0	0	24	26.5
06:00	0	7	0	2	0	1	10	12	0	5	0	0	0	0	6	6.5
06:15	0	19	1	1	3	1	25	30.4	0	12	2	0	0	0	15	15.5
06:30	2	27	1	4	3	0	37	41.7	1	13	3	2	0	0	19	19.4
06:45	1	51	5	5	0	0	62	63.9	0	33	0	0	0	0	35	35.5
H/TOT	3	104	7	12	6	2	134	148	1	63	6	5	0	0	75	76.9
07:00	0	72	6	8	1	0	87	92.3	0	7	1	0	0	0	15	15.5
07:15	1	137	7	5	1	0	151	154.2	0	33	1	3	0	1	38	40.5
07:30	1	168	10	16	1	0	196	204.7	2	6	1	4	0	0	43	43.8
07:45	0	107	7	9	1	0	124	129.8	0	40	4	2	1	0	47	49.3
H/TOT	2	484	30	38	4	0	558	581	0	123	6	10	1	1	143	149.1
08:00	0	138	6	6	2	0	152	157.8	2	27	5	5	0	0	39	40.3
08:15	2	163	9	5	1	0	180	185.5	0	31	1	3	1	0	36	38.8
08:30	3	123	10	6	1	0	143	145.5	1	36	6	2	1	1	47	49.7
08:45	2	109	10	3	1	0	125	126.6	0	45	1	5	3	0	54	60.4
H/TOT	7	533	35	20	5	0	600	612.3	3	139	13	15	5	1	176	189.2
09:00	1	85	2	7	0	0	95	97.9	0	31	4	3	1	0	39	41.8
09:15	1	101	4	7	0	1	114	117.6	1	38	5	2	3	0	49	53.3
09:30	0	53	9	5	1	0	68	71.8	0	28	6	5	1	0	40	43.8
09:45	3	60	2	6	1	0	72	74.5	0	30	2	7	2	1	42	49.1
H/TOT	5	299	17	25	2	1	349	362.1	1	127	17	17	7	1	170	188

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10:00	0	41	3	4	1	0	0	49	52.3	0	25	2	4	0	0	31	33
10:15	1	35	8	6	1	0	0	51	54.7	0	36	5	8	0	0	49	53
10:30	0	37	3	2	0	0	0	42	43	0	24	1	5	0	1	31	34.5
10:45	0	33	1	8	0	0	0	42	46	0	30	3	5	0	0	38	40.5
H/TOT	1	146	15	20	2	0	0	184	196	0	135	11	22	0	1	144	161
11:00	0	25	2	5	0	0	0	32	34.5	0	11	2	10	1	0	24	30.3
11:15	0	20	2	6	2	0	0	30	35.6	0	30	4	2	0	0	36	37
11:30	0	26	4	1	3	0	0	34	38.4	0	27	0	5	0	0	32	34.5
11:45	1	23	3	3	1	0	0	31	33.2	0	25	4	5	1	0	35	38.8
H/TOT	1	94	11	15	6	0	0	127	141.7	0	93	10	22	2	0	127	140.6
12:00	0	23	2	3	1	0	0	29	31.8	0	30	1	3	0	0	34	35.5
12:15	0	30	4	5	0	0	0	39	41.5	1	21	2	5	1	1	31	35.2
12:30	0	30	3	3	0	0	0	36	37.5	0	34	5	3	0	0	42	43.5
12:45	1	29	0	7	0	0	0	37	39.9	0	39	8	5	2	0	54	59.1
H/TOT	1	112	9	18	1	0	0	141	150.7	1	124	16	16	3	1	161	173.3
13:00	0	25	2	4	1	1	1	33	37.3	0	27	4	6	2	0	39	44.6
13:15	0	24	3	4	2	0	0	33	37.6	0	35	1	2	2	0	40	43.6
13:30	1	25	3	3	1	0	0	33	35.2	1	45	3	6	0	0	55	57.4
13:45	0	36	1	6	0	0	0	43	46	0	33	4	6	0	0	43	46
H/TOT	1	110	9	17	4	1	1	142	156.1	1	140	12	20	4	0	177	191.6
14:00	1	33	3	3	1	0	0	41	43.2	0	36	1	3	0	0	40	41.5
14:15	1	32	3	2	0	0	0	38	38.4	0	50	4	7	1	1	62	66.8
14:30	0	30	1	2	0	0	0	33	34	0	43	6	8	1	1	59	65.3
14:45	0	30	2	7	0	0	0	39	42.5	0	38	3	5	0	0	46	48.5
H/TOT	2	125	9	14	3	0	0	151	158.1	0	167	14	23	2	1	207	222.1
15:00	1	33	1	3	1	0	0	39	41.2	1	34	4	10	1	0	50	55.7
15:15	0	36	5	2	1	1	1	45	48.3	0	44	6	7	1	1	58	62.8
15:30	0	28	6	6	0	0	0	40	43	0	53	3	4	0	0	60	62
15:45	1	24	4	1	1	0	0	31	32.2	0	61	3	4	3	1	72	78.9
H/TOT	2	121	16	12	3	1	1	155	164.7	1	192	16	25	5	1	240	259.4
16:00	0	52	3	3	0	0	0	58	59.5	0	56	12	4	0	0	72	74
16:15	2	42	2	4	1	0	0	51	51.1	0	74	6	6	2	0	81	88.6
16:30	0	46	4	5	1	0	0	56	59.8	0	80	7	6	0	0	93	96
16:45	1	31	1	5	1	0	0	39	42.2	0	104	5	9	1	0	119	124.8
H/TOT	3	171	10	17	3	0	0	204	214.6	0	319	36	25	3	0	377	393.4
17:00	1	55	5	3	0	0	0	64	64.9	0	86	11	4	1	0	102	105.3
17:15	0	49	6	2	0	0	0	57	58	1	101	6	0	2	0	110	112
17:30	0	37	3	4	1	0	0	45	48.3	0	95	7	3	1	0	106	108.8
17:45	0	32	4	0	1	0	0	37	38.3	0	89	6	5	0	0	100	103.6
H/TOT	1	173	18	9	2	0	0	203	209.5	1	371	30	12	4	0	418	428.6
18:00	0	31	1	1	1	0	0	34	35.8	0	68	2	2	0	0	73	73
18:15	1	23	2	0	1	0	0	27	27.7	0	59	10	3	0	0	72	73.5
18:30	0	24	0	3	0	0	0	27	28.5	0	56	2	6	0	0	65	69.3
18:45	1	28	1	1	0	0	0	31	30.9	0	54	1	4	0	0	59	61
H/TOT	2	106	4	5	2	0	0	119	122.9	0	237	15	15	0	0	268	276.8
19:00	1	21	0	1	1	0	0	24	25.2	0	45	0	2	0	0	47	48
19:15	1	20	0	1	1	0	0	23	24.2	1	34	1	1	0	0	38	39.7
19:30	2	24	0	0	0	0	0	26	24.8	0	26	1	0	0	0	27	27.5
19:45	2	21	0	0	0	0	0	23	21.8	0	2	2	0	0	0	31	32
H/TOT	6	86	0	2	2	0	0	96	96	1	130	4	7	1	0	143	147.2
20:00	1	21	2	0	0	0	0	24	23.4	0	2	0	2	0	0	29	30
20:15	0	20	1	2	0	0	0	23	24	0	23	0	1	0	0	24	24.5
20:30	1	22	1	0	0	0	0	24	23.4	0	22	1	2	0	0	25	26
20:45	1	13	1	0	0	0	0	15	14.4	0	21	1	0	1	0	23	24.3
H/TOT	3	76	5	2	0	0	0	86	86	0	93	2	5	1	0	101	104.8
21:00	0	12	1	0	0	0	0	13	13	0	16	0	0	1	0	17	18.3
21:15	1	5	1	0	0	0	0	7	6.4	0	13	0	1	1	0	15	16.8
21:30	2	11	1	3	1	0	0	18	19.6	0	9	0	0	0	0	9	9
21:45	0	8	1	0	0	0	0	9	9	0	7	0	0	0	0	7	7
H/TOT	3	36	4	3	1	0	0	47	48	0	45	0	1	2	0	48	51.1
22:00	1	7	0	0	0	0	0	8	7.4	0	12	2	1	0	0	15	15.5
22:15	0	6	0	0	0	0	0	6	6	0	9	0	0	0	0	9	9
22:30	1	9	0	2	0	0	0	12	12.4	0	8	0	0	0	0	8	8
22:45	0	4	0	0	0	0	0	4	4	0	4	2	1	1	0	8	9.8
H/TOT	2	26	0	2	0	0	0	30	29.8	0	33	4	2	1	0	40	42.3
23:00	1	7	0	1	0	0	0	8	8.8	0	3	0	0	0	0	11	11.8
23:15	0	3	0	0	0	0	0	3	3	0	3	1	2	0	0	6	7
23:30	0	3	0	1	0	0	0	4	4.5	0	1	0	0	0	0	1	1
23:45	0	3	0	0	0	0	0	3	3	0	3	0	0	0	0	3	3
H/TOT	1	16	0	2	0	0	0	19	19.4	0	10	1	2	0	0	13	14
24 TOT	46	2859	200	235	45	5	3390	3543	3543	13	2564	208	230	43	7	3085	3245

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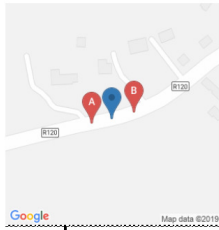
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Wed 02-Oct-2019

TIME	A -> B							TOT	PCU	B -> A							TOT	PCU
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)				M/C	CAR	LGV	OGV1	OGV2	SV(BUS)			
00:00	0	1	0	0	0	0	1	1	1	0	1	0	2	0	0	3	4	
00:15	0	0	0	1	0	0	1	1.5	0	1	0	0	0	0	1	1	1	
00:30	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	3	
00:45	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2	2	
H/TOT	0	2	0	1	0	0	3	3.5	0	7	0	2	0	0	9	10	10	
01:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2	2	
01:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	
01:30	1	1	0	0	0	0	2	1.4	0	3	0	0	0	0	3	3	3	
01:45	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	
H/TOT	1	3	0	0	0	0	4	3.4	0	8	0	0	0	0	8	8	8	
02:00	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	
02:15	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	
02:30	1	1	0	0	0	0	2	1.4	0	0	0	0	0	0	0	0	0	
02:45	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	
H/TOT	1	4	0	0	0	0	5	4.4	0	1	0	0	0	0	1	1	1	
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	
03:30	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	1	
03:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	
H/TOT	0	1	0	0	0	0	1	1	0	2	1	0	0	0	3	3	3	
04:00	0	1	0	0	0	0	1	1	0	1	1	0	0	0	2	2	2	
04:15	1	1	0	0	0	0	2	1.4	0	0	0	0	0	0	0	0	0	
04:30	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	2	
04:45	1	3	1	1	0	0	6	5.9	0	2	1	1	0	0	4	4	4	
H/TOT	2	5	1	1	0	0	9	8.3	0	5	2	1	0	0	7	7	7	
05:00	0	6	1	1	0	0	10	13.1	0	0	0	1	0	0	1	1	1	
05:15	1	3	1	1	0	0	6	5.9	0	1	0	0	0	0	1	1	1	
05:30	0	5	0	0	1	0	6	7.3	0	6	0	1	2	0	9	9	9	
05:45	4	7	1	1	2	0	15	15.7	0	6	0	1	2	0	7	7	7	
H/TOT	5	21	3	3	5	0	37	42	0	13	0	2	2	0	18	18	18	
06:00	0	7	0	0	0	1	8	9	0	7	1	0	0	0	8	8	8	
06:15	2	19	0	0	1	0	22	22.1	0	12	0	3	0	0	18	18	18	
06:30	4	32	2	4	1	1	44	45.9	0	17	0	0	0	0	19	19	19	
06:45	5	45	4	7	0	0	61	61.5	0	24	3	1	0	0	28	28	28	
H/TOT	11	103	6	11	2	2	135	138.5	0	6	3	0	0	0	73	73	73	
07:00	1	69	5	5	1	0	81	84.2	0	23	0	4	0	0	38	38	38	
07:15	8	131	4	7	1	0	151	151	0	1	3	0	1	35	37.5	37.5	37.5	
07:30	4	175	9	8	0	0	196	197.6	1	45	4	4	1	0	55	57.7	57.7	
07:45	3	123	6	7	2	1	142	147.3	0	46	7	1	0	0	55	54.9	54.9	
H/TOT	16	498	24	27	4	1	570	580.2	2	154	13	12	1	1	183	190.1	190.1	
08:00	1	100	11	10	1	0	123	123	0	31	4	5	1	0	41	46.8	46.8	
08:15	4	131	9	9	1	0	154	157.4	0	44	3	1	0	0	48	48.5	48.5	
08:30	2	137	5	3	1	0	148	149.6	0	40	3	4	4	0	51	58.2	58.2	
08:45	2	91	5	5	1	0	104	106.6	0	38	3	4	1	0	46	49.3	49.3	
H/TOT	9	459	30	27	4	0	529	542.3	0	153	13	14	6	0	186	200.8	200.8	
09:00	0	72	2	8	3	0	85	82.9	0	41	4	8	2	0	55	61.6	61.6	
09:15	0	85	2	4	0	0	91	93	0	34	6	7	0	0	47	50.5	50.5	
09:30	0	41	7	5	0	0	53	55.5	0	28	1	9	0	1	39	44.5	44.5	
09:45	1	43	9	3	0	0	56	56.9	0	31	3	5	1	0	40	43.8	43.8	
H/TOT	1	241	20	20	3	0	285	286.2	0	134	14	29	3	1	162	171.9	171.9	
10:00	0	32	2	6	3	0	43	49.9	0	24	1	3	0	0	28	29.5	29.5	
10:15	0	31	2	4	0	1	38	41	0	36	4	6	0	1	47	51	51	
10:30	0	24	0	8	2	0	34	40.6	0	39	2	4	0	0	45	47	47	
10:45	1	27	3	5	1	1	38	42.2	1	32	3	6	0	0	42	44.4	44.4	
H/TOT	1	114	7	23	6	2	153	173.2	1	131	10	19	0	1	162	171.9	171.9	
11:00	0	22	4	8	1	0	35	40.3	0	23	3	4	0	0	30	32	32	
11:15	0	17	2	3	0	0	22	23.5	0	19	5	5	0	0	29	31.5	31.5	
11:30	0	39	5	2	2	1	49	53.6	0	22	2	5	1	0	30	33.8	33.8	
11:45	0	34	5	0	2	0	41	43.6	0	30	7	3	1	2	43	47.8	47.8	
H/TOT	0	112	16	13	5	1	147	161	0	94	17	17	2	2	122	145.1	145.1	

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12:00	0	28	5	7	0	0	40	43.5	0	32	4	6	0	1	43	47
12:15	0	41	3	4	1	0	49	52.3	1	28	4	4	0	0	37	38.4
12:30	0	42	5	3	2	0	52	56.1	0	27	3	3	0	0	33	34.5
12:45	1	26	3	5	1	1	37	41.2	0	30	2	0	1	0	33	34.3
H/TOT	1	137	16	19	3	1	178	151.1	1	137	13	13	1	1	146	156.2
13:00	0	36	3	5	1	0	45	48.8	0	24	4	5	0	0	33	35.5
13:15	0	33	1	7	1	0	42	46.8	1	26	4	3	3	0	37	41.8
13:30	0	35	1	4	0	0	40	42	0	32	3	6	5	0	46	55.5
13:45	1	34	6	3	0	0	44	44.9	0	43	3	5	1	1	53	57.8
H/TOT	1	138	11	19	2	0	171	182.5	1	125	14	19	9	1	169	190.6
14:00	0	46	2	3	1	0	52	54.8	0	45	3	3	1	0	52	54.8
14:15	0	31	1	1	1	0	34	35.8	0	45	5	8	0	0	58	62
14:30	0	25	1	6	0	1	33	37	0	48	7	4	0	1	60	63
14:45	0	30	3	2	0	0	35	36	0	42	2	2	0	0	46	47
H/TOT	0	132	7	12	2	1	154	153.6	0	180	17	17	1	1	216	226.8
15:00	1	37	8	5	1	0	52	55.2	0	45	4	4	0	0	53	55
15:15	0	31	2	4	1	0	38	41.3	0	45	5	4	0	0	54	56
15:30	0	33	4	5	1	0	43	46.8	0	53	3	7	0	0	63	66.5
15:45	1	38	4	4	0	0	47	48.4	1	56	4	4	2	1	68	73
H/TOT	2	139	18	18	3	0	180	191.7	1	199	16	19	2	1	238	250.5
16:00	1	39	4	3	1	0	48	50.2	1	65	13	5	1	0	85	88.2
16:15	0	48	2	3	1	0	54	56.8	1	74	4	5	1	0	85	88.2
16:30	0	53	2	5	0	0	60	62.5	1	92	10	5	1	0	109	112.2
16:45	1	33	2	1	1	0	38	39.2	1	97	6	6	0	0	110	112.4
H/TOT	2	172	10	12	3	0	200	208.7	4	328	32	21	3	0	389	401
17:00	0	46	4	4	0	0	54	56	0	117	6	6	1	1	131	136.3
17:15	2	47	1	3	0	0	53	53.3	0	101	8	6	1	0	116	120.3
17:30	1	38	6	1	1	0	47	48.2	0	106	8	5	0	0	119	121.5
17:45	0	35	2	1	0	0	38	38.5	0	85	2	7	0	0	94	97.5
H/TOT	3	166	13	9	1	0	192	196	0	409	24	24	2	1	460	475.6
18:00	0	43	1	1	1	0	46	47.8	1	85	3	5	1	0	95	98.2
18:15	0	40	4	5	3	0	52	54.4	1	52	3	3	1	0	60	62.2
18:30	0	37	1	2	1	0	41	43.3	1	74	4	5	1	0	85	88.2
18:45	1	36	4	1	0	0	42	41.9	0	67	3	4	1	0	75	78.3
H/TOT	1	156	10	9	5	0	181	191.4	3	278	13	17	4	0	315	326.9
19:00	0	33	5	2	0	0	40	41	1	49	3	3	0	0	56	56.9
19:15	0	43	2	1	2	0	48	51.1	1	42	2	1	2	0	48	50.5
19:30	0	21	0	2	0	0	23	24	0	34	1	1	0	0	36	36.5
19:45	0	18	1	2	0	0	21	22	0	37	4	5	0	0	44	45.5
H/TOT	0	115	8	7	2	0	132	138.1	2	162	10	10	2	0	186	192.4
20:00	0	26	0	1	0	0	27	27.5	1	29	2	0	0	0	31	31.4
20:15	0	31	1	0	0	0	32	32	0	25	0	3	1	0	29	31.8
20:30	0	23	2	1	1	0	27	28.8	0	24	2	0	0	0	26	26
20:45	0	17	2	1	0	0	20	20.5	0	21	1	0	0	0	22	22
H/TOT	0	97	5	3	1	0	106	108.8	1	99	5	0	0	0	109	111.2
21:00	1	13	1	0	0	0	15	14.4	0	14	1	0	0	0	15	15
21:15	0	14	1	1	1	0	17	18.8	1	9	0	0	0	0	12	11.9
21:30	0	9	0	0	0	0	9	9	0	18	0	0	0	0	18	18
21:45	0	9	1	0	0	0	10	10	0	0	0	0	0	0	20	20
H/TOT	1	45	3	1	1	0	51	52.2	1	61	2	1	0	0	65	64.9
22:00	0	10	0	0	0	0	10	10	0	0	1	1	0	0	11	12.8
22:15	0	8	0	2	0	0	10	11	0	5	0	0	0	0	5	5
22:30	0	6	0	1	0	0	7	7.5	0	9	0	0	0	0	10	9.4
22:45	0	3	0	1	1	0	5	6.8	0	3	1	0	0	0	4	4
H/TOT	0	27	0	4	1	0	32	32.8	1	26	1	1	1	0	30	31.2
23:00	0	6	0	0	0	0	6	6	0	10	0	0	0	0	10	10
23:15	0	2	0	0	0	0	2	2	0	3	0	1	0	0	4	4.5
23:30	0	3	0	1	1	0	5	6.8	0	4	0	0	0	0	4	4
23:45	0	3	0	0	0	0	3	3	0	4	0	0	0	0	4	4
H/TOT	0	14	0	1	1	0	16	17.8	0	21	0	1	0	0	22	22.5
24 TOT	58	202	208	240	55	8	3471	3636	18	2767	222	249	43	10	3309	3489

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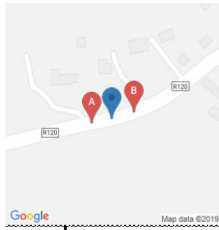
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Thu 03-Oct-2019

TIME	A -> B							PCU	B -> A							PCU
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)	TOT		M/C	CAR	LGV	OGV1	OGV2	SV(BUS)	TOT	
00:00	1	1	0	0	0	0	2	1.4	0	7	0	1	0	0	8	8.5
00:15	0	0	0	1	0	0	1	1.5	0	4	0	0	0	0	4	4
00:30	0	0	0	1	0	0	1	1.5	0	1	0	0	0	0	1	1
00:45	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3
H/TOT	1	1	0	2	0	0	4	4.4	0	14	1	1	0	0	16	16.5
01:00	0	3	0	0	0	0	3	3	0	1	0	0	0	0	1	1
01:15	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
01:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
01:45	0	2	0	0	0	0	2	2	0	0	0	0	1	0	1	2.3
H/TOT	0	5	0	0	0	0	5	5	0	4	0	0	1	0	5	6.3
02:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
02:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
02:30	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	2	0	0	0	0	2	2	0	2	0	0	0	0	2	2
03:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
03:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
03:30	0	3	0	0	0	0	3	3	0	1	0	0	0	0	1	1
03:45	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
H/TOT	0	5	0	0	0	0	5	5	0	3	1	0	0	0	4	4
04:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
04:15	0	1	0	0	0	0	1	1	1	1	0	0	0	0	2	1.4
04:30	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0
04:45	0	3	0	0	0	0	3	3	0	1	0	0	0	0	1	1
H/TOT	0	6	0	0	0	0	6	6	1	3	0	0	0	0	2	1.4
05:00	0	3	1	0	0	0	5	6.3	0	1	0	0	0	0	1	1.5
05:15	0	3	0	0	0	0	3	3	0	2	0	3	0	0	5	6.5
05:30	0	5	0	2	2	0	9	12.6	0	3	0	3	0	0	6	7.5
05:45	0	10	0	1	2	0	13	16.1	0	9	1	3	0	0	13	14.5
H/TOT	0	21	1	3	5	0	30	38	0	15	1	3	0	0	25	29.5
06:00	0	10	0	0	0	0	11	12.3	0	11	0	0	0	0	11	12.5
06:15	0	24	1	2	0	1	28	30	0	8	0	0	0	0	9	9.5
06:30	0	37	2	4	4	0	47	54.2	0	23	0	0	0	0	27	27.5
06:45	0	57	6	4	4	0	71	78.2	0	28	2	0	0	0	30	30
H/TOT	0	128	9	10	9	1	157	174.7	0	60	3	0	0	0	78	79.5
07:00	0	95	6	11	0	0	112	117.5	0	28	0	3	0	0	31	32.5
07:15	0	113	7	10	1	0	131	137.3	0	33	3	4	0	0	46	48
07:30	0	141	6	11	1	1	160	167.8	0	42	3	6	1	0	52	56.3
07:45	0	115	5	7	2	0	129	135.1	0	60	5	8	1	0	74	79.3
H/TOT	0	464	24	39	4	1	532	557.2	0	169	11	21	2	0	203	216.1
08:00	1	128	8	11	4	0	152	158.2	0	44	4	4	1	0	53	56.3
08:15	1	132	7	3	0	0	143	143.9	1	45	2	5	2	0	55	59.5
08:30	1	81	5	4	1	0	92	94.7	0	31	3	1	1	0	36	37.8
08:45	1	78	4	4	2	0	89	93	0	38	2	6	1	0	47	51.3
H/TOT	4	419	24	22	7	0	476	493.7	1	158	11	16	5	0	191	204.9
09:00	1	59	2	9	1	0	72	77.2	0	45	4	6	3	0	58	64.9
09:15	0	79	3	6	1	0	89	93.3	0	39	8	7	0	0	54	57.5
09:30	1	36	5	4	1	0	47	49.7	0	22	2	6	2	0	32	37.6
09:45	0	40	2	9	2	0	53	60.1	0	21	3	4	1	0	29	32.3
H/TOT	2	214	12	28	5	0	264	280.3	0	127	17	23	6	0	173	190.3
10:00	1	26	6	8	3	3	47	51.3	0	18	4	6	2	0	30	35.6
10:15	0	30	3	5	1	0	39	42.8	0	28	3	6	0	1	38	42
10:30	1	29	3	4	0	0	37	38.4	1	20	2	4	2	0	29	33
10:45	1	29	4	5	2	0	41	45.5	0	35	6	7	0	0	48	51.5
H/TOT	3	114	16	22	6	3	164	184.2	1	101	15	23	4	1	145	162.1
11:00	0	36	3	3	2	0	44	46.1	0	25	4	5	1	2	37	42.8
11:15	0	25	2	6	0	1	34	38	1	25	6	8	1	0	41	45.7
11:30	0	23	6	4	2	0	35	39.6	0	22	2	4	1	0	29	32.3
11:45	0	31	1	4	1	0	37	40.3	0	26	3	6	0	0	35	38
H/TOT	0	115	12	17	5	1	150	156.2	1	98	15	23	3	2	142	158.8

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12:00	0	26	4	4	1	0	35	38.3	0	23	3	4	1	2	33	38.3
12:15	0	26	3	3	0	0	32	33.5	0	25	5	6	0	0	36	39
12:30	1	39	3	7	0	1	51	54.9	0	25	6	3	1	0	35	37.8
12:45	0	21	1	3	1	0	26	28.8	0	43	3	4	1	0	51	54.3
H/TOT	1	112	11	17	2	1	144	155.5	0	130	17	17	3	2	155	169.4
13:00	0	30	2	8	2	1	43	50.6	1	26	4	5	2	0	38	42.5
13:15	0	20	4	5	2	1	32	38.1	0	38	4	8	1	0	51	56.3
13:30	0	41	3	6	2	0	52	57.6	0	42	5	6	1	0	54	58.3
13:45	0	34	2	4	1	1	42	46.3	0	38	3	2	0	0	43	44
H/TOT	0	125	11	23	7	3	169	192.6	1	144	18	21	4	0	186	201.1
14:00	0	31	1	10	0	0	42	47	0	37	0	8	1	1	47	53.3
14:15	0	29	0	4	1	0	34	37.3	0	31	5	5	1	2	44	49.8
14:30	0	25	1	2	1	1	30	33.3	0	34	6	17	2	0	59	70.1
14:45	0	18	6	6	0	0	30	33	1	42	1	10	1	0	55	60.7
H/TOT	0	103	9	22	2	1	136	150.6	1	144	12	40	5	3	205	233.9
15:00	0	41	5	9	3	0	58	66.4	0	39	8	7	0	1	55	59.5
15:15	1	28	1	5	1	0	36	39.2	1	58	6	8	1	0	74	78.7
15:30	1	28	4	6	0	1	40	43.4	0	72	5	8	1	0	86	91.3
15:45	0	23	3	6	0	0	32	35	2	54	6	7	1	1	71	75.6
H/TOT	2	120	13	26	4	1	166	184	3	223	25	30	3	2	286	305.1
16:00	0	39	3	7	0	0	49	52.5	0	63	7	5	1	0	76	79.8
16:15	0	43	3	3	0	0	49	50.5	0	66	5	5	1	0	77	80.8
16:30	0	43	1	2	0	0	46	47	1	78	8	5	0	0	92	93.9
16:45	0	32	1	4	1	0	38	41.3	0	82	7	6	1	0	96	100.3
H/TOT	0	157	8	16	1	0	182	191.3	1	289	27	21	3	0	341	354.8
17:00	0	64	3	3	0	0	70	71.5	0	117	6	2	0	0	125	126
17:15	0	44	1	3	1	0	49	51.8	0	117	10	4	2	0	133	137.6
17:30	0	35	1	2	0	0	38	39	2	105	1	2	0	0	110	109.8
17:45	0	26	2	1	0	0	29	29.5	0	99	4	7	2	0	112	118.1
H/TOT	0	165	7	9	1	0	186	191.8	2	438	21	15	4	0	480	491.5
18:00	0	31	2	1	1	0	35	36.8	0	68	4	1	0	0	73	73.5
18:15	1	78	4	7	0	0	35	35.4	0	51	5	1	1	0	58	59.8
18:30	0	33	1	0	1	1	36	38.3	1	42	3	2	0	0	48	48.4
18:45	0	25	3	1	0	0	29	29.5	0	32	2	3	0	0	37	38.5
H/TOT	1	117	10	4	2	1	135	140	1	193	14	7	1	0	216	220.2
19:00	1	27	3	1	0	0	32	31.9	0	40	1	2	0	0	43	44
19:15	0	17	1	2	0	0	20	21	0	33	1	0	0	0	34	34
19:30	0	24	1	4	0	0	29	31	0	24	2	2	0	0	28	29
19:45	0	15	1	0	0	0	16	16	0	29	3	2	0	0	21	21
H/TOT	1	83	6	7	0	0	97	99.9	0	126	7	6	0	0	139	142
20:00	0	19	1	4	0	0	24	26	0	26	1	1	0	0	28.5	28.5
20:15	0	25	1	2	0	0	28	29	0	28	2	0	0	0	30	30
20:30	0	25	0	0	0	0	25	25	0	22	0	0	0	0	22	22
20:45	0	10	0	1	0	0	11	11.5	0	25	2	0	0	0	27	27
H/TOT	0	79	2	7	0	0	88	91.5	0	101	5	0	0	0	107	107.5
21:00	0	12	1	0	0	0	13	13	0	20	0	1	0	0	21	21.5
21:15	0	8	1	1	0	0	10	10.5	0	15	1	1	0	0	17	18.8
21:30	0	8	0	2	0	0	10	11	0	10	2	2	0	0	14	15
21:45	0	5	0	1	0	0	6	6.5	0	7	1	0	0	0	13	13.5
H/TOT	0	33	2	4	0	0	39	41	0	57	2	5	1	0	65	68.8
22:00	0	0	0	0	0	0	0	0	0	0	1	1	0	0	10	10.3
22:15	0	4	1	0	0	0	5	5	0	11	0	1	0	0	12	12.5
22:30	0	7	0	2	0	0	9	10	0	5	0	0	0	0	5	5
22:45	0	1	0	0	1	0	2	2.3	0	4	0	0	0	0	4	4
H/TOT	0	18	1	2	1	0	22	23.3	0	28	1	2	0	0	31	32
23:00	0	6	0	0	0	0	6	6	0	5	0	0	0	0	5	5
23:15	0	3	0	0	0	0	3	3	0	1	0	1	0	0	2	2.5
23:30	0	0	0	1	0	0	1	1.5	0	5	0	0	0	0	5	5
23:45	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	0	9	0	1	0	0	10	10.5	0	12	0	1	0	0	13	13.5
24 TOT	15	2619	177	281	61	13	3166	3390	19	2635	224	285	45	10	3212	3415

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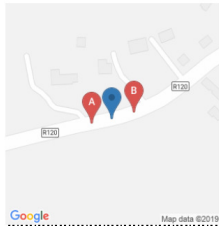
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Fri 04-Oct-2019

TIME	A -> B							TOT	PCU	B -> A							TOT	PCU
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)				M/C	CAR	LGV	OGV1	OGV2	SV(BUS)			
00:00	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	2	2.5	
00:15	0	1	0	1	0	0	2	2	2.5	0	3	0	0	0	0	3	3	
00:30	0	1	0	0	0	0	1	1	1	0	2	0	0	0	0	2	2	
00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H/TOT	0	3	0	1	0	0	4	4	4.5	0	6	0	1	0	0	7	7.5	
01:00	0	3	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	
01:15	0	2	0	0	0	0	2	2	2	0	2	0	0	0	0	2	2	
01:30	0	1	0	0	0	0	1	1	1	0	2	0	0	1	0	3	4.3	
01:45	0	0	0	1	0	0	1	1	1.5	0	1	0	0	0	0	1	1	
H/TOT	0	6	0	1	0	0	7	7	7.5	0	5	0	0	1	0	6	7.3	
02:00	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	1	1	
02:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	
02:30	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	1	1	
02:45	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	
H/TOT	0	2	0	0	0	0	2	2	2	0	7	0	0	0	0	7	7	
03:00	0	2	0	0	0	0	2	2	2	0	1	0	0	0	0	1	1	
03:15	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	
03:30	0	0	0	1	0	0	1	1	1.5	0	0	0	0	0	0	0	0	
03:45	0	2	0	0	0	0	2	2	2	0	1	0	0	0	0	1	1	
H/TOT	0	4	0	1	0	0	5	5	5.5	0	4	0	0	0	0	4	4	
04:00	0	2	0	0	0	0	2	2	2	0	1	0	0	0	0	1	1	
04:15	0	2	0	0	0	0	2	2	2	0	2	0	0	0	0	2	2	
04:30	0	0	1	0	1	0	2	2	3.3	0	2	0	0	0	0	2	2	
04:45	0	2	0	0	0	0	2	2	2	0	1	0	0	0	0	1	1	
H/TOT	0	6	1	0	1	0	8	8	9.3	0	6	0	0	0	0	6	6	
05:00	0	2	0	0	0	0	2	2	2	0	1	0	0	0	0	2	2.5	
05:15	0	4	1	2	0	0	7	7	8	0	1	0	1	0	0	2	2.5	
05:30	0	8	0	0	1	0	9	9	10.3	0	5	0	0	0	0	5	5	
05:45	1	16	0	1	0	0	18	17.9	17.9	0	6	0	2	0	0	8	9	
H/TOT	1	30	1	3	1	0	36	36.2	36.2	0	13	0	2	0	0	17	19	
06:00	0	10	1	3	0	0	17	17	22.4	0	3	0	0	0	0	3	7.5	
06:15	0	22	2	0	1	0	25	26.3	26.3	0	12	0	0	0	0	12	12	
06:30	1	35	1	4	2	0	43	47	47	1	18	1	1	0	0	21	22.2	
06:45	0	47	6	5	1	0	59	62.8	62.8	0	29	2	2	0	0	33	34	
H/TOT	1	114	10	12	7	0	144	158.5	158.5	1	4	1	0	0	0	73	75.7	
07:00	0	67	4	7	1	1	80	85.8	85.8	0	20	4	2	0	1	24	26	
07:15	1	109	13	10	1	0	134	139.7	139.7	0	4	4	0	0	0	42	44	
07:30	0	121	4	7	1	0	133	137.8	137.8	1	41	7	5	1	0	55	58.2	
07:45	0	115	7	7	2	0	131	137.1	137.1	0	52	6	1	0	0	59	59.5	
H/TOT	1	412	28	31	5	1	478	500.4	500.4	1	147	18	12	1	1	180	187.7	
08:00	1	107	7	3	1	1	120	120	120	0	36	2	6	0	0	44	47	
08:15	1	117	6	6	2	0	132	137	137	1	33	3	3	0	1	41	42.9	
08:30	0	118	11	5	0	0	134	136.5	136.5	1	37	3	3	0	0	44	44.9	
08:45	0	98	5	5	0	0	108	110.5	110.5	1	30	1	5	1	0	38	41.2	
H/TOT	2	440	29	19	3	1	494	507.2	507.2	3	136	9	17	1	1	167	176	
09:00	0	68	5	8	1	0	82	87.3	87.3	0	28	2	6	1	0	37	41.3	
09:15	0	75	3	5	3	0	86	92.4	92.4	0	30	4	3	1	0	38	40.8	
09:30	0	42	6	9	0	0	57	61.5	61.5	0	29	4	4	1	0	38	41.3	
09:45	0	37	4	4	3	0	48	53.9	53.9	0	35	4	1	1	0	41	42.8	
H/TOT	0	222	18	26	7	0	273	295.1	295.1	0	122	14	14	4	0	154	166.2	
10:00	0	36	4	4	0	1	45	48	48	0	23	2	2	2	0	29	32.6	
10:15	0	26	4	5	0	0	35	37.5	37.5	0	26	6	2	0	1	35	37	
10:30	0	16	1	2	2	0	21	24.6	24.6	0	14	3	4	1	0	22	25.3	
10:45	0	29	4	4	1	0	38	41.3	41.3	0	28	3	3	0	2	36	39.5	
H/TOT	0	107	13	15	3	1	139	151.4	151.4	0	91	14	11	3	0	122	136.4	
11:00	0	31	7	4	0	0	42	44	44	0	27	2	6	1	0	36	40.3	
11:15	0	28	3	6	0	0	37	40	40	0	34	2	6	1	1	44	49.3	
11:30	0	31	2	4	0	0	37	39	39	0	31	4	6	1	0	42	46.3	
11:45	0	29	6	6	2	0	43	46.6	46.6	0	34	1	4	2	0	41	45.6	
H/TOT	0	119	18	20	2	0	159	171.6	171.6	0	126	9	22	5	0	163	181.5	

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12:00	0	21	5	4	1	0	31	34.3	0	27	5	11	0	0	43	48.5
12:15	0	23	4	10	1	0	38	44.3	1	31	1	5	2	0	40	44.5
12:30	0	46	2	5	0	1	54	57.5	1	30	3	5	0	0	39	40.9
12:45	0	32	3	2	1	1	39	42.3	0	27	2	2	0	0	31	32
H/TOT	0	122	14	21	9	2	162	178.2	2	115	11	23	2	0	153	165.9
13:00	0	27	2	5	3	0	37	43.4	0	28	9	5	0	0	42	44.5
13:15	0	36	1	4	1	0	42	45.3	0	43	2	9	3	0	57	65.4
13:30	0	28	4	0	0	0	32	32	0	41	1	3	1	0	46	48.8
13:45	0	36	0	4	0	0	40	42	0	34	3	6	0	0	43	46
H/TOT	0	127	7	13	4	0	151	162.7	0	146	15	23	4	0	188	204.7
14:00	0	41	4	4	1	1	51	55.3	0	50	7	5	0	0	62	64.5
14:15	0	41	1	4	2	0	48	52.6	0	40	1	7	1	0	49	53.8
14:30	0	37	1	3	0	0	41	42.5	0	42	5	2	2	0	51	54.6
14:45	0	26	4	7	3	0	40	47.4	0	56	6	7	3	0	72	79.4
H/TOT	0	145	10	18	6	1	180	197.8	0	188	15	21	6	0	234	252.3
15:00	0	34	5	4	0	0	43	45	0	47	4	6	0	0	57	60
15:15	0	36	0	7	1	0	44	48.8	1	80	6	6	1	0	94	97.7
15:30	1	28	5	2	0	0	36	36.4	0	70	5	10	2	2	89	98.6
15:45	0	27	2	5	1	0	35	38.6	1	81	8	4	0	0	94	95.4
H/TOT	1	125	12	18	2	0	158	169	2	278	23	26	3	2	334	351.7
16:00	0	47	8	2	0	0	57	58	0	88	3	6	2	0	99	104.6
16:15	1	33	2	4	1	0	41	43.7	1	96	8	7	0	0	112	114.9
16:30	0	33	1	4	1	0	39	42.3	2	81	6	4	2	0	95	98.4
16:45	0	34	1	6	1	0	42	46.3	0	73	7	2	3	1	86	91.9
H/TOT	1	147	12	16	3	0	179	190.3	3	338	24	19	7	1	392	409.8
17:00	0	58	3	5	0	0	66	68.5	0	92	9	7	2	0	110	116.1
17:15	0	38	2	6	1	0	47	51.3	0	70	7	2	2	0	81	84.6
17:30	1	34	3	1	0	0	39	38.9	0	71	8	1	0	0	80	80.5
17:45	0	34	3	0	0	0	37	37	0	62	5	6	0	0	73	76
H/TOT	1	164	11	12	1	0	189	195.7	0	295	29	16	4	0	344	357.2
18:00	0	33	1	2	1	0	37	39.3	0	64	7	3	0	0	74	75.5
18:15	0	27	1	1	0	0	30	30.5	1	52	5	1	0	0	50	50.9
18:30	0	20	3	1	0	0	24	24.5	0	35	1	1	2	0	39	42.1
18:45	0	27	0	0	0	0	27	27	0	44	1	1	1	0	47	48.8
H/TOT	0	107	5	4	0	0	117	120.3	1	195	14	6	3	0	219	225.3
19:00	0	24	1	2	0	0	27	28	0	36	3	0	0	0	39	39
19:15	0	39	0	2	0	1	42	44	0	32	2	2	1	0	37	39.3
19:30	0	24	2	3	0	0	29	30.5	0	34	2	0	1	0	37	38.3
19:45	0	17	1	0	0	0	18	18	2	36	0	0	0	0	24	26
H/TOT	0	104	4	7	0	1	116	120.5	2	138	7	2	2	0	151	153.4
20:00	0	25	1	2	0	0	28	29	0	30	1	3	0	0	35	35.5
20:15	0	26	1	1	0	0	28	28.5	0	26	0	1	1	0	28	29.8
20:30	0	16	1	1	0	0	18	18.5	0	14	1	0	0	0	15	15
20:45	0	21	1	0	0	0	22	22	0	12	1	0	0	0	13	13
H/TOT	0	88	4	4	0	0	96	98	0	82	3	0	0	0	90	93.3
21:00	0	11	1	0	0	0	12	12	0	29	0	2	1	0	32	34.3
21:15	0	9	1	0	0	0	10	10	0	14	0	0	0	0	14	14
21:30	0	11	0	1	0	0	12	12.5	0	6	1	1	0	0	8	9.8
21:45	0	9	0	0	0	0	9	9	0	0	0	0	0	0	12	12
H/TOT	0	40	2	1	0	0	43	43.5	0	61	0	3	2	0	66	70.1
22:00	0	6	1	3	0	0	10	11.0	1	0	0	0	0	0	10	9.4
22:15	0	6	0	0	0	0	6	6	0	17	0	1	0	0	18	18.5
22:30	0	4	0	1	0	0	5	5.5	0	5	0	0	1	0	6	7.3
22:45	0	3	0	0	0	0	3	3	0	0	1	0	0	1	2	3
H/TOT	0	19	1	4	0	0	24	26	1	31	1	1	1	1	36	38.2
23:00	0	6	0	0	0	0	6	6	0	9	0	0	0	0	9	9
23:15	0	4	0	0	0	0	4	4	0	5	0	0	0	0	5	5
23:30	0	2	0	2	0	0	4	5	0	1	0	0	0	0	1	1
23:45	0	2	0	0	0	0	2	2	0	5	0	0	0	0	5	5
H/TOT	0	14	0	2	0	0	16	17	0	20	0	0	0	0	20	20
24 TOT	8	267	200	249	49	7	3180	3370	16	2614	213	229	51	10	3133	3314

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IDASO

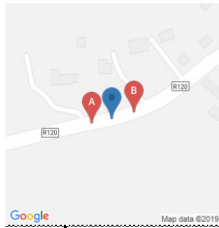
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Sat 05-Oct-2019

TIME	A -> B							TOT	PCU	B -> A							TOT	PCU	
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)				M/C	CAR	LGV	OGV1	OGV2	SV(BUS)				
00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:15	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3	5.3	0	0
00:30	0	3	0	1	0	0	4	4.5	0	6	0	0	0	0	0	6	6	0	0
00:45	0	2	0	0	0	0	2	2	0	5	0	0	0	0	0	5	5	0	0
H/TOT	0	5	0	1	0	0	6	6.5	0	11	0	2	1	0	14	16.3	0	0	
01:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	
01:15	0	2	0	0	0	0	2	2	0	2	0	0	0	0	2	2	0	0	
01:30	0	2	0	0	0	0	2	2	0	3	0	0	0	0	3	3	0	0	
01:45	0	1	0	0	0	0	1	1	0	4	0	0	1	0	5	6.3	0	0	
H/TOT	0	5	0	0	0	0	5	5	0	10	0	0	1	0	11	12.3	0	0	
02:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2	0	0	
02:15	0	2	0	0	0	0	2	2	0	2	0	0	0	0	2	2	0	0	
02:30	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	3.5	0	0	
02:45	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	3.3	0	0	
H/TOT	0	3	0	0	0	0	3	3	0	7	0	1	1	0	9	10.8	0	0	
03:00	0	1	0	0	0	0	1	1	0	4	0	0	0	0	4	4	0	0	
03:15	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	
03:30	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	
03:45	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2	0	0	
H/TOT	0	4	0	0	0	0	4	4	0	8	0	0	0	0	8	8	0	0	
04:00	0	1	1	0	0	0	2	2	0	2	0	0	0	0	2	2	0	0	
04:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	0	0	
04:30	0	1	0	0	0	0	1	1	0	2	0	1	0	0	3	3.5	0	0	
04:45	0	2	0	0	0	0	2	2	0	1	0	0	0	0	1	1	0	0	
H/TOT	0	5	1	0	0	0	6	6	0	6	0	1	0	0	7	7	0	0	
05:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2	0	0	
05:15	0	1	0	0	0	0	1	1	0	2	0	2	0	0	5	5	0	0	
05:30	0	3	0	1	1	0	5	6.8	0	2	0	1	0	0	3	3.5	0	0	
05:45	0	4	0	1	0	1	6	7.5	0	0	0	0	0	0	0	0	0	0	
H/TOT	0	9	0	2	1	1	13	16.3	0	6	0	3	0	0	9	10.5	0	0	
06:00	0	3	0	1	0	0	4	6.8	0	1	0	0	0	0	4	4	0	0	
06:15	0	5	0	0	0	0	5	5	0	3	0	0	0	0	3	3	0	0	
06:30	0	10	0	0	0	0	10	10	0	5	0	0	0	0	5	5	0	0	
06:45	0	6	1	1	0	0	8	8.5	0	2	0	0	0	0	10	10	0	0	
H/TOT	0	24	1	2	1	0	28	30.3	0	0	0	0	0	0	18	18	0	0	
07:00	0	12	1	0	1	0	14	15.3	0	15	0	0	1	0	16	17.3	0	0	
07:15	0	11	1	4	1	0	17	20.3	0	2	0	3	1	0	17	19.8	0	0	
07:30	0	5	2	2	1	0	10	12.3	0	18	0	2	0	0	20	21	0	0	
07:45	0	14	1	4	1	0	20	23.3	0	33	1	1	0	0	35	35.5	0	0	
H/TOT	0	42	5	10	4	0	61	71.2	0	79	1	6	2	0	88	93.6	0	0	
08:00	0	23	2	4	1	0	30	31	0	10	0	1	0	0	11	11.5	0	0	
08:15	0	17	1	2	0	0	20	21	0	12	0	3	0	0	15	16.5	0	0	
08:30	0	24	0	3	2	0	29	33.1	0	15	1	2	0	0	18	19	0	0	
08:45	1	16	0	1	1	0	19	20.2	0	25	2	3	0	0	30	31.5	0	0	
H/TOT	1	80	3	10	4	0	98	107.6	0	62	3	9	0	0	74	78.5	0	0	
09:00	1	20	2	2	0	0	25	25.4	0	17	3	0	0	0	20	20	0	0	
09:15	0	30	3	3	0	0	36	37.5	0	17	2	0	0	0	19	19	0	0	
09:30	0	31	1	0	0	0	32	32	0	23	2	0	0	0	25	25	0	0	
09:45	0	30	1	3	0	0	34	35.5	0	22	1	1	0	0	24	24.5	0	0	
H/TOT	1	111	7	8	0	0	127	130.4	0	79	8	1	0	0	88	89.5	0	0	
10:00	0	23	2	1	2	0	28	31.1	0	28	2	1	0	0	31	31.5	0	0	
10:15	0	28	1	2	3	0	34	38.9	0	9	2	2	0	0	13	14	0	0	
10:30	0	31	0	0	0	0	31	31	0	32	6	1	0	0	39	39.5	0	0	
10:45	1	33	2	1	0	0	37	36.9	0	34	2	3	0	0	39	40.5	0	0	
H/TOT	1	115	5	4	2	0	130	137.6	0	103	12	7	0	0	122	125.5	0	0	
11:00	0	28	2	2	0	0	32	33	1	25	3	1	1	0	31	32.2	0	0	
11:15	0	32	2	2	0	0	36	37	0	46	1	1	0	0	48	48.5	0	0	
11:30	0	41	5	1	0	0	47	47.5	0	41	1	6	0	0	48	51	0	0	
11:45	0	34	1	2	0	0	37	38	1	39	2	2	0	0	44	44.4	0	0	
H/TOT	0	135	10	7	0	0	152	155.5	2	151	7	10	1	0	171	176.1	0	0	
12:00	0	33	0	3	0	0	36	37.5	0	43	1	2	0	0	46	47	0	0	
12:15	0	38	0	2	1	0	41	43.3	0	35	1	2	1	0	39	41.3	0	0	
12:30	0	42	2	1	0	0	45	45.5	0	39	1	1	0	0	41	41.5	0	0	
12:45	0	34	3	2	1	0	40	42.3	0	35	4	0	0	0	39	39	0	0	
H/TOT	0	145	5	8	2	0	162	168.6	0	152	7	5	1	0	165	168.8	0	0	

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13:00	2	29	3	2	0	0	36	35.8	0	43	2	2	0	0	47	48
13:15	0	32	0	1	2	0	35	38.1	0	38	4	2	0	0	44	45
13:30	0	34	2	1	0	0	37	37.5	0	38	2	2	1	0	43	45.3
13:45	0	31	0	0	0	0	31	31	0	35	2	0	0	0	37	37
H/TOT	2	126	5	4	2	0	139	122.4	0	154	10	6	1	0	171	175.3
14:00	0	25	0	3	0	0	28	29.5	0	34	3	3	1	0	41	43.8
14:15	0	38	0	1	0	0	39	39.5	0	40	2	0	1	0	43	44.3
14:30	0	29	2	1	0	0	32	32.5	0	29	3	3	0	1	36	38.5
14:45	1	29	2	0	0	0	32	31.4	0	43	3	3	0	0	49	50.5
H/TOT	1	121	4	5	0	0	131	132.9	0	146	11	9	2	1	169	177.1
15:00	0	31	4	2	0	1	38	40	0	34	2	4	1	0	41	44.3
15:15	0	34	3	0	0	0	37	37	0	44	1	3	0	0	48	49.5
15:30	0	31	1	0	0	0	32	32	0	44	3	1	0	0	48	48.5
15:45	1	26	4	0	1	0	32	32.7	0	49	2	2	0	0	53	54
H/TOT	1	122	12	2	1	1	139	141.7	0	171	8	10	1	0	190	196.3
16:00	0	31	0	1	1	0	33	34.8	0	35	2	1	0	0	38	38.5
16:15	0	22	2	0	0	0	24	24	0	39	1	4	0	0	44	46
16:30	0	25	0	1	0	0	26	26.5	0	35	6	1	0	0	42	42.5
16:45	0	25	1	0	1	0	27	28.3	0	28	0	0	0	0	28	28
H/TOT	0	103	3	2	2	0	110	113.6	0	137	9	6	0	0	152	155
17:00	0	23	1	4	0	0	28	30	0	33	1	1	0	0	35	35.5
17:15	0	16	0	0	0	0	16	16	0	32	3	3	0	0	38	39.5
17:30	0	28	2	0	0	0	30	30	0	24	0	2	0	0	26	27
17:45	0	16	1	1	0	0	18	18.5	0	34	2	1	1	0	38	39.8
H/TOT	0	83	4	5	0	0	92	94.5	0	123	6	7	1	0	137	141.8
18:00	0	29	1	2	0	0	32	33	1	35	1	0	0	0	37	36.4
18:15	0	20	2	0	0	0	22	22	0	33	1	1	0	0	35	35.5
18:30	0	22	3	1	0	0	26	26.5	0	33	4	3	0	0	40	41.5
18:45	0	21	0	0	0	0	21	21	0	23	2	1	0	0	26	26.5
H/TOT	0	92	6	3	0	0	101	102.5	1	124	8	5	0	0	138	139.9
19:00	0	32	2	3	0	0	37	38.5	0	25	0	0	0	0	25	25
19:15	0	31	0	0	0	0	31	31	0	23	2	1	0	0	26	26.5
19:30	0	18	0	0	0	0	18	18	0	20	1	0	0	0	21	21
19:45	0	14	1	0	0	0	15	15	0	28	0	1	0	0	29	29.5
H/TOT	0	95	3	3	0	0	101	102.5	0	96	3	2	0	0	101	102
20:00	1	23	1	0	0	0	25	24.4	0	21	2	0	0	0	23	23
20:15	0	16	2	1	0	0	19	19.5	0	16	0	0	0	0	16	16
20:30	0	33	0	0	0	0	33	33	0	18	0	1	0	0	19	19.5
20:45	0	10	2	0	0	0	12	12	0	9	2	0	1	0	13	13
H/TOT	1	82	5	1	0	0	89	88.9	0	64	4	1	1	0	70	71.8
21:00	0	7	1	1	0	0	9	9.5	0	10	2	0	0	0	12	12
21:15	0	8	0	0	0	0	8	8	0	7	0	1	0	0	8	8.5
21:30	0	9	1	0	0	0	10	10	0	7	0	0	0	0	7	7
21:45	0	18	0	0	0	0	16	16	0	12	0	0	0	0	13	14.3
H/TOT	0	40	2	1	0	0	43	43.5	0	36	2	0	0	0	40	41.8
22:00	0	6	0	0	0	0	6	6	0	3	0	0	0	0	3	3
22:15	0	15	0	0	0	0	15	15	0	7	0	0	0	0	7	7
22:30	0	10	1	1	0	0	12	12.5	0	2	0	0	0	0	2	2
22:45	0	4	0	0	0	0	4	4	0	0	0	0	0	0	10	10
H/TOT	0	35	1	1	0	0	37	37.5	0	21	1	0	0	0	22	22
23:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
23:15	0	7	0	0	0	0	7	7	0	4	0	0	0	0	4	4
23:30	1	1	0	1	0	0	3	2.9	0	5	0	0	0	0	5	5
23:45	0	2	0	0	0	0	2	2	0	10	0	0	0	0	10	10
H/TOT	1	15	0	1	0	0	17	16.9	0	24	0	1	0	0	25	25.5
24 TOT	9	1599	82	80	22	2	1794	1859	3	1786	102	93	14	1	1999	2063

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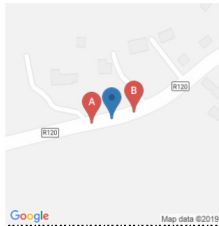
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Sun 06-Oct-2019

TIME	A -> B						TOT	PCU	B -> A						TOT	PCU
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)			M/C	CAR	LGV	OGV1	OGV2	SV(BUS)		
00:00	0	3	0	0	0	0	3	3	0	8	0	0	0	0	8	8
00:15	0	1	0	0	0	0	1	1	0	3	1	1	0	0	5	5.5
00:30	0	4	0	0	0	0	4	4	0	4	0	1	0	0	5	5.5
00:45	0	2	0	1	0	0	3	3.5	0	6	0	0	0	0	6	6
H/TOT	0	10	0	1	0	0	11	11.5	0	21	1	2	0	0	24	25
01:00	0	5	0	1	0	0	6	6.5	0	2	0	0	0	0	2	2
01:15	0	2	0	0	0	0	2	2	0	3	0	0	0	0	3	3
01:30	0	2	0	0	0	0	2	2	0	4	0	0	0	0	4	4
01:45	0	1	1	0	0	0	2	2	0	4	1	1	0	0	6	6.5
H/TOT	0	10	1	1	0	0	12	12.5	0	13	1	1	0	0	15	15.5
02:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2
02:15	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	6
02:30	0	1	0	0	0	0	1	1	0	4	0	1	0	0	5	5.5
02:45	0	0	0	0	0	0	0	0	0	2	0	3	0	0	5	6.5
H/TOT	0	2	0	0	0	0	2	2	0	14	0	4	0	0	18	20
03:00	0	3	0	0	0	0	3	3	0	3	0	0	0	0	3	3
03:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
03:30	0	2	0	0	0	0	2	2	0	1	0	0	0	0	1	1
03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	6	0	0	0	0	6	6	0	5	0	0	0	0	5	5
04:00	0	1	0	0	0	0	1	1	0	2	0	0	0	0	2	2
04:15	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0
04:30	0	2	0	0	0	0	2	2	0	1	0	1	0	0	2	2.5
04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	5	0	0	0	0	5	5	0	3	0	1	0	0	4	4
05:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
05:15	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
05:30	0	1	0	0	1	0	2	3.3	0	2	0	0	0	0	2	2
05:45	0	2	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0
H/TOT	0	4	0	1	1	0	6	7.8	0	4	0	0	0	0	4	4
06:00	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0
06:30	0	8	0	0	0	0	8	8	0	2	0	0	0	0	2	2
06:45	0	3	0	0	0	0	3	3	0	5	0	1	0	0	6	6.5
H/TOT	0	16	0	1	1	0	18	19.8	0	7	0	1	0	0	10	10.5
07:00	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	2.5
07:15	0	2	0	0	1	0	3	4.3	0	0	0	0	0	0	18	18
07:30	0	8	0	0	0	0	8	8	0	18	0	0	0	0	18	18
07:45	0	5	0	1	0	0	6	6.5	0	32	1	0	0	0	33	33
H/TOT	0	15	0	1	1	0	17	18.8	0	69	1	1	0	0	71	71.5
08:00	0	8	0	3	0	0	11	11	0	7	0	0	0	0	7	7
08:15	0	8	0	0	0	0	8	8	0	4	1	1	0	0	6	6.5
08:30	0	12	1	1	0	0	14	14.5	0	9	0	0	0	0	9	9
08:45	1	9	1	0	0	0	11	10.4	0	8	0	0	0	0	8	8
H/TOT	1	45	2	4	0	0	52	53.4	0	28	1	1	0	0	30	30.5
09:00	0	8	0	2	0	0	10	11	0	9	0	1	0	0	10	10.5
09:15	0	15	0	0	0	0	15	15	0	14	2	1	0	0	17	17.5
09:30	0	23	0	1	0	0	24	24.5	0	14	0	1	0	0	15	15.5
09:45	0	18	0	1	0	0	19	19.5	0	11	0	0	0	0	11	11
H/TOT	0	64	0	4	0	0	68	70	0	46	2	3	0	0	53	54.5
10:00	0	14	0	0	0	0	14	14	0	18	0	2	1	0	21	23.3
10:15	0	14	0	1	0	0	15	15.5	0	18	2	1	0	0	21	21.5
10:30	0	13	0	0	1	0	14	15.3	0	16	0	2	0	0	18	19
10:45	0	22	1	1	0	0	24	24.5	0	17	1	0	0	0	18	18
H/TOT	0	63	1	2	0	0	67	69.3	0	69	3	5	1	0	78	81.8
11:00	0	21	1	2	0	0	24	25	1	23	0	0	0	0	24	23.4
11:15	0	19	2	1	1	0	23	24.8	1	23	0	0	0	0	24	23.4
11:30	1	33	0	1	0	0	35	34.9	0	19	0	0	0	0	19	19
11:45	2	25	1	0	0	0	28	26.8	0	26	1	1	0	0	28	28.5
H/TOT	3	98	4	4	1	0	110	111.5	2	91	1	1	0	0	95	94.3
12:00	1	17	0	0	0	0	18	17.4	2	29	0	1	0	0	32	31.3
12:15	0	31	2	2	0	0	35	36	0	26	0	0	0	0	26	26
12:30	2	29	1	0	0	0	32	30.8	0	23	1	0	0	0	24	24
12:45	0	28	1	0	0	0	29	29	2	31	1	0	0	0	34	32.8
H/TOT	3	105	4	2	0	0	114	113.2	4	109	2	1	0	0	116	114.1

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13:00	1	31	2	0	0	0	0	34	33.4	0	34	0	1	0	0	0	35	35.5
13:15	0	38	2	1	0	0	0	41	41.5	0	33	1	1	1	0	0	36	37.8
13:30	0	29	2	1	0	0	0	32	32.5	1	30	1	1	1	0	0	34	35.2
13:45	1	25	0	1	1	0	0	28	29.2	0	43	0	2	0	0	0	45	46
H/TOT	2	122	6	3	1	0	0	135	136.6	1	140	2	5	2	0	0	150	154.5
14:00	2	38	0	1	0	0	0	41	40.3	1	34	2	1	0	0	0	38	37.9
14:15	0	26	1	0	0	0	0	27	27	2	32	2	0	0	0	0	36	34.8
14:30	0	30	0	0	0	0	0	30	30	0	37	1	1	0	0	0	39	39.5
14:45	0	28	0	1	0	0	0	29	29.5	0	27	0	0	0	0	0	27	27
H/TOT	2	122	1	2	0	0	0	127	126.8	3	130	5	2	0	0	0	140	139.2
15:00	1	27	1	0	0	0	0	29	28.4	1	24	2	2	0	0	0	29	29.4
15:15	0	27	0	1	0	0	0	28	28.5	0	39	2	0	0	0	0	41	41
15:30	0	42	1	0	0	0	0	43	43	0	23	1	0	0	0	0	24	24
15:45	0	26	0	0	0	0	0	26	26	0	28	2	1	0	0	0	31	31.5
H/TOT	1	122	2	1	0	0	0	126	125.9	1	114	7	3	0	0	0	125	125.9
16:00	0	35	0	0	0	0	0	35	35	0	36	0	1	0	0	0	37	37.5
16:15	1	24	0	1	0	0	0	26	25.9	0	47	3	2	0	0	0	52	53
16:30	1	31	2	0	0	0	0	34	33.4	0	29	1	2	0	0	0	32	33
16:45	0	19	1	1	0	0	0	21	21.5	0	36	1	1	0	0	0	38	38.5
H/TOT	2	109	3	2	0	0	0	116	115.6	0	148	5	6	0	0	0	159	162
17:00	1	26	0	0	2	0	0	29	31	1	33	0	0	0	0	0	34	33.4
17:15	0	27	1	0	1	0	0	29	30.3	0	33	3	2	1	0	0	39	41.3
17:30	0	31	0	1	0	0	0	32	32.5	1	33	0	0	0	0	0	34	33.4
17:45	0	28	0	0	0	0	0	28	28	0	30	0	1	0	0	0	31	31.5
H/TOT	1	112	1	1	0	0	0	118	121.8	2	129	3	3	1	0	0	138	139.6
18:00	0	27	1	1	0	0	0	29	29.5	1	30	0	1	1	0	0	33	34.2
18:15	1	19	2	2	0	0	0	24	24.4	0	34	2	2	0	0	0	38	39
18:30	0	27	0	1	1	0	0	29	30.8	0	27	0	0	1	0	0	28	29.3
18:45	0	28	0	1	2	0	0	31	31.1	0	33	3	3	0	0	0	39	40.5
H/TOT	1	101	3	5	3	0	0	113	118.6	1	124	5	6	2	0	0	138	143
19:00	0	18	2	0	0	0	0	20	20	0	33	0	0	0	0	0	33	33
19:15	0	17	1	1	0	0	0	14	14.5	0	29	1	0	0	0	0	30	30
19:30	0	18	0	0	0	0	0	18	18	0	26	1	0	0	0	0	27	27
19:45	0	19	0	2	0	0	0	21	22	0	30	2	3	0	0	0	35	36.5
H/TOT	0	67	3	3	0	0	0	73	74.5	0	118	4	3	0	0	0	125	126.5
20:00	0	22	0	0	0	0	0	22	22	0	32	1	0	0	0	0	33	33
20:15	0	30	0	0	0	0	0	30	30	0	19	1	0	0	0	0	20	20
20:30	0	26	0	0	0	0	0	26	26	0	20	1	0	0	0	0	21	21
20:45	0	16	1	0	0	0	0	17	17	0	11	0	0	0	0	0	17	17
H/TOT	0	94	1	0	0	0	0	95	95	0	82	3	0	0	0	0	85	85
21:00	0	8	0	2	0	0	0	10	11	0	7	0	1	0	0	0	8.5	8.5
21:15	0	11	0	0	0	0	0	11	11	0	10	0	0	0	0	0	10	10
21:30	0	7	1	0	0	0	0	8	8	0	11	0	0	0	0	0	11	11
21:45	0	8	1	0	0	0	0	9	9	0	6	0	0	0	0	0	6	6
H/TOT	0	34	2	2	0	0	0	38	39	0	34	0	0	0	0	0	35	35.5
22:00	0	9	0	0	0	0	0	9	9	0	2	2	0	0	0	0	4	4
22:15	1	2	0	0	0	0	0	3	2.4	0	7	0	0	0	0	0	8	8.5
22:30	0	5	0	2	0	0	0	7	8	0	8	0	0	0	0	0	8	8
22:45	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	6	6
H/TOT	1	18	0	2	0	0	0	21	21.4	0	22	3	1	0	0	0	26	26.5
23:00	0	7	0	0	0	0	0	7	7	0	0	0	0	0	0	0	6	6
23:15	0	3	0	0	0	0	0	3	3	0	4	0	0	0	0	0	4	4
23:30	0	2	0	0	0	0	0	2	2	0	3	0	0	0	0	0	3	3
23:45	0	2	0	0	0	0	0	2	2	0	1	0	0	0	0	0	1	1
H/TOT	0	14	0	0	0	0	0	14	14	0	14	0	0	0	0	0	14	14
24 TOT	17	1359	34	42	12	0	0	1464	1490	14	1537	50	51	6	0	0	1658	1683

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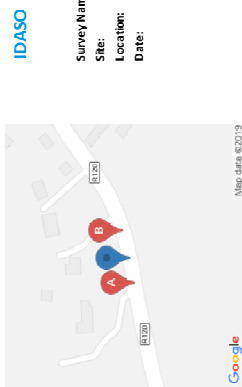
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutterland
 Date: Mon 07-Oct-2019

TIME	A -> B							TOT	PCU	B -> A							TOT	PCU
	M/C	CAR	LGV	OGV1	OGV2	SV(BUS)				M/C	CAR	LGV	OGV1	OGV2	SV(BUS)			
00:00	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	3.5	
00:15	0	0	0	1	0	0	1	1.5	0	4	0	0	0	0	4	4	4	
00:30	0	3	0	0	0	0	3	3	0	2	0	2	0	0	4	5		
00:45	0	3	0	0	0	0	3	3	0	3	0	0	0	0	3	3		
H/TOT	0	6	0	1	0	0	7	7.5	0	11	0	3	0	0	14	15.5		
01:00	0	4	0	0	0	0	4	4	0	1	0	0	1	0	2	3.3		
01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
01:30	0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	3.5		
01:45	0	0	0	1	0	0	1	1.5	0	1	0	0	0	0	1	1		
H/TOT	0	4	0	1	0	0	5	5.5	0	4	0	1	1	0	6	7.8		
02:00	0	2	1	0	0	0	3	3	0	2	0	0	0	0	2	2		
02:15	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2		
02:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1		
02:45	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3		
H/TOT	0	2	1	0	0	0	3	3	0	7	1	0	0	0	8	8		
03:00	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0		
03:15	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1		
03:30	0	2	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0		
03:45	0	2	0	1	0	0	3	3.5	0	0	0	0	0	0	0	0		
H/TOT	0	5	0	2	0	0	7	8	0	1	0	0	0	0	1	1		
04:00	0	2	0	0	0	0	2	2	0	1	0	0	0	0	1	1		
04:15	0	1	0	0	0	0	1	1	0	0	0	2	0	0	2	3		
04:30	0	2	1	0	0	0	3	3	0	2	0	0	0	0	2	2		
04:45	0	2	0	1	0	0	3	3.5	0	1	0	0	0	0	1	1		
H/TOT	0	7	1	1	0	0	9	9.5	0	4	0	2	0	0	6	6		
05:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1.5		
05:15	0	0	0	0	0	1	1	2	0	1	0	2	0	0	4	4		
05:30	0	5	0	1	0	0	6	6.5	0	4	0	1	0	0	5	5.5		
05:45	0	18	0	1	1	1	21	23.8	0	6	0	3	0	0	9	10.5		
H/TOT	0	23	0	2	1	2	28	32.3	0	11	0	0	0	0	18	21.5		
06:00	0	15	0	3	0	0	18	19.5	0	8	0	3	0	0	9	9.5		
06:15	1	17	0	1	6	1	26	34.7	0	8	1	0	0	0	10	10.5		
06:30	2	36	2	4	4	1	49	56	0	14	0	0	0	0	16	16.5		
06:45	0	51	4	6	1	0	62	66.3	0	24	3	1	0	0	28	28.5		
H/TOT	3	119	6	14	11	2	155	176.5	0	40	4	4	0	0	63	65		
07:00	3	88	6	6	0	0	103	104.2	1	16	0	4	0	0	22	23.4		
07:15	0	156	14	5	1	0	176	179.8	0	32	1	1	1	1	38	40.8		
07:30	0	147	11	8	0	3	169	176	2	50	4	4	0	0	60	60.8		
07:45	0	166	11	8	1	1	187	193.3	0	52	4	2	1	0	60	61.7		
H/TOT	3	557	42	27	2	4	635	653.2	4	152	10	11	2	1	180	186.7		
08:00	2	193	10	5	0	0	210	213	1	32	4	3	1	0	41	43.2		
08:15	1	153	4	9	2	0	169	175.5	3	39	3	1	1	0	47	47		
08:30	0	153	7	5	1	0	166	169.8	0	39	3	6	0	0	48	51		
08:45	0	131	10	7	2	0	150	156.1	0	44	3	4	1	0	52	55.3		
H/TOT	3	630	31	26	0	0	695	712.7	4	154	13	14	3	0	188	196.5		
09:00	0	74	8	10	1	0	93	99.3	0	40	2	3	0	1	46	48.5		
09:15	0	76	6	9	1	0	92	97.8	0	26	3	5	1	0	35	38.8		
09:30	0	43	1	2	0	0	46	47	0	26	8	4	2	0	40	44.6		
09:45	0	30	6	3	3	0	42	47.4	0	30	3	1	0	0	34	34.5		
H/TOT	0	223	21	24	0	0	273	291.2	0	122	16	13	3	1	155	166.4		
10:00	0	15	6	7	2	0	30	35.1	1	24	3	6	4	0	38	45.6		
10:15	0	19	0	6	3	0	28	34.9	0	26	2	5	1	0	34	37.8		
10:30	0	28	1	6	2	0	37	42.6	0	23	2	4	0	0	29	31		
10:45	0	21	1	4	2	0	28	32.6	0	22	5	5	0	0	32	34.5		
H/TOT	0	83	8	23	0	0	113	146.2	1	95	12	20	5	0	113	148.9		
11:00	0	24	3	6	1	0	34	38.3	0	34	2	6	0	0	42	45		
11:15	0	24	2	4	0	0	30	32	0	24	1	5	1	1	32	36.8		
11:30	0	28	1	6	2	0	37	42.6	0	28	3	4	1	0	36	39.3		
11:45	0	31	2	5	1	0	39	42.8	0	25	0	6	0	0	31	34		
H/TOT	0	107	8	21	0	0	140	155.1	0	111	6	21	2	0	141	155.1		
12:00	0	21	5	2	1	0	29	31.3	0	35	3	4	0	0	42	44		
12:15	0	21	0	3	1	0	25	27.8	0	37	3	5	1	0	46	49.8		
12:30	0	27	2	2	1	1	33	36.3	0	36	4	3	1	0	44	46.8		
12:45	0	28	1	4	0	0	33	35	0	36	2	1	0	1	40	41.5		
H/TOT	0	97	8	11	0	1	117	130.2	0	144	12	13	2	1	172	182.1		
13:00	0	31	0	4	1	0	36	39.3	0	30	5	7	0	0	42	45.5		
13:15	0	31	0	4	2	0	37	41.6	0	30	5	4	1	0	40	43.3		

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13:30	0	33	3	4	1	0	0	41	44.3	0	30	4	4	3	0	0	41	46.9
13:45	0	39	3	6	0	0	0	48	51	0	41	4	3	1	0	0	49	51.8
H/TOT	0	134	6	18	4	0	0	162	176.2	0	131	18	18	5	0	0	172	187.5
14:00	0	36	3	3	0	0	0	42	43.5	0	42	6	5	2	1	0	56	62.1
14:15	0	30	2	3	0	2	0	37	40.5	0	33	2	1	0	0	0	36	36.5
14:30	0	29	1	3	0	1	0	34	36.5	0	36	9	8	0	0	0	53	57
14:45	0	26	6	1	2	0	0	35	38.1	0	35	6	3	1	1	0	46	49.8
H/TOT	0	121	12	10	2	3	0	148	158.6	0	146	23	17	3	2	0	191	205.4
15:00	0	35	2	6	0	0	0	43	46	0	42	3	4	1	0	0	50	53.3
15:15	0	26	1	2	1	0	0	30	32.3	0	44	5	12	2	1	0	64	73.6
15:30	1	38	2	3	0	1	0	45	46.9	0	46	6	7	1	0	0	60	64.8
15:45	0	41	0	3	0	0	0	44	45.5	1	47	5	4	0	2	0	59	62.4
H/TOT	1	140	5	14	1	1	0	162	170.7	1	179	19	27	4	3	0	233	254.1
16:00	1	37	3	1	2	0	0	44	46.5	0	57	4	9	3	0	0	73	81.4
16:15	0	44	5	5	2	0	0	56	61.1	1	79	4	6	1	0	0	91	94.7
16:30	0	40	3	4	2	0	0	49	53.6	1	92	6	7	1	0	0	107	111.2
16:45	0	42	5	5	0	0	0	52	54.5	2	99	6	4	1	0	0	112	114.1
H/TOT	1	163	16	15	5	0	0	201	215.7	4	327	20	26	6	0	0	383	401.4
17:00	3	57	4	2	2	0	0	68	69.8	0	94	9	6	2	0	0	111	116.6
17:15	0	51	4	2	2	0	0	59	62.6	0	93	13	2	0	0	0	108	109
17:30	0	35	3	2	0	0	0	40	41	0	102	6	7	0	2	0	117	122.5
17:45	0	25	3	3	1	0	0	32	34.8	1	63	4	6	1	0	0	75	78.7
H/TOT	1	165	14	9	0	0	0	199	208.2	1	352	32	21	3	0	0	411	426.8
18:00	0	23	0	1	0	0	0	24	24.5	1	73	6	2	4	0	0	86	91.6
18:15	0	37	1	3	0	1	0	42	44.5	0	84	6	3	2	0	0	95	99.1
18:30	0	37	0	0	1	0	0	38	39.3	0	53	7	2	1	0	0	63	65.3
18:45	0	26	0	1	0	0	0	27	27.5	1	49	2	2	0	0	0	54	54.4
H/TOT	0	123	0	5	0	0	0	131	135.6	2	259	21	9	7	0	0	288	310.4
19:00	0	33	2	0	0	0	0	35	35	0	39	5	3	0	0	0	47	48.5
19:15	0	24	3	1	0	0	0	28	28.5	2	43	2	2	1	0	0	50	51.1
19:30	0	15	1	0	1	1	0	18	20.3	0	30	0	1	1	0	0	32	33.8
19:45	0	22	3	0	1	0	0	26	27.3	0	25	1	1	0	0	0	27	27.5
H/TOT	0	94	0	1	0	0	0	107	111.1	2	137	8	7	2	0	0	156	160.9
20:00	0	22	0	0	0	0	0	22	22	0	24	2	0	0	0	0	26	26
20:15	1	29	1	3	0	0	0	34	34.9	0	29	0	2	0	0	0	31	32
20:30	0	28	0	0	0	0	0	28	28	0	23	0	0	1	0	0	24	25.3
20:45	0	13	1	2	0	0	0	16	17	0	19	1	0	0	0	0	20	20
H/TOT	1	92	2	5	0	0	0	100	101.9	1	95	3	2	1	0	0	101	103.3
21:00	0	9	1	0	0	0	0	10	10	0	18	0	1	2	0	0	15	15.5
21:15	0	10	0	1	0	0	0	11	11.5	0	13	1	1	0	0	0	15	15.3
21:30	0	7	0	1	1	0	0	9	10.8	0	13	0	0	1	0	0	11	11.5
21:45	0	4	0	0	0	0	0	4	4	0	8	0	0	0	0	0	8	8
H/TOT	0	30	1	2	1	0	0	34	36.3	0	52	1	2	0	0	0	58	62.9
22:00	0	5	0	0	0	0	0	5	5	1	6	0	0	0	0	0	8	7.9
22:15	0	4	1	0	0	0	0	5	5	0	7	0	0	0	0	0	7	7
22:30	0	4	0	1	0	0	0	5	5.5	0	12	0	2	0	0	0	14	15
22:45	0	1	0	0	0	0	0	1	1	0	13	0	0	0	0	0	13	13
H/TOT	0	14	1	1	0	0	0	16	16.5	1	38	0	2	0	0	0	42	42.9
23:00	0	4	0	0	0	0	0	4	4	0	0	0	0	0	0	0	4	4
23:15	0	5	0	0	0	0	0	5	5	0	2	0	1	0	0	0	3	3.5
23:30	0	2	0	1	0	0	0	3	3.5	0	0	0	0	0	0	0	2	2
23:45	0	2	0	0	0	0	0	2	2	0	2	0	0	0	0	0	2	2
H/TOT	0	13	0	1	0	0	0	14	14.5	0	10	0	1	0	0	0	11	11.5
24 TOT	15	2955	193	234	62	15	3474	3678	3678	20	2596	220	242	52	11	3141	3329	

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IDASO

Survey Name: 221.149228 EIAR Grange Castle ATC & MCC Data
 Site: ATC 1
 Location: R120, Clutberland
 Date: Tue 01 Oct 2019 — Mon 07 Oct 2019

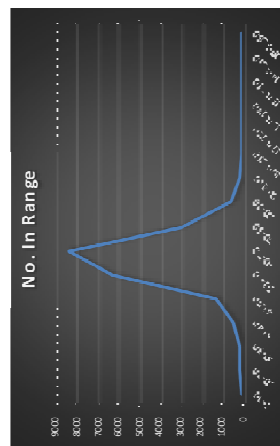
Speed Survey

Cumulative 85% Speed 72 KPH
 Cumulative Minimum Speed 5 KPH
 Cumulative Maximum Speed 157 KPH
 Cumulative Average Speed 62.84 KPH

Northbound (A => B)

No. of Vehicles 19539
 85% Speed 71 KPH
 Minimum Speed 8 KPH
 Maximum Speed 157 KPH
 Average Speed 61.63 KPH

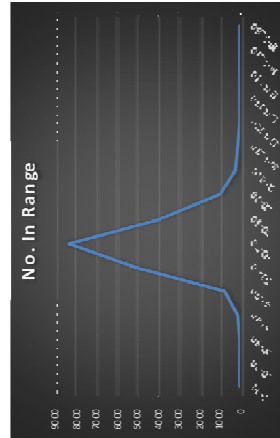
Speed (KPH)	No. In Range
0-10	1
10-20	39
20-30	112
30-40	357
40-50	1206
50-60	6251
60-70	8350
70-80	2927
80-90	538
90-100	106
100-110	29
110-120	7
120-130	2
130-140	6
140-150	5
150-160	3



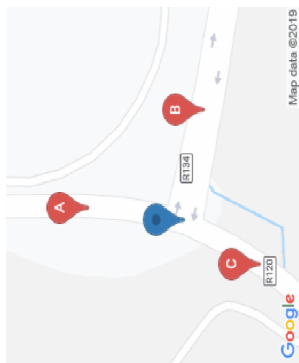
Southbound (B => A)

No. of Vehicles 19537
 85% Speed 73 KPH
 Minimum Speed 5 KPH
 Maximum Speed 155 KPH
 Average Speed 64.28 KPH

Speed (KPH)	No. In Range
0-10	2
10-20	4
20-30	30
30-40	130
40-50	726
50-60	3060
60-70	4233
70-80	4007
80-90	911
90-100	154
100-110	44
110-120	4
120-130	4
130-140	4
140-150	1
150-160	3



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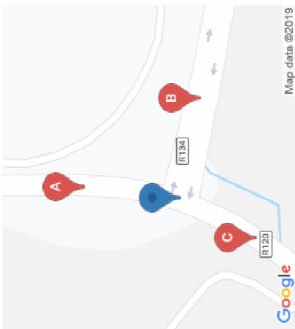


IDASO

Survey Name: 221.19328 EIAR Grange Castle ATC & MCC Data
 Site 1
 Location: R120/R134 New Mangor Road/R120
 Date: Tue 01-Oct-2019

TIME	A => A										A => B										
	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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IDASO

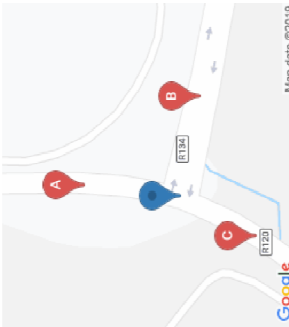
Survey Name: 221 19328 EIAR Grangecastle ATC & MCC Data
 Site: Site 1
 Location: R120/R134 New Nangor Road/R120
 Date: Tue 01-Oct-2019

A => C											B => A										
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU		
0	0	7	0	2	1	0	0	10	10.5	1	0	15	0	4	4	5	0	29	36.7		
1	0	19	0	4	0	0	0	24	23.2	0	0	8	0	3	3	4	0	18	24.7		
0	0	21	0	4	0	0	0	25	25	0	0	8	0	4	1	5	0	18	25		
0	0	29	0	14	1	0	0	44	44.5	1	0	18	0	3	1	2	0	25	27.3		
1	0	76	0	24	2	0	0	103	98.2	2	0	49	0	14	9	16	0	90	113.7		
1	0	21	0	3	2	1	0	28	29.5	0	0	16	0	4	1	2	0	23	26.1		
0	0	19	0	6	0	0	0	25	25	0	0	11	0	8	1	6	0	26	34.3		
1	0	27	1	4	0	0	0	33	32.2	0	0	8	0	6	1	1	0	16	17.8		
0	0	27	1	4	0	3	0	35	38.9	0	0	13	1	5	0	3	0	22	25.9		
2	0	94	2	17	2	4	0	121	125.6	0	0	48	1	23	3	12	0	87	104.1		
0	0	12	0	1	0	1	0	14	15.3	0	0	12	1	3	1	1	0	18	19.8		
0	0	22	0	5	1	2	0	30	33.1	0	0	17	1	5	3	3	0	29	34.4		
0	0	16	0	5	0	0	0	21	21	0	0	25	1	5	1	5	0	37	44		
0	0	27	0	4	1	2	0	34	37.1	0	0	22	0	5	5	5	0	27	36		
0	0	77	0	15	2	5	0	99	106.5	0	0	66	3	18	10	14	0	111	134.2		
0	0	15	2	2	3	0	0	22	23.5	0	0	11	0	7	2	3	0	23	27.9		
0	0	17	0	3	1	0	0	21	21.5	0	0	16	1	7	2	2	0	28	31.6		
0	0	15	1	3	3	2	0	24	28.1	0	0	15	0	6	1	2	0	24	27.1		
0	0	12	0	3	1	0	0	16	16.5	1	0	16	0	4	1	0	0	22	21.7		
0	0	59	3	11	8	2	0	83	89.6	1	0	58	1	24	6	7	0	97	108.3		
0	0	7	0	2	2	2	0	13	16.6	0	0	11	1	4	2	2	0	20	23.6		
0	0	12	0	8	0	0	0	20	20	0	0	12	0	3	6	1	0	22	26.3		
0	0	17	0	4	1	0	0	22	22.5	0	0	22	3	7	3	2	0	37	41.1		
0	0	8	0	5	0	1	0	14	15.3	0	0	18	0	7	3	3	0	31	36.4		
0	0	44	0	19	3	3	0	69	74.4	0	0	63	4	21	14	8	0	110	127.4		

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0	0	17	0	2	1	0	0	20	20.5	0	0	13	0	6	0	2	0	21	23.6
0	0	11	0	5	1	0	0	17	17.5	0	0	24	2	8	1	3	0	38	42.4
0	0	13	1	7	2	0	0	23	24	0	1	32	0	3	3	2	0	41	44.5
0	0	16	0	6	1	4	0	27	32.7	0	0	12	3	5	2	1	0	23	25.3
0	0	57	1	20	5	4	0	87	94.7	0	1	81	5	22	6	8	0	123	135.8
0	0	14	0	3	0	1	0	18	19.3	0	1	34	0	2	4	1	0	42	44.7
0	0	9	0	1	2	2	0	14	17.6	0	0	22	0	7	0	1	0	30	31.3
0	0	15	0	8	2	0	0	25	26	0	0	18	1	9	1	1	0	30	31.8
0	0	15	0	9	2	1	0	27	29.3	0	0	14	0	6	2	3	0	25	29.9
0	0	53	0	21	6	4	0	84	92.2	0	1	88	1	24	7	6	0	127	137.7
0	0	8	0	4	0	1	0	13	14.3	0	0	25	0	9	3	4	0	41	47.7
0	0	17	1	4	1	0	0	23	23.5	0	0	24	1	9	3	4	0	41	47.7
0	0	18	1	5	1	2	0	27	30.1	0	0	22	0	7	2	5	0	36	43.5
0	0	21	0	4	0	0	0	25	25	1	0	18	0	4	0	3	0	25	29.1
0	0	64	2	17	2	3	0	88	92.9	1	0	89	1	29	8	16	0	144	168
0	0	15	2	2	2	3	0	28	28.9	0	0	31	1	8	3	2	0	45	49.1
0	0	19	0	4	4	3	0	30	35.9	0	0	28	1	5	1	1	0	36	37.8
0	0	27	0	3	1	0	0	31	31.5	0	0	29	1	6	1	5	0	42	49
0	0	19	1	6	1	1	0	28	29.8	1	1	37	0	10	2	3	0	54	57.5
0	0	80	3	15	8	7	0	113	121.1	1	1	125	3	29	7	11	0	177	193.4
0	0	12	0	8	1	1	0	22	23.8	0	0	47	0	10	2	3	0	62	66.9
0	0	19	0	6	0	2	0	27	29.6	1	62	0	9	4	7	0	84	93.7	
0	0	26	0	4	1	1	0	32	33.8	1	75	0	13	1	0	0	91	90.1	
0	0	25	1	5	1	2	0	34	37.1	2	63	0	16	2	1	0	85	85.1	
0	0	82	1	23	3	6	0	115	124.3	4	247	0	48	9	11	0	222	315.8	
0	1	17	1	5	3	2	0	29	32.5	1	0	94	0	10	1	3	0	109	112.6
0	1	29	0	5	0	1	0	36	36.7	1	0	87	0	12	0	2	0	112	113.8
0	0	20	1	10	0	1	0	32	33.3	0	0	86	1	12	0	1	0	99	100.3
1	0	25	1	5	1	0	1	34	34.7	1	0	58	1	10	1	0	0	71	70.7
1	2	91	3	25	4	4	1	131	137.2	3	0	334	2	44	2	6	0	391	397.4
0	0	16	1	2	1	0	0	20	20.5	1	1	64	1	8	0	2	0	77	78.2
0	0	20	0	3	0	0	0	23	23	1	0	48	1	8	0	0	0	58	57.2
0	0	18	1	6	0	1	0	26	27.3	0	0	30	0	2	0	0	0	32	32
0	0	23	0	1	0	1	0	25	26.3	1	0	42	0	5	0	0	0	48	47.2
0	0	77	2	12	1	2	0	94	97.1	3	1	184	2	23	0	2	0	215	214.6
4	2	854	17	319	46	44	1	1187	1263.9	15	7	1432	23	319	81	117	0	1994	2170.4

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B => B

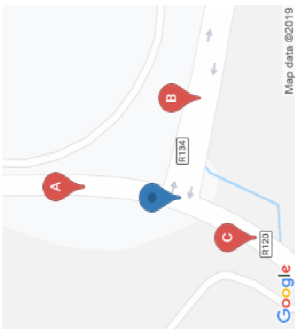
IDASO

Survey Name: 221-19328 EIAR Grangecastle ATC & MCC Data
Site: Site 1
Location: R120/R134 New Nangor Road/R120
Date: Tue 01-Oct-2019

B => C

	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	0	0	0	0	0	0	0	0	0	0	1	1	13	0	2	1	0	0	1	19	19.1
	0	0	0	0	0	0	0	0	0	0	1	0	22	0	5	0	0	0	28	27.2	
	0	0	0	0	0	0	0	0	0	0	0	1	24	1	5	0	1	0	32	32.7	
	0	0	0	0	0	0	0	0	0	0	2	2	68	1	12	1	1	1	88	88	
	0	0	0	0	0	0	0	0	0	0	0	1	14	1	4	3	0	0	23	23.9	
	0	0	0	0	0	0	0	0	0	0	1	0	17	0	2	0	1	0	21	21.5	
	0	0	0	0	0	0	0	0	0	0	0	0	18	1	4	2	0	0	27	26.4	
	0	0	0	0	0	0	0	0	0	0	0	0	20	0	1	1	0	1	23	24.5	
	0	0	0	0	0	0	0	0	0	0	3	69	2	11	6	1	1	1	94	96.3	
	0	0	0	0	0	0	0	0	0	0	0	0	19	2	4	2	1	0	28	30.3	
	0	0	0	0	0	0	0	0	0	0	0	0	22	1	2	1	0	0	26	26.5	
	0	0	0	0	0	0	0	0	0	0	0	0	17	1	3	2	1	1	25	28.3	
	0	0	0	0	0	0	0	0	0	0	0	0	11	0	4	2	1	0	18	20.3	
	0	0	0	0	0	0	0	0	0	0	0	0	69	4	13	7	3	1	97	105.4	
	0	0	0	0	0	0	0	0	0	0	0	0	12	0	1	3	0	0	16	17.5	
	0	0	0	0	0	0	0	0	0	0	0	0	17	0	5	1	1	0	24	25.8	
	0	0	0	0	0	0	0	0	0	0	0	0	10	0	4	1	1	1	17	19.8	
	0	0	0	0	0	0	0	0	0	0	0	0	15	0	4	2	1	0	22	24.3	
	0	0	0	0	0	0	0	0	0	0	0	0	54	0	14	7	3	1	79	87.4	
	0	0	0	0	0	0	0	0	0	0	0	0	9	0	5	3	1	0	18	20.8	
	0	0	0	0	0	0	0	0	0	0	0	0	17	0	1	1	0	1	20	21.5	
	0	0	0	0	0	0	0	0	0	0	0	0	13	0	1	3	0	0	17	18.5	
	0	0	0	0	0	0	0	0	0	0	0	0	17	1	3	2	0	1	24	26	
	0	0	0	0	0	0	0	0	0	0	0	0	56	1	10	9	1	2	79	86.8	

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IDASO

Survey Name: 221-19328 EIAR Grangecastle ATC & MCC Data
 Site: Site 1
 Location: R120/R134 New Mangor Road/R120
 Date: Tue 01-Oct-2019

C => A													C => B												
P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	TAXI	LGV	OGV1	OGV2	PSV	TOT	PCU						
0	0	8	0	7	5	0	0	20	22.5	0	0	53	0	5	1	2	1	62	66.1						
0	0	22	0	6	2	1	1	31	33.3	0	0	118	0	14	2	0	0	134	135						
0	0	35	0	6	3	1	1	46	49.8	1	0	138	0	17	5	0	1	162	164.7						
0	0	37	0	9	1	0	0	47	47.5	0	0	148	1	16	0	0	0	165	165						
0	0	102	0	28	11	2	1	144	151.1	1	0	457	1	52	8	2	2	523	530.8						
0	0	54	0	5	0	0	0	59	59.4	0	0	169	0	25	2	0	1	197	199						
0	0	29	0	6	0	0	0	35	35	0	0	134	2	15	3	1	0	155	157.8						
1	1	15	0	5	3	1	0	26	27.4	1	126	2	8	2	0	0	0	139	139.4						
0	1	10	0	5	3	0	0	19	19.9	0	107	0	7	2	0	0	0	116	117						
1	2	108	0	21	6	1	0	139	141.3	0	536	4	55	9	1	1	1	607	613.2						
1	0	17	1	3	1	1	0	24	25	0	71	1	5	1	3	0	0	81	85.4						
1	0	25	0	4	1	0	0	31	30.7	1	80	0	9	2	0	1	1	93	94.2						
0	0	13	0	8	0	2	0	23	25.6	0	40	0	7	0	0	0	0	47	47						
0	0	14	1	5	3	1	0	24	26.8	0	127	3	5	0	0	0	0	55	55						
2	0	69	2	20	5	4	0	102	108.1	1	238	4	26	3	3	1	1	276	281.6						
0	0	19	0	3	0	0	0	22	22	0	23	3	4	0	2	2	2	34	36.6						
0	0	17	0	3	3	1	0	24	26.8	0	20	0	6	1	1	0	0	28	29.8						
0	0	15	0	4	0	0	0	19	19	0	23	0	2	1	1	0	0	27	28.8						
0	0	17	0	4	1	0	0	22	22.5	0	22	0	2	1	0	0	0	26	26.5						
0	0	68	0	14	4	1	0	87	90.3	0	88	3	15	3	4	2	115	123.7							
0	0	10	0	2	3	0	0	15	16.5	0	15	0	6	1	1	1	24	26.8							
0	0	11	0	1	1	1	0	14	15.8	0	11	1	6	2	2	0	22	25.6							
0	0	11	0	5	0	2	0	18	20.6	9	18	0	2	1	3	0	33	30.2							
0	0	11	0	2	2	0	0	15	16	0	19	0	1	1	1	0	23	24.2							
0	0	43	0	10	6	3	0	62	68.9	9	63	1	15	5	7	1	102	106.8							

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0	0	11	1	3	0	1	0	16	17.3	0	0	9	1	2	1	0	1	14	15.5
1	0	16	0	8	1	0	0	26	25.7	0	0	11	0	2	1	0	0	14	14.5
0	0	17	0	4	3	0	0	24	25.5	0	0	17	0	2	0	2	0	21	23.6
0	0	9	0	2	0	2	0	13	15.6	0	0	18	0	5	0	0	0	23	23
1	0	53	1	17	4	3	0	79	84.1	0	0	55	1	11	2	2	1	72	76.6
0	0	18	1	1	2	1	0	23	25.3	0	0	16	0	4	2	0	1	23	25
0	0	10	0	3	1	2	0	16	19.1	0	0	14	0	6	0	1	0	21	22.3
0	0	11	0	8	0	1	0	20	21.3	0	0	15	0	1	1	0	0	17	17.5
0	0	15	0	4	2	0	0	21	22	0	0	27	2	3	2	0	0	34	35
0	0	54	1	15	5	4	0	80	87.7	0	0	72	2	14	5	1	1	95	99.8
0	1	12	1	5	2	1	0	22	23.7	0	0	14	0	4	0	0	1	19	20
0	0	17	1	2	1	1	0	22	23.8	0	0	13	2	4	0	0	0	19	19
0	0	11	0	2	0	0	0	13	13	0	0	13	1	4	0	0	0	18	18
0	0	17	0	4	2	1	0	24	26.3	0	0	13	1	6	1	0	0	21	21.5
0	1	57	2	13	5	3	81	86.8	86.8	0	0	53	4	18	1	0	1	77	78.5
0	0	16	0	2	0	1	0	19	20.3	0	0	16	1	1	3	0	1	22	24.5
0	0	19	1	6	1	1	0	28	29.8	0	0	20	3	1	1	1	0	26	27.8
0	0	12	2	7	2	1	0	24	26.3	0	0	15	1	3	1	0	0	20	20.5
0	0	12	0	6	0	0	0	18	18.8	0	1	18	0	1	0	1	0	21	21.7
0	0	59	3	21	3	3	89	94.4	94.4	0	1	69	5	6	5	2	1	89	94.5
0	0	24	0	8	0	0	0	32	32	0	0	29	1	2	0	0	0	32	32
1	0	21	0	4	3	1	0	30	32	0	0	21	1	4	0	1	1	28	30.3
0	0	23	0	7	3	0	0	33	34.5	2	25	2	4	0	1	0	0	34	34.1
0	0	15	0	3	0	1	0	19	20.3	0	0	13	1	4	2	1	0	21	23.3
1	0	83	0	22	6	2	114	118.8	118.8	0	0	86	5	14	2	3	1	115	119.7
1	0	31	1	7	0	1	0	41	41.5	1	0	33	2	3	1	0	0	40	39.7
1	0	26	0	4	1	0	0	32	31.7	0	0	24	0	3	0	0	1	28	29
0	0	23	0	5	0	1	0	29	30.3	0	1	1	6	1	0	0	0	22	21.9
0	0	18	2	5	0	0	0	25	25	0	0	20	2	1	0	0	0	23	23
2	0	98	3	21	1	2	0	127	128.5	1	1	90	5	13	2	0	1	113	113.6
0	0	17	1	1	0	2	0	21	23.6	0	0	13	1	0	0	0	0	14	14
0	0	11	0	5	0	1	0	17	18.3	0	0	13	0	1	0	0	1	15	16
0	0	15	0	2	0	0	0	17	17	0	0	15	0	4	0	1	0	20	21.3
0	0	15	0	3	0	0	0	18	18	0	0	14	0	1	2	0	0	17	18
0	0	58	1	11	0	3	0	73	76.9	0	0	55	1	6	2	1	1	66	69.3
7	3	853	13	314	56	31	1177	1238.9	1238.9	12	6	1864	36	246	87	26	14	2350	2386.1

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Appendix 12.2 24 hour AADT Traffic Flows

24 HOUR AADT TRAFFIC FLOWS

Junction	Arm	2019 12-hour two-way total traffic from survey	2019 12-hour two-way HGV's from survey	2019 24-hour AADT Total Vehicles	2019 24-hour AADT %age HGV's	2023 24-hour AADT Total Vehicles	2023 24-hour AADT %age HGV's	2038 24-hour AADT Total Vehicles	2038 24-hour AADT %age HGV's	2040 24-hour AADT Total Vehicles	2040 24-hour AADT %age HGV's
BASE FLOWS	1 R130 (W) Site Access	6,385	352	7,665	5.51%	8,198	4.82%	9,650	5.60%	7,795	4.65%
	2 R120 (E)	6,385	352	7,665	5.51%	8,198	4.82%	9,650	5.60%	7,795	4.65%
NO DEVELOPMENT	2 R120 (S)	6,764	620	8,120	9.17%	8,702	8.00%	10,309	9.23%	8,261	7.73%
	2 R120 (N) R134	8,421	618	10,109	7.34%	10,823	6.41%	12,781	7.42%	10,283	6.19%

NOTE 1: 12-hour traffic survey to 24-hour AADT factor derived from PAG Unit 16.1. Expansion Factors for Short Period Traffic Counts

PAG Unit 16.1, Appendix A, Dublin Area profile identifies 12-hour as being 0.833 of 24-hour AADT

NOTE 2: Growth factors from PAG Unit 5.3: Project Appraisal Guidelines For National Road Unit 5.3 - Table 6.1 Dublin Metropolitan Area

2016-2030 = 1.0162 (LV) / 1.0285 (HV) per annum, 2026-2040 = 1.0521 (LV) / 1.0136 (HV) per annum

DEVELOPMENT TRAFFIC

ICT Centre	AM Peak Hour		Daily	
	Arrivals	Departures	Arrivals	Departures
ICT Centre	60	15	135	135
Devisers	1	4	4	4
Visitors	1	1	16	16
Power Plant	2	2	5	5
			160	160

Based on TRGS for offices
AM peak is 25% of daily traffic

DISTRIBUTION

Site to from R120 west 25.00%
Site to from R120 east 75.00%
R120 south to from R120 north 25.00%
R120 south to from R134 50.00%

Junction	Arm	2019 12-hour two-way total traffic from survey	2019 12-hour two-way HGV's from survey	2019 24-hour AADT Total Vehicles	2019 24-hour AADT %age HGV's	2023 24-hour AADT Total Vehicles	2023 24-hour AADT %age HGV's	2038 24-hour AADT Total Vehicles	2038 24-hour AADT %age HGV's
WITH DEVELOPMENT FLOWS 2023 and 2037	1 R130 (W) Site Access	6,385	352	7,665	5.51%	8,198	4.82%	9,650	5.60%
	2 R120 (E)	6,385	352	7,665	5.51%	8,198	4.82%	9,650	5.60%
WITH DEVELOPMENT FLOWS 2023 and 2037	2 R120 (S)	6,764	620	8,120	9.17%	8,702	8.00%	10,309	9.23%
	2 R120 (N) R134	8,421	618	10,109	7.34%	10,823	6.41%	12,781	7.59%

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Appendix 12.3 Bus timetables

A A A
9 47 Like 1 9

68/a

Buses from/to
From Hawkins St. Towards Newcastle / Greenogue Business Park
 Operative Date: 20/10/2019
 Version: TT 9.1

From Hawkins St. Towards Newcastle / Greenogue Business Park

Sráid Hawkins , Sráid Camden , Bóthar Bulfin , Sráidbhaile Chluain Dolcáin , Bailtíni Choill na Silíní , An Caisleán Nua / Páirc Ghnó Ghrianóige

	Monday to Friday				Saturday				Sunday			
Buses leave terminus at:	06:25v	07:30v	08:30	09:30	06:40v	07:50v	08:20	09:30	09:00	10:15	11:30	12:45
Route Variations	10:30	11:30	12:30	13:30	10:30	11:30	12:30	13:30	14:00	15:15	16:30	17:45
v Via Baldonnell	14:30v	15:30	16:00a	16:30	14:30v	15:30	16:30	17:30	19:00v	20:15v	21:30v	22:40
a To Bulfin Road (Route 68a)	17:00a	17:30	18:15a	18:45	18:30	19:30	21:05v	22:20v	23:30			
	20:15	21:15v	22:30v	23:30	23:30							

Hawkins St. >> 8mins >> Camden St. >> 12mins >> Bulfin Rd. >> 15mins >> Clondalkin Village >> 10mins >> Cherrywood Villas >> 15mins >> Newcastle / Greenogue Business Park

All times are off peak estimates

From Newcastle / Greenogue Business Park Towards Hawkins St.

An Caisleán Nua / Páirc Ghnó Ghrianóige , Bailtíni Choill na Silíní , Sráidbhaile Chluain Dolcáin , Bóthar Bulfin , Sráid Camden , Sráid Hawkins

	Monday to Friday				Saturday				Sunday			
Buses leave terminus at:	06:00	06:30n	07:00	07:45	06:35n	07:10	07:50	09:15v	10:15	11:30	12:45	14:00
Route Variations	08:15a	09:00v	09:15a	10:00	08:45	11:00	12:00	13:00	15:15	16:30	17:45	19:00
v Via Baldonnell	11:00	12:00	13:00	14:00	14:00	15:00	16:00v	17:00v	20:15	21:30	22:30	23:45c
a From Bulfin Road (Route 68a)	15:00	16:00v	17:10v	18:15	18:00	19:00	20:00	21:00	00:25c			
n Via Newlands Cross	19:15	20:15	21:25	22:25	22:15	23:30	00:15c					
c To Conyngham Road Garage via Emmet Rd. and Islandbridge	23:35c	00:15c										

Newcastle / Greenogue Business Park >> 15mins >> Cherrywood Villas >> 10mins >> Clondalkin Village >> 15mins >> Bulfin Rd. >> 12mins >> Camden St. >> 8mins >> Hawkins St.

All times are off peak estimates

Fare Stages	25 75 Hawkins St.	42 58 Monastery Rd. (Castle Park)
	26 74 South Great George's St.	43 57 Clondalkin Village
	27 73 Aungier St. (Bishop St.)	44 56 Cherrywood Villas
	28 72 Kelly's Corner (Camden St.)	45 55 Ongar Rd. (Castlegrange)
	29 71 South Circular Rd. (Leonard's Corner)	46 54 Woodlands
	30 70 South Circular Rd. (Donore Ave.)	47 53 Nangor Castle
	31 69 Dolphin's Barn	48 52 Kilcarbery
	32 68 Bulfin Rd.	49 51 Ballbane (Kelly's)
	33 67 Naas Rd. (Canal Bridge)	50 50 Leravanagh
	34 66 Naas Rd. (Bluebell)	51 49 Milltown Cross / Baldonnell
	35 65 Naas Rd. (Robin Hood Rd.)	52 48 Peamount Cottages
	36 64 Naas Rd. (Long Mile Rd.)	53 47 Peamount House
	37 63 Naas Rd. (Fox and Geese)	54 46 Peamount Cross
	38 62 Naas Rd. (John Sisk and Sons)	55 45 Peamount Rd.
	39 61 Naas Rd. (Red Cow Inn)	56 44 Sancta Maria
	40 60 Naas Rd. (Monastery Corner)	57 43 Newcastle / Greenogue Business Park
	41 59 Monastery Rd. (Cluain Mhuire)	

Route Information

Monday to Saturday all buses on Route 68 will operate to and from Greenogue Business Park until 20:00hrs. Last bus from Hawkins St. to Greenogue will be 18:30hrs and last bus from Greenogue will be 20:00hrs. On Sunday all buses will operate to and from Newcastle only.


Customer Comment Desk: (01) 8734222
 Phone lines open: Monday to Saturday 08:30hrs – 18:00hrs (except public holidays)

A A A

18 85 Like 2 52

13

Buses from/to
From Harristown Towards Grange Castle
 Operative Date: 24/03/2019
 Version: Version TT 9.1



From Harristown Towards Grange Castle


Baile Anraí , An tSráid Mhór Baile Munná , Stáisiún Droim Conrach , Sráid Uí Chonaill , Ospidéal San Séamus , Bóthar Thír Chonaill , Bóthar an Náis , Sráidbhaile Chluain Dolcáin , Caislean na Grainín

	Monday to Friday				Saturday				Sunday			
Buses leave terminus at:	05:30	06:00v	06:30v	06:45v	06:10	06:30	06:50	07:10	07:00	07:30	08:00	08:30
Route Variations	07:00v	07:10	07:20	07:30v	07:30	07:50	08:10	08:30	09:00	09:30	10:00	10:30
c To City Centre	07:40	07:50	08:00	08:10	08:45	09:00	09:15	09:30	11:00	11:20	11:40	12:00
v To Cuisine de France	08:20	08:30	08:40	08:50	09:45	10:00	10:15	10:30	12:20	12:40	13:00	13:20
	09:00	09:15	09:30	09:45	10:45	11:00	11:15	11:30	13:40	14:00	14:20	14:40
	10:00	10:15	10:30	10:45	11:45	12:00	12:15	12:30	15:00	15:20	15:40	16:00
	11:00	11:15	11:30	11:45	12:45	13:00	13:15	13:30	16:20	16:40	17:00	17:20
	12:00	12:15	12:30	12:45	13:45	14:00	14:15	14:30	17:40	18:00	18:20	18:40
	13:00	13:15	13:30	13:45	14:45	15:00	15:15	15:30	19:00	19:20	19:40	20:00
	14:00	14:15	14:30	14:45v	15:45	16:00	16:15	16:30	20:20	20:40	21:00	21:20
	15:00	15:10	15:20	15:30	16:45	17:00	17:15	17:30	21:40	22:00	22:20	22:40
	15:40v	15:50	16:00	16:10	17:45	18:00	18:15	18:30	23:00	23:20c		
	16:20	16:30	16:40v	16:50	18:50	19:10	19:30	19:50				
	17:00	17:10	17:20v	17:30	20:10	20:30	20:50	21:10				
	17:45	18:00	18:15	18:30v	21:30	21:50	22:10	22:30				
	18:45	19:00	19:20	19:40	22:50	23:10c	23:30					
	20:00	20:20	20:40	21:00								
	21:20	21:40	22:00	22:20								
	22:40	23:00	23:20e									

Harristown >> 12mins >> Main St. Ballymun (Ballymun Shopping Centre) >> 9mins >> Drumcondra Rail Station >> 10mins >> O'Connell St. >> 5mins >> St James's Hospital >> 10mins >> Tyrconnell Rd. (Blacklion) >> 10mins >> Naas Rd. (John Sisk and Sons) >> 12mins >> Clonsilla Village >> 15mins >> Grange Castle

All times are off peak estimates

From Grange Castle Towards Harristown



Caislean na Grainín , Sráidbhaile Chluain Dolcáin , Bóthar an Náis , Bóthar Thír Chonaill , Ospidéal San Séamus , Sráid Uí Chonaill , Stáisiún Droim Conrach , An tSráid Mhór Baile Munná , Baile Anraí

	Monday to Friday				Saturday				Sunday			
Buses leave terminus at:	06:00	06:15	06:30	06:40	06:10	06:30	06:50	07:10	07:00	07:30	08:00	08:30
Route Variations	06:50	07:00	07:10	07:20	07:30	07:50	08:10	08:30	09:00	09:30	10:00	10:30
c To City Centre	07:30	07:40	07:50	08:00v	08:45	09:00	09:15	09:30	11:00	11:20	11:40	12:00
v From Cuisine de France	08:10	08:20v	08:30	08:45v	09:45	10:00	10:15	10:30	12:20	12:40	13:00	13:20
	09:00	09:15v	09:30	09:45	10:45	11:00	11:15	11:30	13:40	14:00	14:20	14:40
	10:00	10:15	10:30	10:45	11:45	12:00	12:15	12:30	15:00	15:20	15:40	16:00
	11:00	11:15	11:30	11:45	12:45	13:00	13:15	13:30	16:20	16:40	17:00	17:20
	12:00	12:15	12:30	12:45	13:45	14:00	14:15	14:30	17:40	18:00	18:20	18:40
	13:00	13:15	13:30	13:45	14:45	15:00	15:15	15:30	19:00	19:20	19:40	20:00
	14:00	14:15	14:30	14:45	15:45	16:00	16:15	16:30	20:20	20:40	21:00	21:20
	15:00	15:10	15:20	15:30	16:45	17:00	17:15	17:30	21:40	22:00	22:20	22:40
	15:40	15:50	16:00	16:10	17:45	18:00	18:15	18:30	23:00c	23:20c		
	16:20	16:30	16:40	16:50	18:50	19:10	19:30	19:50				
	17:00	17:10	17:20v	17:30	20:10	20:30	20:50	21:10				
	17:40	17:50	18:00	18:15v	21:30	21:50	22:10	22:30				
	18:30	18:45	19:00	19:20	22:50c	23:10c	23:30c					
	19:40v	20:00	20:20	20:40v								
	21:00	21:20	21:40	22:00								
	22:20	22:40	23:00c	23:20c								

Grange Castle >> 15mins >> Clonsilla Village >> 12mins >> Naas Rd. (John Sisk and Sons) >> 10mins >> Tyrconnell Rd. (Blacklion) >> 10mins >> St James's Hospital >> 5mins >> O'Connell St. >> 10mins >> Drumcondra Rail Station >> 9mins >> Main St. Ballymun (Ballymun Shopping Centre) >> 12mins >> Harristown

All times are off peak estimates

Fare Stages		
	86 14	Harristown
	85 15	Ballymun Rd.
	84 16	Poppintree
	83 17	Main St. Ballymun (Ballymun Shopping Centre)
	82 18	Ballymun Rd. (Glasnevin Ave.)
	81 19	Ballymun Rd. (The Rise)
	80 20	Drumcondra Rd. Upr. (Griffith Ave.)
	79 21	Drumcondra Rd. Upr. (Clonturk Park)
	78 22	Drumcondra Rail Station
	77 23	Dorset St. (North Circular Rd.)
	76 24	Dorset St. (North Frederick St.)
	75 25	O'Connell St.
	74 26	Lord Edward St.
	73 27	Thomas St. (Francis St.)
	72 28	Thomas St. (Watling St.)
	71 29	James St. (St. James's Hospital)
	70 30	Old Kilmainham (Junction Brookfield Rd.)
	69 31	Emmet Rd. (Kilmainham Cross)
	68 32	Tyronnell Rd. (Blacklion)
	67 33	Naas Rd. (Canal Bridge)
	66 34	Naas Rd. (Bluebell)
	65 35	Naas Rd. (Robin Hood Rd.)
	64 36	Naas Rd. (Long Mile Rd.)
	63 37	Naas Rd. (Fox and Geese)
	62 38	Naas Rd. (John Sisk and Sons)
	61 39	Naas Rd. (Red Cow Inn)
	60 40	Monastery Corner
	59 41	Woodford Walk
	58 42	Watery Lane (Riversdale)
	57 43	Clondarkin Village
	56 44	St. Ronan's Church (Junction Oldcastle Drive)
	55 45	Grange Castle Business Park

Customer Comment Desk: (01) 8734222
 Phone lines open: Monday to Saturday 08:30hrs – 18:00hrs (except public holidays)

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151

Buses from/to
From Docklands (East Rd.) To Foxborough (Balgaddy Rd.)
 Operative Date: 06/09/2015
 Version: TT 5.1

[Click here to view Route 151 from Hawkins St. towards Foxborough \(Balgaddy Rd.\)](#)
[Click here to view Route 151 from Eden Quay Towards Docklands \(East Rd.\)](#)

From Docklands (East Rd.) Towards Foxborough (Balgaddy Rd.)



Ceantar na nDugai (An Bóthar Thoir) , Sráid an Dáma / Cé Urumhan Íochtarach , An Carnán , Bóthar Dhroimeanaigh , An Pháirc Thiar , Baile an tSionnaigh

Buses leave terminus at:

Route Variations
 f From Docklands and departs Eden Quay South at 23:30

	Monday to Friday				Saturday				Sunday			
06:30	06:50	07:10	07:30	07:10	07:30	07:50	08:10	08:30	09:00	09:30	10:00	
07:50	08:05	08:20	08:40	08:30	08:50	09:10	09:30	10:30	11:00	11:30	12:00	
09:00	09:20	09:40	10:00	09:50	10:10	10:30	10:50	12:30	13:00	13:30	14:00	
10:20	10:40	11:00	11:20	11:10	11:30	11:50	12:10	14:30	15:00	15:30	16:00	
11:40	12:00	12:20	12:40	12:30	12:50	13:10	13:30	16:30	17:00	17:30	18:00	
13:00	13:20	13:40	14:00	13:50	14:10	14:30	14:50	18:30	19:00	19:30	20:00	
14:20	14:40	15:00	15:20	15:10	15:30	15:50	16:10	20:30	21:00	21:30	22:00	
15:40	16:00	16:20	16:40	16:30	16:50	17:10	17:30	22:30	23:00	23:20f		
17:00	17:20	17:40	18:00	17:50	18:10	18:30	18:50					
18:20	18:40	19:00	19:30	19:10	19:30	20:00	20:30					
20:00	20:30	21:00	21:30	21:00	21:30	22:00	22:30					
22:00	22:30	23:00	23:20f	23:00	23:20f							

Docklands (East Rd.) >> 10mins >> Dame St. / Ormond Quay >> 15mins >> Dolphin's Barn >> 15mins >> Drinnagh Rd. >> 15mins >> Parkwest >> 15mins >> Foxborough

All times are off peak estimates

From Foxborough (Balgaddy Rd.) Towards Docklands (East Rd.)



Baile an tSionnaigh , An Pháirc Thiar , Bóthar Dhroimeanaigh , An Carnán , Sráid an Dáma / Cé Urumhan Íochtarach , Ceantar na nDugai (An Bóthar Thoir)

Buses leave terminus at:

Route Variations
 t To Eden Quay only

	Monday to Friday				Saturday				Sunday			
06:00	06:15	06:30	06:45	06:30	06:50	07:10	07:30	07:30	08:00	08:30	09:00	
07:00	07:15	07:30	07:45	07:50	08:10	08:30	08:50	09:30	10:00	10:30	11:00	
08:00	08:20	08:40	09:00	09:30	09:50	10:10	10:30	11:30	12:00	12:30	13:00	
09:20	09:40	10:00	10:20	10:30	10:50	11:10	11:30	13:25	13:50	14:20	14:50	
10:40	11:00	11:20	11:40	11:50	12:10	12:30	12:50	15:20	15:50	16:20	16:50	
12:00	12:20	12:40	13:00	13:10	13:30	13:50	14:10	17:20	17:50	18:20	18:50	
13:20	13:40	14:00	14:20	14:30	14:50	15:10	15:30	19:10	19:30	20:00	20:30	
14:40	15:00	15:20	15:40	15:50	16:10	16:30	16:50	21:00	21:30	22:00	22:30	
16:00	16:20	16:40	17:00	17:10	17:30	17:50	18:10	23:00	23:30t			
17:20	17:40	18:00	18:20	18:30	18:50	19:10	19:30					
18:40	19:00	19:30	20:00	20:00	20:30	21:00	21:30					
20:30	21:00	21:30	22:00	22:00	22:30	23:00	23:30t					
22:30	23:00	23:30t										

Foxborough >> 15mins >> Parkwest >> 15mins >> Drinnagh Rd. >> 15mins >> Dolphin's Barn >> 15mins >> Dame St. / Ormond Quay >> 10mins >> Docklands (East Rd.)

All times are off peak estimates

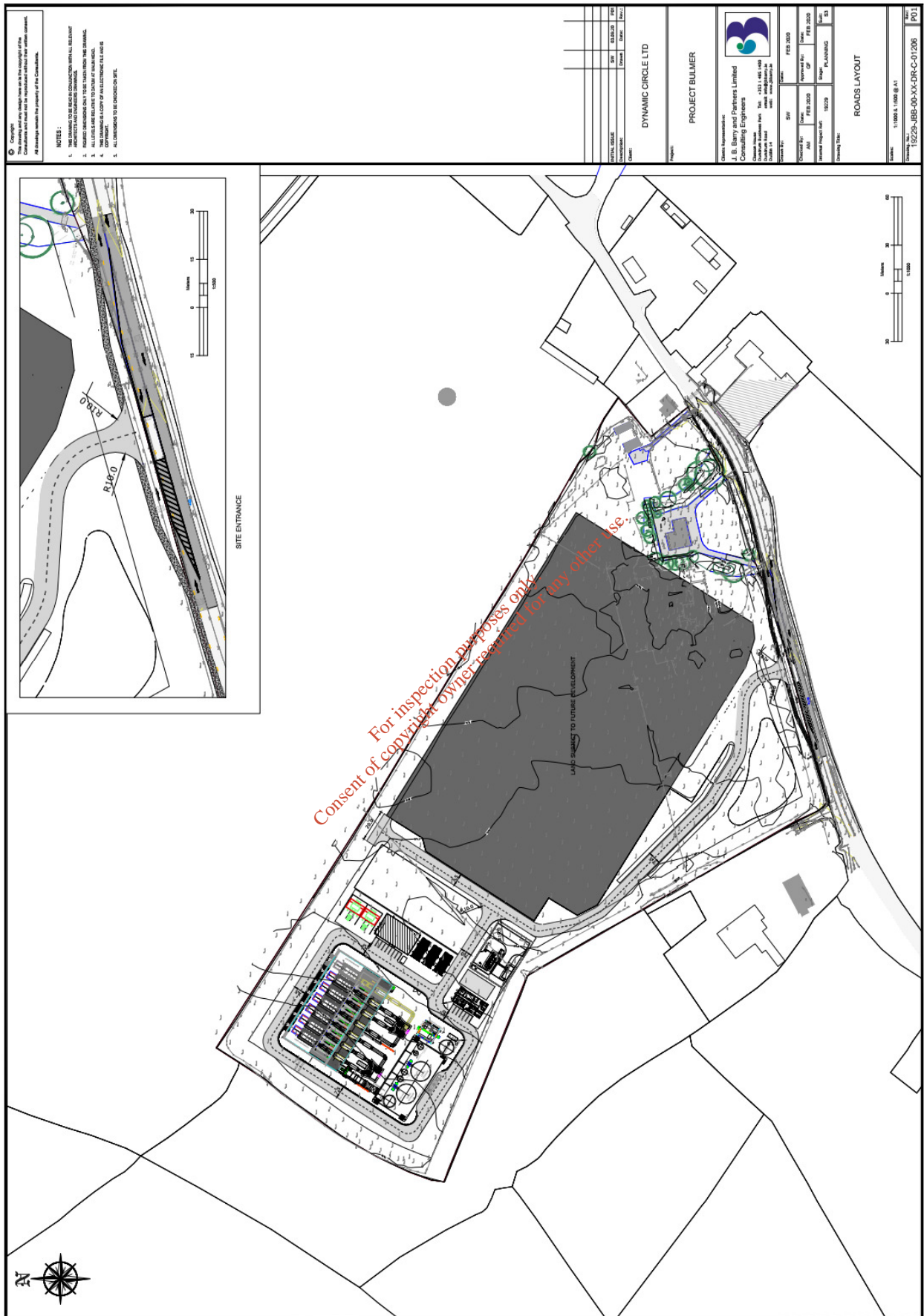
Fare Stages

22 78 Docklands (East Rd.)	35 65 Drinnagh Rd. (Halfway House)
23 77 Docklands Rail Station / North Wall Quay	36 64 Long Mile Rd. (Walkinstown Ave.)
24 76 Eden Quay / Custom House Quay	37 63 Long Mile Rd. (Robinhood Park)
25 75 Hawkins St. / Eden Quay	38 62 New Nangor Rd. (Jct. Killeen Rd.)
26 74 Werburgh St. / Upr. Ormond Quay	39 61 New Nangor Rd. (Willow Rd.)
27 73 Kevin St. (Patrick St.)	40 60 New Nangor Rd. (Oak Rd.)
28 72 Cork St. (Ardee St.)	41 59 New Nangor Rd. (Woodford Walk)
29 71 Cork St. (Donore Ave.)	42 58 Nangor Rd. (Michael Collins Park)
30 70 Cork St. (Coombe Hospital)	43 57 Nangor Rd. (Fonthill Rd.)

31 69 Dolphin's Barn Cross	44 56 Nangor Rd. (Westbourne)
32 68 Crumlin Rd. (Loreto Convent)	45 55 Grange Castle Business Park
33 67 Crumlin Rd. (Bangor Drive)	46 54 Outer Ring Rd.
34 66 Crumlin Rd. (Cooley Rd.)	47 53 Foxborough

Customer Comment Desk: (01) 8734222
 Phone lines open: Monday to Saturday 08:30hrs – 18:00hrs (except public holidays)

Appendix 12.4 Site access design under Ref. SD20A/0058



Appendix 12.5 Traffic modelling



Generated on 03/12/2020 11:23:47 using Junctions 9 (9.0.2.5947)

Junctions 9
PICADY 9 - Priority Intersection Module
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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Filename: 2020-12-03 Site Access V2.j9
Path: C:\Users\brian.condon\CondonDrew Associates\Condon Drew Associates Ltd. - Documents\CDA Projects\1300-1399\1387-Project Bulmer, Ireland\02-Analysis\Junctions9
Report generation date: 03/12/2020 11:23:04

- »2023 + Development, AM
- »2023 + Development, PM
- »2038 + Development, AM
- »2038 + Development, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
2023 + Development								
Stream B-AC	0.1	9.91	0.05	A	0.2	7.91	0.08	A
Stream C-AB	0.1	9.37	0.11	A	0.1	6.90	0.08	A
2038 + Development								
Stream B-AC	0.1	11.19	0.06	B	0.2	8.26	0.13	A
Stream C-AB	0.2	10.32	0.12	B	0.1	6.95	0.08	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

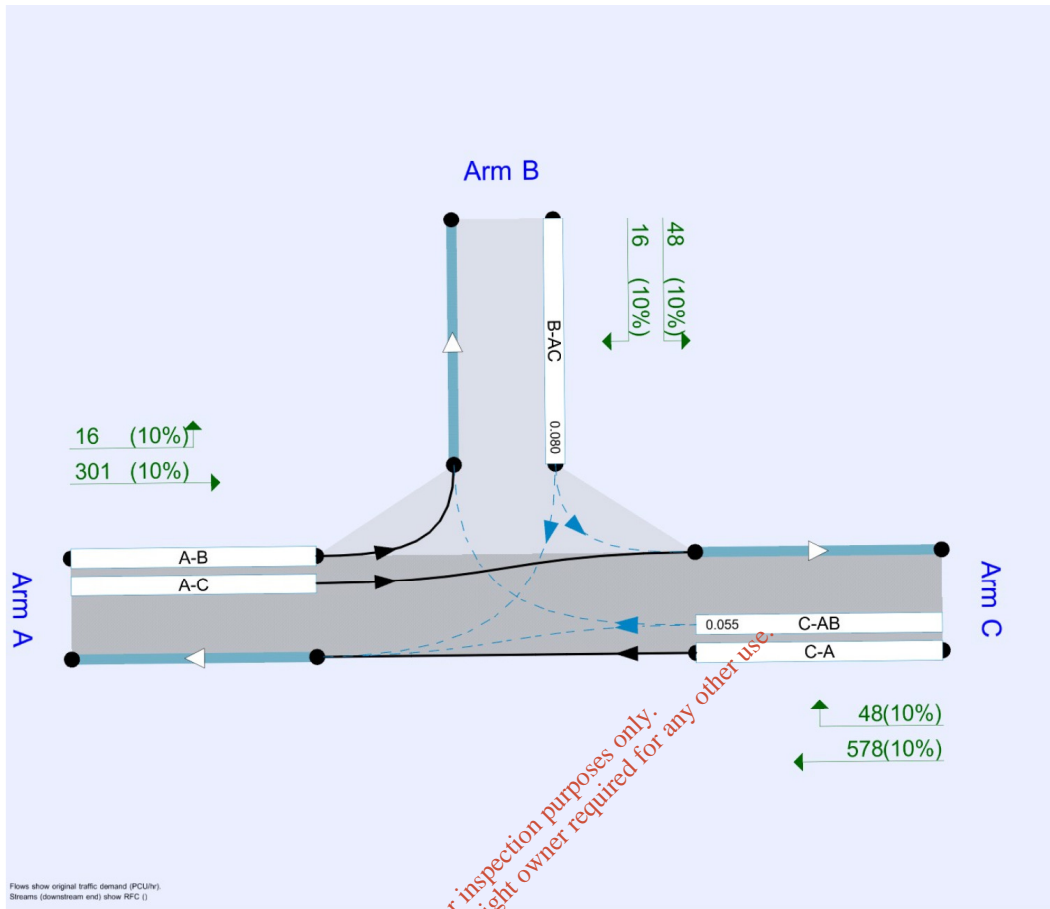
Title	(untitled)
Location	
Site number	
Date	19/02/2020
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	briancondon-PC\brian.condon
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin



Generated on 03/12/2020 11:23:47 using Junctions 9 (9.0.2.5947)



Flows show original traffic demand (PCU/hr).
Streams (downstream end) show RFC (.)
The junction diagram reflects the last run of Junctions.

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2023 + Development	AM	ONE HOUR	08:00	09:30	15
D2	2023 + Development	PM	ONE HOUR	17:00	18:30	15
D3	2038 + Development	AM	ONE HOUR	08:00	09:30	15
D4	2038 + Development	PM	ONE HOUR	17:00	18:30	15

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

2023 + Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.57	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	R120 (West)		Major
B	Site Access		Minor
C	R120 (East)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.00		✓	3.50	90.0	✓	5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.81	90	90

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	597	0.104	0.263	0.165	0.376
1	B-C	736	0.108	0.273	-	-
1	C-B	715	0.265	0.265	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2023 + Development	AM	ONE HOUR	08:00	09:30	15



Generated on 03/12/2020 11:23:47 using Junctions 9 (9.0.2.5947)

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	821	100.000
B		✓	19	100.000
C		✓	285	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A	B	C
A	0	18	805
B	5	0	14
C	237	48	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A	B	C
A	0	10	10
B	10	0	10
C	10	10	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.05	9.91	0.1	A
C-AB	0.11	9.37	0.1	A
C-A				
A-B				
A-C				

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Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14	509	0.028	14	0.0	7.996	A
C-AB	36	551	0.066	36	0.1	7.681	A
C-A	178			178			
A-B	12			12			
A-C	606			606			



Generated on 03/12/2020 11:23:47 using Junctions 9 (9.0.2.5947)

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	17	472	0.036	17	0.0	8.695	A
C-AB	43	519	0.083	43	0.1	8.317	A
C-A	213			213			
A-B	14			14			
A-C	724			724			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	421	0.050	21	0.1	9.903	A
C-AB	53	475	0.111	53	0.1	9.368	A
C-A	261			261			
A-B	18			18			
A-C	886			886			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	421	0.050	21	0.1	9.906	A
C-AB	53	475	0.111	53	0.1	9.374	A
C-A	261			261			
A-B	18			18			
A-C	886			886			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	17	472	0.036	17	0.0	8.698	A
C-AB	43	519	0.083	43	0.1	8.323	A
C-A	213			213			
A-B	14			14			
A-C	724			724			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14	509	0.028	14	0.0	8.002	A
C-AB	36	551	0.066	36	0.1	7.695	A
C-A	178			178			
A-B	12			12			
A-C	606			606			

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2023 + Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.94	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D2	2023 + Development	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	274	100.000
B		✓	64	100.000
C		✓	544	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A	B	C
A	0	16	258
B	16	0	48
C	496	48	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A	B	C
A	0	10	10
B	10	0	10
C	10	10	0

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Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.12	7.91	0.2	A
C-AB	0.08	6.80	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	48	612	0.079	48	0.1	7.010	A
C-AB	36	660	0.055	36	0.1	6.341	A
C-A	373			373			
A-B	12			12			
A-C	194			194			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	58	595	0.097	57	0.1	7.364	A
C-AB	43	640	0.066	43	0.1	6.530	A
C-A	446			446			
A-B	14			14			
A-C	232			232			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	70	571	0.123	70	0.2	7.910	A
C-AB	53	635	0.083	53	0.1	6.804	A
C-A	546			546			
A-B	18			18			
A-C	284			284			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	70	571	0.123	70	0.2	7.915	A
C-AB	53	635	0.083	53	0.1	6.804	A
C-A	546			546			
A-B	18			18			
A-C	284			284			

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18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	58	595	0.097	58	0.1	7.372	A
C-AB	43	649	0.066	43	0.1	6.532	A
C-A	446			446			
A-B	14			14			
A-C	232			232			

18:15 - 18:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	48	612	0.079	48	0.1	7.024	A
C-AB	36	660	0.055	36	0.1	6.347	A
C-A	373			373			
A-B	12			12			
A-C	194			194			

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2038 + Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.55	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D3	2038 + Development	AM	ONE HOUR	08:00	09:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	954	100.000
B		✓	19	100.000
C		✓	324	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A	B	C
A	0	16	938
B	5	0	14
C	278	48	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A	B	C
A	0	10	10
B	10	0	10
C	10	10	0

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Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.06	11.19	0.1	B
C-AB	0.12	10.32	0.2	B
C-A				
A-B				
A-C				

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14	479	0.030	14	0.0	8.512	A
C-AB	36	524	0.069	36	0.1	8.099	A
C-A	208			208			
A-B	12			12			
A-C	706			706			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	17	436	0.039	17	0.0	9.446	A
C-AB	43	488	0.088	43	0.1	8.907	A
C-A	248			248			
A-B	14			14			
A-C	843			843			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	375	0.056	21	0.1	11.183	B
C-AB	53	436	0.121	53	0.1	10.313	B
C-A	304			304			
A-B	18			18			
A-C	1033			1033			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	21	375	0.056	21	0.1	11.189	B
C-AB	53	436	0.121	53	0.2	10.321	B
C-A	304			304			
A-B	18			18			
A-C	1033			1033			

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09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	17	436	0.039	17	0.0	9.455	A
C-AB	43	488	0.089	43	0.1	8.919	A
C-A	248			248			
A-B	14			14			
A-C	843			843			

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	14	479	0.030	14	0.0	8.520	A
C-AB	36	524	0.069	36	0.1	8.112	A
C-A	208			208			
A-B	12			12			
A-C	706			706			

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2038 + Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction Type	Major road direction	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	0.86	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D4	2038 + Development	PM	ONE HOUR	17:00	18:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		✓	317	100.000
B		✓	64	100.000
C		✓	626	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To		
	A	B	C
A	0	16	301
B	16	0	48
C	578	48	0

Vehicle Mix

Heavy Vehicle Percentages

From	To		
	A	B	C
A	0	10	10
B	10	0	10
C	10	10	0

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Results

Results Summary for whole modelled period

Stream	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS
B-AC	0.13	8.26	0.2	A
C-AB	0.08	6.95	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	48	599	0.080	48	0.1	7.181	A
C-AB	36	651	0.055	36	0.1	6.429	A
C-A	435			435			
A-B	12			12			
A-C	227			227			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	58	579	0.099	57	0.1	7.593	A
C-AB	43	639	0.068	43	0.1	6.643	A
C-A	520			520			
A-B	14			14			
A-C	271			271			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	70	550	0.128	70	0.2	8.254	A
C-AB	53	622	0.085	53	0.1	6.954	A
C-A	636			636			
A-B	18			18			
A-C	331			331			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	70	550	0.128	70	0.2	8.259	A
C-AB	53	622	0.085	53	0.1	6.954	A
C-A	636			636			
A-B	18			18			
A-C	331			331			

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18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	58	579	0.099	58	0.1	7.804	A
C-AB	43	639	0.068	43	0.1	6.647	A
C-A	520			520			
A-B	14			14			
A-C	271			271			

18:15 - 18:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	LOS
B-AC	48	599	0.080	48	0.1	7.195	A
C-AB	36	651	0.055	36	0.1	6.436	A
C-A	435			435			
A-B	12			12			
A-C	227			227			

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CHAPTER 13 CULTURAL HERITAGE

Appendix 13.1 Record of Monuments and Places

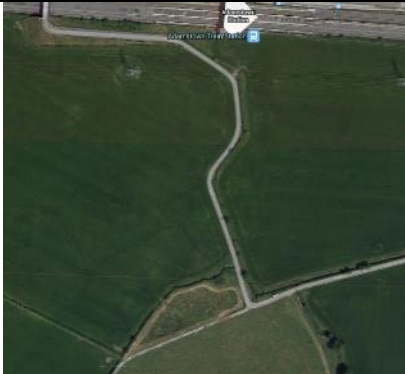
The recorded archaeological sites within c. 2km of the development are listed below, all noted in the Record of Monuments and Places for Co. Dublin.


RMP No.	DU017-029----
Townland	ADAMSTOWN (NEWCASTLE BY.)
Site Type	Castle - tower house
NGR	702836, 732705
Description	Located on flat ground between the canal and the railway. A three-storey tower house, which was oblong in plan with a projecting turret and stepped crenellations. Demolished in the 1960s. No visible at ground level (Compiled by: Geraldine Stout, Date of upload: 26 August 2011, Date of last visit: 23 July 1993).
Sources	RMP Healy, P. 1974 Report on Monuments and Sites of Archaeological Interest in County Dublin, p. 22 Ball, F. E. 1906 Parish of Arderrig Part 4, 58-60; Dix, E. R. 1897 The lesser castles of Co. Dublin, in Irish Builder, p. 12.

RMP No.	DU017-034----
Townland	GRANGE (NEWCASTLE BY.)
Site Type	Castle - tower house
NGR	703857, 731879
Description	Attached to a farmhouse in flat, low-lying ground. Shown as a castle on the Down Survey (1655-6) map. This is a rectangular tower house with a square tower that's projects to the N in the NE corner. The tower house is three storeys high. The walls are plastered but where stonework is visible it is coursed limestone with roughly dressed quoins. The windows are all later insertions. Entrance is in the N wall through a round-headed doorway. There is a murder hole over the entrance lobby which leads into a vaulted ground floor (int. dims. L 7.08m; Wth.5.2m). Access to stair turret is off the lobby through a round-headed doorway. First floor not accessible. Second floor is accessed through a two-centred arched doorway. There is a garderobe chute in the SE corner which is supported by corbels and entered through a narrow round-headed door to a small circular chamber lit by a single ope. The jambs are hammer-dressed. There is a square stair tower or cap house which rises above parapet level (Healy 1974, 22; Mc Dix 1897, XXXIX, 22). A drawing by Beranger in 1773 shows stepped crenellations at parapet level (Harbison 1998, 168-9). In 1997 monitoring and excavation were undertaken in the vicinity of the castle, in advance of the construction of an access road and the excavation of foul sewers for a Business Park at Grange Castle. A curving ditch was identified orientated north-east/south-west. It was 30m in length, 0.8-0.9m deep, and 1.2-2.4m wide. The upper fills contained charcoal, mortar, flint and animal bones, and were aceramic. A decorated bone comb, stick-pin and knife gave the later ditch phase a terminus ante quem of from the 12th to the 13th century AD. A stone causeway, 0.5-0.6m wide and 0.06-0.1m deep, crossed the ditch. The evidence suggests that extensive early medieval and post-medieval activity survives in this area; the ditches can be interpreted as medieval field boundaries (O'Brien, R. 1998, 26-7). (Compiled by: Geraldine Stout, Date of upload: 26 August 2011, Date of last visit: 03 October 1986)
Sources	RMP Healy, P. 1974 Report on Monuments and Sites of Archaeological Interest in County Dublin, p. 22. Ball, F. E. 1906 Parish of Arderrig Part 4, 65 Dix, E. R. 1897 The lesser castles of Co. Dublin, in Irish Builder, p. 22 Cooper, A. 1780 Down Survey.

RMP No.	DU017-089
Townland	COOLSCUDDAN
Site Type	Enclosure
NGR	700632, 732125
Description	This site was first recorded as a positive cropmark in August 1991. Aerial photograph (GB91. EI.21) shows cropmark of a circular enclosure defined by a fosse (Gillian Barrett). Compiled by: Geraldine Stout
Sources	RMP

RMP No.	DU017-093
Townland	GOLLIERSTOWN
Site Type	Enclosure
NGR	701891, 732600

Description	A rectilinear enclosure visible as crop marks on an aerial photograph (SMR file; pers. comm. Tom Condit, 11 March 2015).
Sources	RMP Google Maps.
Images	

RMP No.	DU017-095
Townland	LOUGHTOWN UPPER
Site Type	Enclosure
NGR	700897, 731252
Description	A sub-circular enclosure visible as a crop mark on an aerial photograph (SMR file; pers. comm. Tom Condit, 11 March 2015).
Sources	RMP Google Maps.
Images	

RMP No.	DU021-003001
Townland	KILMACTALWAY
Site Type	Church
NGR	702668, 730092
Description	This medieval parish church is situated at the highest point of a circular walled graveyard surrounded by farmland. There is a bank against the inside of the wall. This is probably an ecclesiastical enclosure(DU021-003003-).The church of Kilmactalway was dedicated to St. Magnenn (Mason 1820, 51, Ronan 1941, 28). In 1366 it was annexed to St. Patrick's Cathedral. In 1615 and 1630 the nave and chancel were returned as in good repair. It was rebuilt (Ball 1906, 66-67). Today the church survives to the eaves, except for the N wall and is built of roughly coursed limestone with hammer dressing on the NE and SE quoins. There is a pronounced base batter on the E wall. The church (int. dims L 16.3m, Wth 5.10m) is entered through a narrow pointed doorway in the E end of the S wall. There is a step down to the interior. It is lit by an ogee headed window in the W gable which has a double bellcote and by a two-centred arched window with granite jambs containing bar holes in the S wall. At loft level is a large splayed embrasure for a rectangular window. The most easterly window on the S wall is a rectangular double-light window formed of limestone, probably inserted. The E window is a small round-headed lancet in a deep embrasure with an internal ledge formed of granite and limestone. S of this is a simple square-headed ope. According to D'Alton (1838, 684) there was a baptismal font (DU021-003004-) in the graveyard (DU021-003002-), which is no longer in existence (Ní Mharcaigh 1997, 269-270). Compiled by Geraldine Stout
Sources	RMP


RMP No.	DU021-003002
Townland	KILMACTALWAY
Site Type	Graveyard


NGR	702663, 730082
Description	A circular walled graveyard surrounded by farmland. The church of Kilmactalway is located within it (DU021-003001-; see Mason 1820, 51, Ronan 1941, 28). According to D'Alton (1838, 684) there was a baptismal font (DU021-003004-) in the graveyard, which is no longer in existence (Ní Mharcaigh 1997, 269-270). Compiled by Geraldine Stout
Sources	RMP

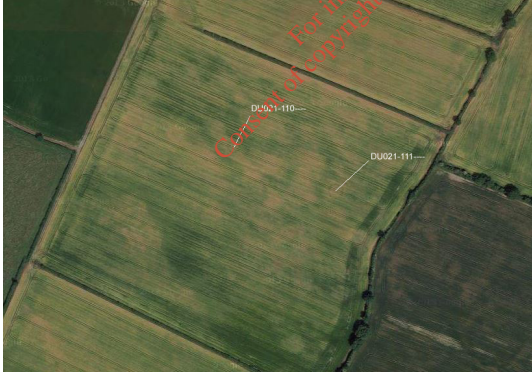
RMP No.	DU021-003003-
Site Type	Ecclesiastical enclosure
Townland	KILMACTALWAY
ITM	702667, 730086
Description	The medieval parish church of Kilmactalway (DU021-003001-) is situated at the highest point of a circular walled graveyard (DU021-003002-) surrounded by farmland. There is a bank revetted against the inside of the wall. This is probably an ecclesiastical enclosure.
Sources	RMP

RMP No.	DU021-003004-
Site Type	Font
Townland	KILMACTALWAY
ITM	702669, 730089
Description	According to D'Alton (1838, 684) there was a baptismal font in the graveyard, which is no longer in existence. Ni Mharcaigh 1997, 269-270).
Sources	RMP D'Alton, XX. 1838, XXXX, p. 684 Ni Mharcaigh, X 1997, XXXX, pp. 269-270.

RMP No.	DU021-004
Townland	KILBRIDE
Site Type	Castle - unclassified
NGR	703751, 730068
Description	Situated in a narrow valley. There are farm buildings on the site. There is no visible trace above ground (Ball 1906, 66). Compiled by Geraldine Stout
Sources	RMP


RMP No.	DU021-108
Townland	BALLYBANE
Site Type	Concentric enclosure
NGR	703060, 730985
Description	Not indicated on any OS map a large concentric enclosure is visible as a crop-mark on an aerial photo. A second enclosure (DU021-109---) is visible to the SW. The area of AH1 contains a recorded concentric enclosure (DU021-108). This site contains subsurface remains of a large double ditched enclosure and the morphology of this monument and its associated ditches suggest it is of possible early medieval date. However, 12 th to 13 th century pottery finds associated with the upper fills of both the internal and external ditch appear to suggest multiple periods of activity. Internal features and deposits within the enclosure are suggestive of settlement evidence. This monument has a diameter of approximately 60m (Stirland 2016, 10).
Sources	RMP Google Maps. Stirland, J. (ACS) 2016 Archaeological testing at Grange Castle South Business Park Ballybane, Clondalkin, Dublin 22 (16E0531).
Images	

RMP No.	DU021-109
Townland	BALLYBANE
Site Type	Enclosure
NGR	702937, 730716
Description	Not indicated on any OS map this enclosure is as a crop-mark on an aerial photo. A second larger enclosure (DU021-108----) is visible to the NE. AH5 – the archaeological test trenching confirmed the presence of a single-ditched circular enclosure (DU021-109), 44m in diameter with the ditch measuring 3m wide and 1.6m deep. The general appearance of this features is suggestive of a possible ringfort type enclosure. No internal features were recorded (Stirland 2016, 10).
Sources	RMP Google Maps. Stirland, J. (ACS) 2016 Archaeological testing at Grange Castle South Business Park Ballybane, Clondalkin, Dublin 22 (16E0531).
Images	

RMP No.	DU021-110
Townland	KEELOGES
Site Type	Ring-ditch
NGR	700982, 729826
Description	The western of two ring-ditches visible as crop marks on an aerial photograph (SMR file; pers. comm. Ger Dowling, 10 March 2015). See also DU021-111-----.
Sources	RMP Google Maps.
Images	

RMP No.	DU021-111
Townland	KEELOGES
Site Type	Ring-ditch
NGR	701109, 729783
Description	The eastern of two ring-ditches visible as crop marks on an aerial photograph (SMR file; pers. comm. Ger Dowling, 10 March 2015). See also DU021-110-----.
Sources	RMP Google Maps.

Images		
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RMP No.	DU021-112	
Townland	KLMACTALWAY	
Site Type	Enclosure	
NGR	702444, 730450	
Description	Two concentric enclosures are visible as a crop mark on an aerial photograph (SMR file; pers. comm. Tom Condit, 11 March 2015).	
Sources	RMP Google maps.	
Images		

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Appendix 13.2 Previous excavations

Previously published archaeological excavations in the area from 1969 to 2018 (www.excavations.ie) are summarised below. The following townlands were assessed Adamstown, Ballybane, Blundelstown, Coolsuddan, Gollierstown, Grange, Keeloges, Kilmactalway, Kilbride, Loughtown Upper, Milltown and Peamount.

1997:086

NANGOR CASTLE/GRANGE CASTLE, KILMAHUDDRICK

Medieval?

DU 17:34 & 37

97E0116

O045312

Test-trenching was carried out along the line of a proposed road leading northwards from the vicinity of the now-demolished Nangor Castle to Grange Castle, within the area of a proposed industrial park. This was the second phase of testing, the first phase having concentrated on the field to the immediate south of Nangor Castle and its general vicinity.

An intensive geophysical survey had been carried out along the line of the proposed road and several anomalies were identified. This testing specifically examined the areas of anomalies, as agreed on with the relevant authorities within the National Monuments Service. Trenching was carried out by machine, and halted once in situ archaeological deposits were encountered. However, as experienced before, only subsoil-cut features survived-years of ploughing the fairly shallow ploughsoil had completely removed any potential archaeological stratigraphy.

Seven trenches were opened. Of these, only three, all located in Grange Field 3, to the east of Grange Castle, produced any significant archaeology. Two linear features 0.5-0.8m wide, of unknown date and function, ran in a north-south direction. However, their proximity both to the 15th-century castle and to one another could suggest substantial archaeological potential. Some spreads of brown soil had 20th-century pottery inclusions in their upper surface, while other areas, a mix of brown soil and broken slate subsoil, were probably the result of the dragging action of the plough.

This licence was taken over by Richard O'Brien to carry out monitoring and excavation along the line of the road (No. 87 below).

Cia Mc Conway, Archaeological Development Services Ltd, Windsor House, 11 Fairview Strand, Fairview, Dublin 3.

1997:087

GRANGE CASTLE BUSINESS PARK, KILMAHUDDRICK

Medieval

DU 17:34 &:37

97E0116ext.

O045312

Monitoring and excavation were undertaken in advance of the construction of an access road and the excavation of foul sewers for a Business Park at Grange Castle. The excavation work continued until February 1998. Documentary evidence is scarce for Nangor Castle, but it is known that a castle stood on the site in the 16th century. Grange Castle is an upstanding 15th-century tower-house. It is proposed to develop an industrial park in this area.

Previous archaeological assessment by Cia Mc Conway (Excavations 1996, 17, 96E273, and above, No. 86) and geophysical survey by A. Mc Cleary, ADS Ltd, in February 1997 established that the area was archaeologically sensitive.

In advance of construction of a site access road topsoil was stripped from a 24m-wide area by mechanical excavator, under archaeological supervision, for a distance of 480m northwards from the Nangor Road. A further strip, 6m wide and 1300m long, was excavated for the sewers. The full 24m-wide strip was excavated in the field adjacent to Grange Castle.

All archaeological features uncovered had been truncated by deep ploughing, resulting in the removal of all but subsurface features cut into natural boulder clay.

A curving ditch was identified in Field 1; it terminated at Nangor Road, and was orientated north-east/south-west. It was 30m in length, 0.8-0.9m deep, and 1.2-2.4m wide. The eastern terminus continued beyond the limits of the excavation. The upper fills contained charcoal, mortar, flint and animal bones, and were aceramic. A decorated bone comb, stick-pin and knife gave the later ditch phase a terminus ante quem of from the 12th to the 13th century AD.

A stone causeway, 0.5-0.6m wide and 0.06-0.1m deep, crossed the ditch. The existence of this ditch had been shown in Mc Conway's assessment.

Field 7 is located between Grange Castle and the Kilmahuddrick Housing Estate. Two curving ditches were identified in this field. One was found under a post-medieval stone and brick trackway. It was 51m in length and varied in width from 1.1m to 1.4m, and in depth from 0.3m to 0.4m. A stone causeway, 0.6-0.84m wide,

crossed it towards the western side of Field 7. No datable finds came from the primary fills of the ditch, but the secondary fills consisted of charcoal-rich clays with animal bones. It continued beyond the limits of the excavation at its western end.

A second ditch was found 1.6m east of the eastern terminus of the first. No archaeological features or deposits were found in this gap. The second ditch closely resembled the first; it was 22m long, 2m wide and 0.5-0.6m deep. The primary fills were sterile apart from some animal bone. The secondary fills consisted of charcoal-rich clays in which were found animal bones, mortar, two metal knives, and a fragment of worked lignite. An incomplete one-sided decorated bone comb and fragments of another in the upper fills gave a terminus ante quem of the 12th to 13th century AD. This ditch continued beyond the limits of excavation at its eastern end. The evidence from Field 7 suggests that extensive early medieval and post-medieval activity survives in this area; the ditches can be interpreted as medieval field boundaries.

A pit that contained a deposit of iron slag was found in Field 2, north of the site of Nangor Castle; it was associated with post-holes and stake-holes, though no structural pattern could be discerned.

Elsewhere various pits, hearths, furrows and field drains were recorded; some of the hearths may be prehistoric in date.

Richard N. O'Brien, Archaeological Development Services Ltd, Windsor House, 11 Fairview Strand, Fairview, Dublin 3.

2000:0223

GRANGE/KILMAHUDDRICK/NANGOR (GRANGE CASTLE INTERNATIONAL BUSINESS PARK)

Various

SMR n/a

00E0263

0043318

The Grange Castle International Business Park is located to the west of Clondalkin village and incorporates part of the townlands of Grange, Kilmahuddrick, and Nangor. Wyeth Medica Ireland intends to construct a biotechnology campus on this site. The area, of c. 100 acres (40ha), was used for agricultural purposes until recently. The site is bounded to the north by the Grand Canal, to the south by the New Nangor Road, to the east by a new housing estate and land reservation for the proposed Dublin Outer Ring Road (linking the N4 and N7 roads), and to the west by the Grange Castle International Business Park access road.

Two medieval occupation sites are adjacent to the boundary of the Business Park. Grange Castle (SMR 17:34) is a fine late medieval tower-house, while Nangor Castle (SMR 17:37), to the south of the development site, appears to have been demolished during the 1970s. Geophysical survey and excavation were previously carried out by Cia McConway and Richard N. O'Brien (Excavations 1996, 17, 96E0273; Excavations 1997, 26–7, 97E0116). This work revealed that plough-truncated medieval and prehistoric features do survive within the confines of the Business Park.

Archaeological assessment by the writer consisted of the excavation of test-trenches during April and May 2000 in Fields 105, 106, 109, 110 (EIS field reference numbers) and in the northern part of Field 111. This was followed by the test-trenching of anomalies detected through geophysical survey carried out by Geophysical Surveys Bradford (GSB) in Fields 104, 107, 108, 111 (southern part), 112, 113 and 114. This assessment took place during June and July 2000.

A ring-barrow was detected through geophysical survey and follow-up test-trenching in Kilmahuddrick townland (Field 108). The remains of field boundaries were revealed close to this ring-barrow. Approximately 50m to the east of the ring-barrow two cobbled surfaces, a charcoal spread and a series of linear features were revealed (see below No. 225).

Other truncated archaeological features were detected in Field 110 to the south of the Grange Castle tower-house. In the other areas that were tested a number of features were detected, the majority of which can be explained by ploughing or by the presence of spreads of dumped redbrick debris. Much of this redbrick debris appears to have been over-fired and reduced to a vitreous slag. There was no evidence for in situ burning or oxidation of the natural subsoil adjacent to these features. These redbrick features were only detected in Field 112.

To the south of Kilmahuddrick townland, in Nangor townland, several features of archaeological potential were detected. In Field 111 a small, undated, charcoal-rich pit was revealed. This contained a small quantity of cremated bone. In the central part of Field 111 a cluster of small, undated pits and charcoal stains was detected. A trench in the south-eastern corner of the field revealed a large cut into natural, containing 19th/20th-century cultural material. This cut corresponds with the location of an 'Old Gravel Pit' marked on the 1864 1:2500 OS map.

Field 112 is located to the north of Nangor Castle and is adjacent to the Business Park access road. In the south-eastern corner of this field a cluster of cobbled surfaces, pits and gullies, associated with medieval pottery, was revealed. Some 60m to the west of this complex a narrow ditch on a south-east/north-west axis was detected. No cultural material that could date this feature was retrieved (see below No. 226).

Further medieval material was uncovered in Field 113. Here, a trench contained a series of linear ditches directly associated with medieval ceramics (see below No. 226). A short stretch of ditch was also revealed in

the north of Field 113. This length of ditch was undated but contained frequent inclusions of charcoal at the base. The ditch proved difficult to trace, but the location and orientation correspond with an anomaly detected in the geophysical survey carried out by GSB. Trenches excavated in the south-eastern portion of this field revealed a series of concrete yard surfaces and modern buildings associated with recent occupation of Nangor Castle. These remains had been covered over by spoil derived from nearby construction activity in the recent past.

Test-trenching in Field 114, a narrow field immediately north of Nangor Castle, revealed modern ground disturbance to a depth of 1.4m below the ground level. This field appears to have been associated with the Nangor Castle gardens.

None of the areas of archaeological potential have any visible, above-ground, expression. Archaeological features, where detected, were present in a truncated form, cut into subsoil and were only apparent when ploughsoil was removed.

Excavation of the ring-barrow and adjacent features commenced under licence 00E0448, while the medieval remains in Nangor townland were excavated under licence 00E0754. Topsoil-stripping during construction was monitored under licence 00E0718.

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2000:0224

GRANGE/KILMAHUDDRICK/NANGOR (GRANGE CASTLE INTERNATIONAL BUSINESS PARK)

Monitoring

SMR n/a

00E0718

0043318

Monitoring of topsoil-stripping commenced in early September 2000. In Nangor townland, in the northern part of Field 111, the remains of a small fulacht fiadh were revealed. This consisted of a small pit or trough, a spread of heat-cracked stone and a linear feature to the south-west of the trough.

The pit/trough consisted of a subcircular cut into natural, 0.56m by 1.25m. The cut was steep-sided, leading to a flat base. It was filled with a mix of silt and compact, stony clays.

A spread of heat-shattered sandstone was located some 0.9m to the west of the trough. This spread consisted of a moderately compact, dark grey, sandy clay with frequent inclusions of heat-shattered sandstone fragments, pieces of burnt clay and charcoal. This spread measured 1.92m north-south x 1.18m with a maximum depth of 0.05m.

Approximately 6m to the west of the spread a linear gully feature was revealed. This gully consisted of a cut into natural boulder clay measuring 2.57m north-south x 0.28–0.54m. This had a depth of 0.16m with sharply sloping sides and a flat base. The cut was filled with a moderately compact, mid-brown clay containing frequent pieces of oxidised clay and occasional flecks of charcoal. Infrequent fragments of burnt bone were noted in the fill. Some 4m to the south of the heat-shattered sandstone spread, a small linear gully feature was excavated. This measured c. 1m north-east/south-west x 0.12m with a depth of 0.14m. The fill of this comprised a mid-brown, sandy clay with frequent charcoal flecking. No archaeological objects were recovered.

To the south of the fulacht fiadh, a backfilled field boundary was revealed by topsoil-stripping. The alignment of this boundary possibly corresponds with a similar ditch encountered in Field 113 (see above No. 223). Topsoil-stripping is set to continue in 2001.

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2000:0225

KILMAHUDDRICK (GRANGE CASTLE INTERNATIONAL BUSINESS PARK)

Ring barrow

SMR n/a

00E0448

304420 231665

The initial detection of this ring-barrow by geophysical survey was confirmed by archaeological assessment under licence 00E0263 (See above No. 223). Excavation commenced in July for a period of eight weeks, during which time the ring-barrow and several adjacent features were excavated.

The ring-barrow was located in Field 108, a large field at the centre of the area designated for the biotechnology campus buildings. The topography is generally level at c. 68m OD. However, the south-eastern corner of the field contains a natural raised area measuring c. 60m east-west x 150m. This area is generally 2m higher than the surrounding topography. The ring-barrow was sited in this slightly elevated position.

The ring-barrow was not visible prior to the geophysical survey or archaeological testing. Following stripping, a dark, circular band of charcoal-rich, black, ditch fill was visible, with a spread of cremated bone in the interior. A series of linear features skirted the eastern side of the ditch. Excavation of the ditch fills revealed a

well-stratified sequence of deposits in a ditch 2.5m wide at the top and 0.25–0.3m wide at the base. The ditch cut had a depth of 1.6m below the level of natural subsoil and measured c. 13m in external diameter. The uppermost fills of the ditch, F4 and F5, contained occasional fragments of burnt bone, charcoal and mollusc shells. Although occasional fragments of burnt bone were recovered from these ditch fills, no coherent or discrete cremation deposits were detected. Fragments of a human skull were recovered from the upper fill. A central fill of mid-brown, silty clay in the ditch sealed a series of stone features. F15 and F16, in the western quadrant, were large limestone blocks resting in the base of the ditch. Charcoal deposits were present on the flat upper surfaces of these stones. Oxidised clay patches against the sides of the ditch, adjacent to these stones, indicate that fires had been lit on these boulders in the ditch.

In the northern quadrant of the ditch, at the base, a stone ‘cist-like’ structure with a capstone was revealed. This was composed of medium-to-large angular stones leaning inwards at an angle of c. 45°. A large, angular capstone was positioned at the apex of the inward-leaning stones. Several of the stones comprising this small structure were fire-reddened, though there were no indications of in situ burning. When excavated, this structure was empty. Some 2m to the east of this structure, at the base of the ditch, a limestone pillar was revealed. This stood upright to a height of 0.62m and had a width of 0.44m.

Within the circular area enclosed by the barrow ditch, several deposits of cremated bone were visible. A small spread of cremated bone was initially apparent, and this may indicate disturbance. Upon excavation this was found to seal a shallow depression filled with frequent inclusions of powdered cremated bone fragments. To the north-west of this, a pit measuring some 2.1m north–south x 0.6m was revealed. This pit contained occasional fragments of cremated bone and appeared to cut an irregularly shaped cremation pit (F87), which measured 1.3m east–west x 0.5m and had a depth of 0.8–0.9m. The upper fill of this was a hard, compact, grey clay with occasional stones. This fill sealed a layer of cremated bone and charcoal. A sherd of pottery was recovered from this material, the characteristics of which all point to an Early Bronze Age date for its manufacture, specifically a Beaker or Food Vessel background (Anna Brindley, pers. comm.). What appears to be a small black bead was retrieved, during sieving, from this deposit.

Two undated pits were excavated adjacent to the barrow. A series of linear features was also revealed in the area surrounding the ring-barrow. These are interpreted as the remains of field boundaries and were found to enclose the ring-barrow in a subrectangular field system. These remain undated. A geological seam was traced running from the north side of the barrow.

Some 50m to the east of the ring-barrow a trench was reopened in Field 109 to examine features originally detected during assessment 00E0263 (see above No. 223). A northern return of the field system found to enclose the ring-barrow was revealed. This places the ring-barrow in a rectangular enclosure measuring c. 50m east–west x 100m (minimum). A metallised surface was found to seal the field boundary in this trench. While the field boundary system remains undated at the time of writing, it is likely to post-date the ring-barrow. A hearth was also excavated.

Analysis of the soil samples from the ring-barrow has recovered evidence of cereal production. Charred remains of barley, wheat and oats were identified in the ditch fills and cremation deposits. Traces of hazel, haw and sloe were also found. Post-excavation analysis of the human remains, the faunal remains and the charcoal samples is ongoing.

A cluster of ring-barrow is located on the upland area of Saggart Hill and Verschoyles Hill, approximately 6km to the south of the Kilmahuddrick site. Within this group, the Lugg monument complex, which contained a ring-barrow, was excavated by Kilbride-Jones in the late 1930s. The Kilmahuddrick barrow may be a northern element of this distributional cluster, or, alternatively, its presence in a heavily ploughed lowland area may indicate a greater survival rate and higher level of visibility in the upland areas.

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2000:0226

NANGOR (GRANGE CASTLE INTERNATIONAL BUSINESS PARK)

Medieval field complex

SMR n/a

00E0754

30440 23117

Excavations commenced in this area of the Grange Castle International Business Park in October 2000 and are continuing at the time of writing (January 2001). The site of Nangor Castle (SMR 17:37) is located immediately outside the southern boundary of the Wyeth Medica Ireland biotechnology campus. There are no upstanding remains of Nangor Castle—demolition appears to have happened in the 1970s. Cartographic evidence and test-trenching carried out close to this area (see above No. 223) indicate that a complex of agricultural buildings and concrete surfaces existed in the area. To the west of the Nangor Castle site, mid-19th-century OS maps depict a well-designed garden. The unkempt remains of this garden exist today to the south of the biotechnology campus.

The place name Nangor appears to be of old French origin. In 1307 there is a reference to the tenements of ‘Kilbryde and the Naungre’, which were held by Walter de Kenley from William, son of John de Galbarry, for a rent of 20 pounds (Mills 1914, 356). Test-trenching carried out by Cia McConway in 1996 at Nangor Castle

revealed at least one substantial ditch and a shallow linear feature to the west of the castle site (Excavations 1996, 17, 96E0273).

The present phase of excavation was designed to resolve any archaeological material in Fields 112 and 113 within the southern boundary of the biotechnology campus. In addition to this, excavation is ongoing to the south of the boundary in a corridor through the Nangor Castle gardens (South Dublin County Council land) to enable a gas pipeline and access road to serve the Wyeth Medica Ireland site.

To date, a complex of intercutting medieval ditches and gullies has been excavated. Some 1500 sherds of locally manufactured medieval pottery (Dublin-type wares, Leinster cooking ware) have been recovered. A complete iron sickle was found in a ditch associated with sherds of medieval pottery. Further details will be provided for Excavations 2001.

Reference

Mills, J. (ed.) 1914 Calendar of the Justiciary Rolls or Proceedings in the Court of the Justiciar of Ireland, Edward I. Part 2. Dublin.

Ian W. Doyle, Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

2001:427

GRANGE CASTLE INTERNATIONAL BUSINESS PARK, GRANGE AND KISHOGE

Various

SMR n/a

00E0061

204230 232120

Test-trenching was carried out at Grange Castle International Business Park, Clondalkin, Dublin 22, on a site owned by South Dublin County Council, during February 2001. The greater part of this site is currently under development as a business park by Wyeth Medica Ireland.

The assessment was concerned with the area immediately south of the Grand Canal in Grange and Kishoge townlands. It is intended to construct an attenuation lake in this area, which will aid drainage. The lake structure will measure approximately 250m north-west/south-east by 90m. An underground 110kV electricity cable will run through this area and towards the west for a length of approximately 1.5km. The terrain in the areas to be affected is relatively low-lying and the land has been used for agricultural purposes. The centre of the area intended for the attenuation lake was subjected to ground disturbance in the recent past. This disturbance appears to have been associated with the diversion of a stream and ground was stripped to bedrock in places.

Sixteen trenches were opened by mechanical excavator. These were placed in the areas which would be subjected to disturbance by the attenuation lake and the electricity cable way-leave.

Trench 1 was located at the western end of the lake and associated roadway. It revealed a long linear feature cutting natural subsoil. Where sectioned, the cut for this feature, which measured 2.6m east-west by 16.5m with a depth of 0.35m, comprised a sloping-sided flat-bottomed gully. The upper fill consisted of a moderately compact light brown clay silt with occasional inclusions of mollusc shells and small pebbles. The lower fill comprised a moderately compact grey clay with occasional mollusc shell inclusions. A small undated hearth was revealed in Trench 4, which was also located to the west of the lake.

Trench 13 was opened on the line of the electricity cable way-leave, at a point where a mound and masonry wall were observed in the extreme north-eastern corner of the field. What is likely to be a modern agricultural feature was revealed, comprised of a mound, a stone wall and a metallised surface. This is likely to represent a watering-hole for livestock formed by excavating a depression, placing the upcast to the west into a mound, which was then revetted with a low masonry wall. A metallised surface was then placed at the point of animal access.

Monitoring of topsoil-stripping was recommended and was later carried out (see below, No. 428).

Ian W. Doyle for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

2001:428

GRANGE CASTLE INTERNATIONAL BUSINESS PARK, GRANGE/NANGOR/KILMAHUDDRICK

Monitoring

SMR n/a

01E0718

304420 231665

Monitoring continued in the townlands of Grange, Nangor and Kilmahuddrick. Wyeth Medica Ireland commenced construction of a biotechnology campus in this area in September 2000.

The campus area is located west of Clondalkin village and incorporates parts of the townlands of Grange, Kishoge, Kilmahuddrick and Nangor. It is bounded to the north by the Grand Canal, to the south by New Nangor Road, to the east by a new housing estate and reservation for the South Dublin Outer Ring Road and, finally, to the west by the Grange Castle International Business Park access road. The Wyeth Medica Ireland site is approximately 90 acres in extent.

Previously, during 2000, excavation in Kilmahuddrick townland concentrated on a prehistoric ring-barrow, which was resolved in advance of construction (Excavations 2000, No. 225, 00E0448). Monitoring of topsoil-stripping in October 2000 led to the identification and excavation of a small fulacht fiadh in Nangor townland. The monitoring of topsoil-stripping within these townlands continued during January 2001. No additional archaeological material was detected.

Ian W. Doyle for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glengageary, Co. Dublin.

2001:429

GRANGE CASTLE INTERNATIONAL BUSINESS PARK, GRANGE AND KISHOGE

Post-medieval

SMR n/a

01E0718 ext.

20423 23212

The archaeological assessment carried out in this area during February 2001 (see below, No. 438) recommended that an archaeologist be present to monitor the stripping of topsoil.

The initial recognition of archaeological features was compromised somewhat by the contractor stripping a quantity of topsoil before informing the archaeologist. However, several metallised surfaces, field drains, pits and gullies of post-medieval and modern date were recognised during the stripping when an archaeological presence was maintained.

In Kishoge townland, to the south-west of the area intended for the attenuation lake, the remains of a subrectangular structure, which appears to have burnt down, were detected. This consisted of what appeared to be the remains of slot-trenches cut into natural boulder clay with a fill of oxidised clay and charcoal. The feature measured 5.8m east–west by 4.6m and appeared to have been truncated through intensive ploughing. Access to this area was not available at the time of the assessment owing to dumping and storage of building materials. This area was later excavated by Edmond O'Donovan (see below, No. 438).

Ian W. Doyle for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glengageary, Co. Dublin.

2001:455

GRANGE CASTLE INTERNATIONAL BUSINESS PARK, NANGOR

Medieval field system

SMR n/a

01E0754

304400 231170

Excavations were carried out in Nangor townland, west of Clondalkin, Dublin 22, during October 2000–January 2001. The excavations revealed a medieval ditch complex. The northern area of the site is presently under development as a biotechnology campus.

Construction of the campus commenced in September 2000. The area excavated in Nangor is south of the construction site and outside the immediate area of impact. No detailed development is presently intended for the greater part of this area. However, additional excavation was undertaken to mitigate the impact of a gas pipeline and associated access road in part of the area formerly occupied by the Nangor Castle gardens. Nangor Castle (RMP 17:37) is located immediately outside the southern boundary of the Wyeth Medica Ireland site. References to a castle at this site date from the 15th–16th centuries. All buildings on the site were demolished during the 1970s, but an area of archaeological potential surrounds the site.

Trench 1, which measured 60m north–south by 33m, was located some 90m to the north-west of the castle site. Geophysical survey and subsequent test-trenching had suggested that the area of Trench 1 held archaeological potential. Excavation in Trench 1 commenced in October 2000 and continued until December 2000. Activity assigned to Phase I in this trench consisted of a linear feature and a pit, both of which cut natural subsoil. These features did not produce pottery or finds. The pit consisted of a rectangular cut into natural subsoil, which contained a series of ash deposits. Areas of oxidised or fire-reddened soil present on the north-east and south-west sides are indicative of in situ burning. This cut was filled with a series of sterile silty layers and dumps of ash.

The Phase I activity was succeeded by a medieval phase of activity which consisted of further linear features, pits and cobbled surfaces. These were assigned to a single general phase which is capable of further subdivision based on stratigraphic grounds. Finds retrieved from the fills of these features include approximately 1000 sherds of Leinster Cooking Ware and Dublin-type wares, and assorted iron finds including nails, an armour-piercing arrowhead, a buckle, a key and an intact iron sickle.

Trench 2, located to the east, detected a similar sequence of linear features, which contained sherds of medieval pottery in their fills. Trench 3, to the south of Trench 1, detected shallow linear features running on an east–west axis. These linear features were succeeded by a pit and a metallised surface, both of which were directly associated with medieval pottery.

Trench 4, located to the west, was excavated to examine a ditch encountered during an earlier assessment. A ditch orientated north-west/south-east with steep sloping sides and a rounded U-shaped base was

revealed. It was 1.05m wide, narrowing to 0.3m at the base, with a maximum depth of 1.1m. Its fill contained occasional fragments of animal bone, from which a radiocarbon date of cal. AD 601–883 was obtained.

Trench 5, located to the south-east of Trench 4, uncovered further medieval linear features. A narrow ditch which ran across the trench on a south-east/north-west axis is likely to represent a continuation of a similar feature encountered in Trench A to the south. A series of post-medieval field boundaries was also detected in Trench 5.

Trench A was excavated to the south of Trench 5 on the line of the gas pipeline and associated roadway. Excavation in this area revealed an undated metal surface and a series of ditches/gullies. Excavation of these commenced in January 2001. Although there were relatively few finds from these features, their stratigraphic relationship indicates that there were five phases of ditches and gullies in the trench dating from medieval to modern times.

The excavation of Trench B, an extension of Trench A, revealed one feature of interest, a substantial medieval ditch which cut into natural subsoil. This was found in the extreme eastern end of the trench. The ditch ran through Trench B, outside the northern and southern limits of excavation. The cut measured 10m north–south by 2.5m, with a depth of 1.1m as exposed, and had sloping sides and a rounded base. The ditch ran on a north–south axis with a slight curve towards the north-east. In overall plan the ditch appears to have been subcircular, enclosing an area to the east of Trench B. The fills of the ditch comprised black sticky silts with organic content. The lower and upper fills contained medieval pottery. No trace of an enclosing bank was detected in the area opened for examination; however, the depth of overburden, composed of cultivated soils, in this area may be in part composed of a levelled bank.

Trench C to the north-east of Trench B did not detect the ditch. No archaeological material was detected in Trench C, where it was found that modern disturbance had removed the old ground surface.

In total, some 1600 sherds of native medieval pottery were recovered from the Nangor excavations. It is of some interest that only two sherds of imported medieval pottery were recovered. The excavated linear features at Nangor may represent the remains of medieval field boundaries with associated water-management gullies. The presence of such linear features, which can be dated to the medieval period by the presence of Leinster Cooking Ware and Dublin-type wares, argues for land enclosure during the medieval period. That cereal production was the purpose of such enclosures may be suggested by evidence from pollen and macro-plant analysis. The examination of a wide range of medieval samples from the Nangor excavations has shown a predominance of wheat over other plant remains.

Ian W. Doyle for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

2002:0448

ADAMSTOWN

No archaeological significance

SMR n/a

01E1147

702819, 732976

Test excavation before the construction of a housing development was carried out in the townland of Adamstown, adjacent to the Newcastle Road, west Dublin. The greenfield site measured c. 200m by 200m. Testing was required because of the proximity of the site to that of Adamstown Castle, SMR 17:29. Seven trenches, 30–50m long, were excavated by mechanical digger. In no trench were finds, features or structures of archaeological significance uncovered.

Georgina Scally, 81 Upper Leeson Street, Dublin 4, for Margaret Gowen & Co. Ltd.

2003:0604

GRANGE

Mill

SMR n/a

03E1210

The site was excavated because it was directly threatened by the realignment of the Griffeen River within the precincts of the Grange Industrial Park. Surface evidence for the mill was in the form of the north wall, surviving as part of the boundary fence separating the Beattie farm from the Grand Canal towpath. Some 19th-century pottery was found on the surface and some fragments of floor tiles from an industrial drying kiln. Testing and subsequent excavation revealed the extent of the building as a single block, 13m west–east by 8.5m. Wall thickness was between 0.8 and 0.9m. The wall structure was of coursed rubble with opes defined by brick dressings. The dressings allowed for the identification of two window opes in the north-east corner of the building. Flanking the main block to the west was a wheel pit, 2.2m in width and 1.6–1.7m in depth. The wheel pit is delimited on the west by a wall 0.85m thick, widening to 1.1m where the axle bearing was mounted. The wheel pit was partially lined with red brick. The upper courses, forming the downslope of the wheel pit, are formed of brick with headers presented, while the lower part of the pit and its base are lined with brick, stretchers presented.

The flanking walls show evidence for wheel wear in the stonework, and this suggests that the wheel had a diameter in the region of 3m. The wheel was breast shot fed from a headrace to the south. The headrace either emanated from a penstock to the south or was linked back to the Griffeen further upstream. There was no evidence for a race in the field south of the mill site. The confluence of the headrace and the wheel pit is again lined with red brick in a rough English bond pattern.

Within the mill structure, the pit for the pit wheel was identified. No machinery was present on the site. Artefacts within the mill structure were largely of 19th-century date, although some sherds of post-medieval imported ware were found in the topsoil but do not appear to be contemporary with the mill. It is possible that the mill has its origin in the later 18th century and served as a gristmill for flour milling. The general water supply would make such a mill difficult to operate. With the inauguration of the Grand Canal, a constant head of water became available and so the mill relocated to the Lock area at Adamstown. It is likely that the machinery was taken from the old mill and tweaked to function within the new mill. The old mill may well have served a later function as a cereal-drying kiln, as suggested by the quantities of kiln tiles found on the northern part of the site.

Red Tobin, Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

2003:0607

GRANGE CASTLE

Monitoring

DU 17:29, 34 & 37

03E0025

030335 23200

Monitoring of topsoil-stripping for a pharmaceutical plant and associated services located at Grange Castle International Business Park was carried out from 8 January to 2 February 2003. The development consisted of a 20-acre greenfield site, of which c. twelve acres were stripped of topsoil by a mechanical excavator equipped with a toothless bucket. The only subsoil cut features uncovered dated to recent times. These consisted of refuse pits, field drains and areas of burning. The field boundary and watercourse that were revealed had been backfilled in the 19th century. All the finds recovered were either post-medieval or modern in date.

John O'Connor, 2 Walnut Rise, Courtlands, Dublin 9, for Archaeological Development Services Ltd.

2003:1918

GRANGE INTERNATIONAL BUSINESS PARK

No archaeological significance

DU 17:34

03E1846

Monitoring of works took place within the constraint area of Grange Castle, RMP 17:34, at Grange International Business Park, Clondalkin. South Dublin County Council required that the site be cleared of debris and secured with a fence and ground-beams. The site was being vandalised and used as a dumping ground. A method statement was agreed with the client and with the National Monuments Service. This involved a low-impact solution involving lightweight plant, with the majority of the work being carried out in dry weather to further reduce the surface damage.

The clearance work was carried out without disturbing any archaeological deposits and without the recovery of any artefacts. The fencing required the excavation of a series of holes for the fence posts. These excavations were monitored and no archaeological deposits were disturbed. The ground slab required some excavation but was secured within the depth of the topsoil and remaining debris field. The work has now been completed satisfactorily.

Red Tobin for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

2004:0602

GRANGE INTERNATIONAL BUSINESS PARK, GRANGE

Burnt mounds

SMR n/a

04E0299

Excavations were carried out during works on the Griffeen River realignment, part of ongoing infrastructure works within the precincts of the Grange International Business Park. The works are principally aesthetic in purpose, designed to enhance the appearance of the park and to highlight the river, which otherwise would have flowed behind the Takeda Pharmaceuticals complex. The area stripped will also accommodate the extended road network that will serve the business park when it is fully occupied.

Topsoil-stripping for this realignment commenced in early December 2003 and continued intermittently until May 2004. Topsoil-stripping revealed the locations of three burnt mounds. Of these three features, two were excavated, as the development was likely to have a total impact on them. The third mound was preserved in situ, as it was located outside the development area.

The first mound was excavated between 16 and 18 February 2004 and the second was excavated from 5 April 2004.

Burnt Mound 1, 303279.542 231522.602

During the monitoring of the topsoil removal this site was identified as an irregularly shaped deposit of firing material (heat-shattered stone and blackened soil). The burnt-mound material extended 28m east-west along the northern edge of the stripped corridor and extended to the south by 8m from the northern baulk. The feature lay c. 25m to the west of the Griffeen River on gently undulating pasture sloping to the south. The evidence from initial survey work and subsequent excavation suggests that the main spread of this site remains preserved in situ to the south of this location.

The nature and extent of the mound material was exaggerated by plough action, which had dragged it from its original focal point to extend over 28m in length. After the removal of topsoil, etc., the F2 mound of firing material extended little more than 0.5m from the limit of the excavation. From this southern extremity, the mound rose to the north to a maximum height of 0.65m at the northern limit of the excavation. No cut features were exposed during the excavation.

Burnt Mound 2, 303104.7 231270.2

The realigned Griffeen crosses the course of the old river at two locations. To allow for the excavation of the first of these crossings it was necessary to divert the Griffeen into a third channel. During stripping prior to this channel being dug the second burnt mound was found. During the topsoil removal this site was identified as an irregularly shaped deposit of firing material (heat-shattered stone and blackened soil).

The area of excavation measured 13m east-west by 17.5m. A silted-up streambed abutted the southern part of the mound. The stream appears originally to have flowed from east-north-east to south-west. It had a width of 3-5m, but the length could not be discerned as it extended beyond the limit of excavation. The stream fill contained water-rolled stones, pebbles and a dark-grey silt with a minimum depth of 0.1m. Wood residue, possibly alder, was in evidence here and was probably indicative of remnants of fen woodland. This stream system is likely to have been the reason for siting the burnt mound at this location.

One of the earliest features on the site was a grouping of stake-holes cut into the clayey peat. These formed a semicircular band. All were comparable in shape and size and all contained the same fill. They ranged in depth from 5mm to 2mm with a diameter of 6-12mm. Small amounts of heat-affected pebbles and small stones around the sides of the stake-holes may be evidence for packing material. The function of the complex is not clear. Some stake-holes are vertical, while others have been driven into the ground at an angle. They follow a vague northeast to south-west pattern, but the angled stakes do not appear to offer support to each other or to any possible structure.

The burnt mound was situated on the northern bank of the silted up stream. The bank was steep-sided. The main concentration of firing material is in the west. No evidence for a trough was found and the only evidence of activity associated with the burnt mound appears to be the stake-hole complex. The mound measured 11m east-west by 4.5m. It is more likely that the original east-west dimensions were closer to being 6m, with a depth of 0.12-0.25m.

Covering and surrounding the burnt mound was a layer of peat measuring 4.64m from north to south by 14.7m, with a surviving depth of 0.2-0.45m. This was a moist dark-reddish-brown peat of moderate compaction that contained inclusions of sphagnum moss, plants and wood. It was most pronounced to the south of the burnt mound, sloping downwards to the stream. A third burnt mound was recorded during the course of the topsoil-strip. The site was not fully exposed but was identified by a number of concentrations of the characteristic firing material. This site was not impacted on by the development and it was possible to preserve it in situ. It was first sealed using a double layer of geotextile material and then covered by a soil bund forming the boundary between the business park and the pitch-and-putt course.

Red Tobin, Margaret Gowen & Co. Ltd, 27 Merrion Square, Dublin 2.

2005:379

ADAMSTOWN

Urban burial ground

SMR n/a

703029, 732827

05E1295

Human remains were located within the road-take of the Adamstown link road (ALR) at the rear of the old Lucan train station adjacent to the Ascon compound in Adamstown, Dublin. The investigations involved the excavation of human remains uncovered during the course of topsoil-stripping in advance of the construction of the ALR. The excavations entailed the lifting of 36 full or partial skeletons and eight disarticulated skeletons. Two linear features and two deposits were also excavated at the site.

The skeletal remains were primarily orientated in a west-east direction, with heads to the west, but a number were aligned slightly along a south-west/north-east axis and two along a north-west/south-east axis. All were in simple graves, with no traces of any coffins or grave-markers. They appeared to represent 43 adults and

one infant. A single find uncovered with a burial was a fragment of plastic rosary beads found in the pelvic region of Skeleton 10. This find may not suggest a modern date for the burials, as they were disturbed and truncated by the railway wall, which appears to date to the 1950s. It is possible that the rosary beads were interred when the burial was disturbed during the demolition of Lucan station or the construction of the wall that divided the site from the Dublin/Kildare railway line. Removal of the wall and build-up on its southern side revealed that skeletal remains did not extend over the northern side of the existing railway wall. It is hoped that further post-excavation and osteoarchaeological analysis of the remains will indicate a possible date for the site.

Ellen O'Carroll, The Archaeology Company, 17 Castle Street, Dalkey, Co. Dublin.

2006:581

NEW IAWS HQ, GRANGE CASTLE BUSINESS PARK, CLONDALKIN

No archaeological significance.

SMR n/a

06E1161

30280 23110

The Grange Castle Business Park has witnessed several archaeological investigations since 2000 (O'Donovan 2004; Doyle 2005). These investigations resulted in the discovery and excavation of several prehistoric sites in the area of the Grange Castle Business Park. The Record of Monuments and Places records two castles located within the grounds of Grange Castle Business Park, namely Grange Castle DU(017–134) and Nangor Castle DU(017–037). The new IAWS HQ has an area of 9.3ha and is located at the south-west corner of Grange Castle Business Park, being bordered on the west by the R120 (Lucan road). The site was part of an extensive geophysical survey carried out by Margaret Gowen & Co. Ltd in October 2005, which revealed that the south-west corner of the site had a distinct magnetic disturbance indicative of a spread of material, possibly rubble.

All groundworks associated with the development were monitored during December 2006. The excavation of the site access road resulted in the discovery of a modern pit, a modern linear spread of angular stone, a small spread of red brick mixed with shells and several modern land drains. No features of archaeological significance were encountered during the stripping of topsoil. The programme for the monitored stripping of topsoil at the eastern portion of the site will resume in January 2007.

References

Doyle, I. 2005 Excavation of a prehistoric ring barrow at Kilmahuddrick, Clondalkin, Dublin 22. *The Journal of Irish Archaeology* 14, 43–75.

O'Donovan, E. 2004 A Neolithic house at Kishoge, Co. Dublin. *The Journal of Irish Archaeology* 12 and 13, 1–27.

Eoin Sullivan, for Margaret Gowen & Co. Ltd, 27 Merrion Square, Dublin 2.

2006:659

GRANGE CASTLE BUSINESS PARK (GRANGE, MILLTOWN AND CLUTTERLAND)

No archaeological significance

SMR n/a

06E0777

Monitoring of ground-disturbance activities associated with the construction of a link road within Grange Castle Business Park was undertaken in July and August 2006. The link road was constructed in the west of the business park from the Takeda Factory to the Nangor Road; 1250m of single carriageway was constructed parallel to the course of the Griffeen River. The majority of the route of the link road was disturbed by the previous realignment of the Griffeen River (see Red Tobin in Excavations 2003, No. 604, 03E1210). No features or stratigraphy of an archaeological nature were identified.

Emer Dennehy, Margaret Gowen & Co. Ltd, 27 Merrion Square, Dublin 2.

2007:515

GOLLIERSTOWN

No archaeological significance

SMR n/a

07E0671

Testing was carried out in compliance with a planning condition for enabling works to facilitate the construction of the district centre at Adamstown, Lucan, Co. Dublin. The proposed development lands were in use as a compound for the railway development and, as such, the topsoil had been stripped from some of the area. A bridge has also been constructed across the lands at the western side. There are no known monuments in the development lands for the district centre and cartographic research indicates that the development site was always laid out in open fields.

Eleven test-trenches were excavated across the development site with a 1.8m-wide toothless bucket. The stratigraphy consisted of c. 0.2m of topsoil underlying subsoil on to natural stony marly soils.

Nothing of archaeological significance was recorded during the testing.
Ellen O'Carroll, 8 Cumberland Street, Dún Laoghaire, Co. Dublin.

2008:363

Gollierstown, Adamstown
 Urban
 SMR n/a
 08E0197
 701516, 732303

An assessment and associated testing were in compliance with a planning condition for the construction of a post-primary school and a community centre. The proposed development is to be located to the south of the SDZ lands and adjoins the railway line. Previous testing was carried out by the author at the adjoining site for the Adamstown District Centre. There are no known monuments in the development lands for the District Centre and cartographic research indicates that the development site was always laid out in open fields.

The proposed development site is located on a brownfield site at the western edges of the Adamstown development. The lands were in use as a compound for the railway development and other developments in the surrounding area and therefore topsoil had been stripped from most of the site. Two large holding tanks at the north-west of the site, a small access road at the south and housing developments to the north-east had already been constructed in the part of the areas proposed for development prior to the author arriving on-site.

Seven test-trenches were excavated across the site with a 1.8m wide toothless bucket. The stratigraphy consisted of c. 0.2–0.4m of topsoil intermixed with debris and overlying subsoil onto natural stony marl soils at the western portion of the site where the proposed community centre is to be located. There was very little topsoil remaining at the eastern end of the development site and the stratigraphy comprised of orange/brown subsoil overlying natural marl subsoil with veins of stone/slate running south-east/north-west across the development lands.

Nothing of archaeological significance was recorded during testing.
Ellen O'Carroll, 8 Cumberland Street, Dun Laoghaire, Co. Dublin.

2013:043

GRANGE/BALLYBANE/NANGOR
 Furnace pit (monitoring)
 SMR n/a
 13E0435
 703978, 703391

Monitoring of a proposed central carriageway at Grange Castle Business Park, Co. Dublin was carried out from 1-8 November 2013. Monitoring followed an archaeological appraisal carried out in September 2013 and geophysical survey was previously carried out throughout the entire area of Grange Castle Business Park.

Two features of archaeological interest were identified during monitoring of topsoil stripping in the east of the development area in Nangor townland. These features comprised a small bowl furnace (0.36m x 0.33m x 0.15m) filled with charcoal-rich soil and slag, and a shallow oval pit (0.97m x 0.69m x 0.1m) filled with charcoal, thought to be a charcoal clamp. These features were located approximately 35m apart and may have been associated with each other.

It is anticipated that specialist analyses in the form of charcoal analysis, radiocarbon dating and metallurgical analysis will be carried out on the material retrieved from the features excavated at the site

Courtney Deery Heritage Consultancy, 65 Mountain View Drive, Boghall Road, Bray, Co. Wicklow

2013:196

GRANGE
 No archaeology found
 SMR n/a
 13E0459

Testing was carried out at the site of a proposed biopharmaceutical plant in Grange Castle Industrial Park, Co. Dublin. The entire development site is approximately 11ha in size however the proposed plant will be built on the southern 7.5ha of the site, leaving the northern portion available for future expansion. Only the southern 7.5ha was subject to testing. A total of 15 trenches, measuring 2,585 linear metres, were excavated across the area of proposed development over the course of four days from 9 December 2013. Nothing of archaeological significance was identified during this programme of testing.

Fintan Walsh for IAC Ltd, Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow

2013:521**GRANGE/BALLYBADE/NANGOR**

Iron Age smelting pit and early medieval charcoal clamp

SMR n/a

13E0435

703873, 731566

Archaeological monitoring of a proposed central carriageway at Grange Castle Business Park, Co. Dublin was carried out from 1-8 November 2013 (east of Pfizer Ireland). Monitoring followed an archaeological appraisal carried out in September 2013 and geophysical survey was previously carried out throughout the entire area of Grange Castle Business Park.

Two features of archaeological interest were identified during monitoring of topsoil stripping in the east of the development area in Nangor townland. These features comprised a small bowl furnace (0.36m x 0.33m x 0.15m) filled with charcoal rich soil and slag, and a shallow oval charcoal clamp (0.97m x 0.69m x 0.1m).

These features were located approximately 35m apart and it was initially thought that they could have been associated, however the dating evidence has indicated otherwise.

The furnace pit contained 1.26kg of metalworking residues and constituted the base of a typical slag-pit furnace. A sample of oak charcoal from fill C3 of the furnace pit returned a radiocarbon date of 2403+/-30 BP (UBA 25347), which was calibrated to 732-400 BC (2 Sigma) dating this feature to the early Iron Age. This radiocarbon date is one of the earliest to come from an Irish iron smelting context to date (Rondelez, 2014). (ITM 703873E 731566N).

A sample of oak charcoal from fill C7 in the charcoal clamp returned a radiocarbon date of 1256+/-32 BP (UBA 25348). The 2 Sigma calibrated result for this was 671-867 AD dating this deposit to the early medieval period. (ITM 703843E 731580N).

The features discovered at the site have been excavated and “preserved by record” and as such no further mitigation measures are necessary in relation to this development, however future development of the adjacent areas have the potential for further isolated small features to be discovered.

Courtney Deery Heritage Consultancy, Lynwood House, Ballinteer Road, Dublin 16

2015:268**GRANGE CASTLE ACCESS ROAD, GRANGE CASTLE**

No archaeology found

SMR n/a

15E0392

An archaeological assessment was undertaken for a site at Grange Castle Access Road, Grange, Dublin 22, on a 2.02 ha site. The site was a green field area within an industrial estate off the Nangor Road. The site of a tower-house (Grange Castle) lies 400m to the south. No archaeological features were recorded in the course of the assessment.

Aidan O’Connell for Archer Heritage Planning Ltd, 8 Beat Centre, Stephenstown, Balbriggan, Co.

2016:049**GOLLIERSTOWN, AUNGIERSTOWN, BALLYBANE**

No archaeology found

SMR n/a

15E0551

763222, 730681

MOORE GROUP undertook a programme of archaeological testing at two sites in West Dublin as part of the development of a 220/110 kV Substation in a green field site at Ballybane/Aungierstown and the development of an interface compound at nearby Kishoge, South County Dublin. Earthsound Archaeological Geophysics carried out surveys of the proposed development works at both sites in October 2015 (detection Device no. 15R0116). At the interface site in Kishoge dipolar anomalies detected suggested that the land has been used for the deposition of debris or imported soils, causing the magnetic interference. This interference appeared to be truncated by a number of possible ditches which, it was suggested, relate to underlying features or may be an artefact of the deposition of the debris or imported soils. At Ballybane, the proposed sub-station site, a series of circular and sub-circular trends were detected across the northern survey area. These were interpreted as representing archaeological ditches or geological trends. Testing involving the mechanical excavation of twelve trenches was carried out from 22-24 February 2016 in bright and dry conditions.

Ballybane Site

The proposed substation site was accessed via a new business park access road south of the New Nangor Road (R134). The site consists of an improved tillage field to the north, cut by a ditch to the south. The field was originally subdivided into a smaller sub-triangular plot, the boundary of which has in recent years been cleared away. Due to regular ploughing the site was relatively even underfoot. The test trenches were excavated by a 15-tonne backhoe excavator using a 1.2m-wide ditching bucket. All the test trenches were

deliberately sited to target sub-surface anomalies identified during the geo-physical survey. These anomalies were variously interpreted as possible pits, ditches or relict boundaries. Trench 1 was located in the north-west corner of the site in relatively even ground. The trench measured 24m in length and was dug to an average depth of 0.5m. The topsoil was a rich humic material and the subsoil contained a high inclusion of angular stones. The only notable feature was a drainage channel at the west of the trench and was orientated north to south.

Kishoge Site

The proposed interface compound at Kishoge is located to the south-east of a roundabout at the junction of the R136 and the Ninth Lock Road. The field contains a high voltage tower with power lines overhead; the ground is of rough pasture with evidence of previous infill. This infilling was confirmed by the geophysical results, frequent 'iron spikes' were interpreted as relating to the importation of soils/debris. Three trenches were excavated across this area. Groundworks exposed a disturbed stratigraphy of imported builders' rubble and topsoil that had been dumped on the site. Subsoil, a boulder clay, was exposed at 1m in depth. There were no finds or features of archaeological potential.

Moore Archaeological and Environmental Services Ltd. Corporate House, Ballybrit, Business Park, Ballybrit, Galway.

2016:083

DUB06 DATA CENTRE, GRANGE CASTLE BUSINESS PARK, BALLYBANE

Bronze Age - Early Medieval

SMR n/a

13E0471

The initial excavation comprised extensive test trenches over a large area within Grange Castle Business Park, County Dublin, on behalf of Microsoft Operations (Ireland) Ltd, in advance of a Data Centre complex. Test trenching began in January 2014, confirming the results of a geophysical survey carried out in 2004, identifying a circular enclosure in one portion of the site, known as Area 11, and two burnt mounds in another portion, known as Area 9. The excavation of Area 11 began in May 2014 and additional, associated, enclosures came to light leading to a prolonged excavation continuing on an intermittent basis until January 2016. The excavations in Area 9 took place in July 2014. Monitoring continued elsewhere in lands impacted by the construction works, with the subsequent recovery of more isolated features.

Area 11

The excavation of Area 11 revealed a series of associated enclosures aligned north-south. The earliest enclosure, Site 3, comprised a circular penannular ditch, with a maximum diameter of 48m, and maximum depth of 1m. Finds within the ditch included iron knives, a pair of mismatched quernstones, and a cluster of cow skulls. An upended cow skull, with human femur, provided an AMS date 656-727 and 737-768 CAL AD. The ditch was encircled by the penannular Site 4 ditch, maximum diameter 86m, which also contained cow skulls. Both Site 3 & 4 enclosures shared a south-western entrance way. The Site 4 ditch was preceded by a linear, and more shallow, east-west ditch running across the north end of the site for a distance of 86m. The large D-shaped Site 2 enclosure, 40m x 32m, attached itself to the southern arc of the Site 4 ditch. Much reworked and augmented, the ditch cut through the underlying limestone bedrock to a maximum of 0.9m. A portion of the old ground surface was recovered within this enclosure as well as the burial of a male and female, within a shallow grave, aligned north-south. Other finds included an articulated sheep or goat within a shallow pit, and a complete horse pelvis and femur.

The smaller Site 1 enclosure comprises two concentric ditches, 14.7m diameter maximum. An occupation surface of redeposited clay set it apart from the larger ritual enclosures, as did the numerous stake-holes, post-holes, and kiln, within the interior. A wattle fence survived in what appears to be a later recut ditch within the enclosure. Much of the clay deposits were characterised by large amounts of charcoal, both in the fills of internal pits, and the ditches. Cremated bone was also recovered, raising the possibility of ritual feasting and / or a funeral pyre being situated here.

A significant feature of the enclosures is the deliberate linking of each ditch to one another. In the case of Sites 3 & 4, a shallow ditch provides the connection. Site 2 was then physically attached to the Site 4 ditch. In the case of Site 1, a ditch emanates from its outer enclosure almost to the lip of the Site 2 ditch.

The burial of two individuals within a shallow grave, the cluster of cow skulls, the deposition of a cow skull with human femur, as well as the insertion of mismatched quernstones, all indicate substantial ritual and ceremonial uses, probably including animal sacrifice. The continuation of pre-Christian rituals is not unprecedented but is stark in view of the nearby presence of Clondalkin monastic settlement.

Several post-1169 medieval ditches ran up to, aligned themselves to the enclosures.

Area 9

Two fulacht fiadh were situated in a waterlogged field. The remains to the west comprised a shallow unlined trough, a well and several pits, including a recut pit indicating a second phase of use, as well as a spread of heat-shattered stones. Finds included fragments of human bone in a deep pit.

Thirty metres to the east, another fulacht fiadh comprised troughs, pits, numerous stake-holes and an elongated gully. The stake-holes, and an associated deep trough, appear to belong to a second phase of use. The findings tend to support the hypothesis of intermittent communal feasting. Other archaeological sites have since been excavated within the Data Centre complex, although none to the same scale as those described above. They include a Bronze Age structure, and a possible Neolithic structure. A summary will be submitted in due course. Excavations were also carried out in an adjacent associated site under licence 14E0453 in the townland of Nangor revealing a corn-drying kiln, medieval field boundaries as well as two clusters of cremations pits.

Neil O’Flanagan, Botanic Court, 30-32 Botanic Road, Glasnevin

2016:084

DSF, GRANGE CASTLE BUSINESS PARK

Bronze Age cremation pits & medieval corn-drying kiln

SMR n/a

14E0453

Excavations were carried out on behalf of Sisk & Sons Ltd during the course of 2015-16, yielding a corn-drying kiln, medieval field boundaries, and two clusters of cremation pits.

The kiln was dumbbell shaped, 6.06m in length, 1.4m wide across its flue, and cut to a depth of 0.48m. The fill included clays that appear to have originally formed part of the roofing of the kiln, indicating that the roof collapsed after its use, to be followed by a gradual natural accumulation.

The kiln lay adjacent to a pair of parallel ditches, one of which extended to 38m within the monitored area, with a depth of 0.25m maximum.

Some distance to the south, a cluster of 5 cremation pits came to light, with burnt bone within the pits evident from the surface. The pits were cut to a depth of 0.32m maximum, and a diameter of 0.37m maximum.

Further to the south, another cluster of 4 cremation pits, including a shallow oval-shaped pit, measuring 0.57m in length, and 0.07 in depth, and another circular pit 0.48m in diameter, and 0.14m in depth. Some of the pits appear to have been ‘capped’, or sealed.

Neil O’Flanagan, Botanic Court, 30-32 Botanic Road, Glasnevin, Dublin 9

2016:094

BALLYBANE AND AUNGIERSTOWN

No archaeology found

250m from ‘the zones of notification’ for RMP’s DU 21-108 & 109

16E0030

Archaeological testing at the site of a proposed substation site at Ballybane and an interface compound at Kishoge, Co. Dublin was undertaken between the 22nd and 24th of February 2016. The test trenches were purposely sited on both sites to provide coverage for the new development and to investigate geophysical anomalies identified in an earlier survey. The trenches exposed a number of modern drainage channels across the site and a natural sterile stratigraphy elsewhere. The anomalies can be accounted for by modern disturbance, drains and geology. There was no evidence for any features of archaeological potential.

Billy Quinn for Moore Archaeological and Environmental Services, 3 Gort na Ri, Athenry, Co. Galway

2016:147

GRANGE CASTLE BUSINESS PARK

Early modern agricultural activity

SMR n/a

15E0394

703773, 732160

Testing and monitoring were carried out at Grange Castle Business Park, Clondalkin, Dublin 22, on behalf of Interxion Ireland in advance of the construction of a new data centre. Testing (followed by monitoring as an extension to the existing licence in January 2016) was required as a condition to grant of planning (SD15A/0034: Condition 11 b) from South Dublin County Council.

The 7 test trenches (totaling 229m) were aligned to investigate a faint geophysical trend (c. 23m in diameter) that was identified during geophysical survey of the site in January 2015. The trenching did not reveal any features of considered archaeological significance but did identify a furrow, some oxidised soil, brick waste and evidence of modern ploughing.

The testing report recommended monitoring of the soil strip – due to the wider archaeological/historical significance of the surrounding landscape and the small percentage of the development’s footprint that was assessed through the initial testing.

Monitoring was undertaken over two days in January 2016 and exposed evidence for agriculture (furrows) and land improvement (drains) on the site in the early modern to modern period; isolated spreads of burnt clay, brick and charcoal (which were also frequently contained in the backfill of the agricultural features) indicate contemporary light industrial in the vicinity of the site – the brick inferring such activity may have

been associated with a brickfield/brick firing and/or the demolition of brick buildings. However, no features of considered archaeological significance were recorded. The site was fully reduced to the level of natural subsoil under archaeological supervision.

Denis Shine, Number 1, Brendan Street, Birr, County Offaly

2016:340

BALLYBANE, BALLYMAKAILY, CLUTTERLAND, GRANGE AND MILLTOWN

Post-medieval structure

SMR n/a

16E0520

702670, 731650

The development is intended to improve the standard of the existing carriageway on both the Adamstown Road and Nangor Road, and will provide footpaths, cycle tracks, pedestrian crossing facilities, public lighting and two new signalised junctions. The overall length of the scheme is 2.45km. The excavation of six test trenches located throughout the proposed development area failed to reveal any archaeological features or artefacts.

Test trenching in Milltown townland, immediately west of Adamstown Road, revealed two associated mortar-bonded stone walls. The walls appeared parallel, and were 25m apart, forming the gables of a structure that was orientated north-east/south-west. A concrete floor was continuous throughout the structure at a depth of 0.4m below the existing ground level. A structure is depicted in this location on the First Edition Ordnance Survey map.

Dermot Nelis, 36 Fingal Street, Dublin 8

2016:418

PEAMOUNT-SAGGART TRUNKMAIN PROJECT

No Archaeological Features Uncovered

16E0264

700913, 731250m

As part of the overall Leixlip to Saggart Trunkmain Project it is proposed to construct a c. 7km water pipeline from the existing Peamount to the existing Saggart Reservoir, Co. Dublin, together with extension/upgrading works at the existing reservoirs, all located within the townlands of Loughtown Upper, Milltown, Keeloges, Westmanstown, Blundelstown, Jordanstown, Collegeland, Rathcoole and Saggart. This was subjected to an Archaeological Impact Assessment, which included the results of a limited programme of archaeological testing and monitoring of geotechnical investigations.

A limited programme of testing was undertaken as part of the preparation of the Assessment. This entailed the excavation of two 30m long trenches along the edge of the proposed wayleave corridor nearest monuments DU021-110 and DU021-111, Ring Ditches, Keeloges Td. Nothing of archaeological interest/potential was uncovered. The excavation of a total of 48 Geotechnical Trial Pits and 3 Geotechnical Slit Trenches was monitored. No subsurface features of archaeological interest were noted, although a total of 6 sherds of pottery, five of medieval date, were recovered.

Martin E. Byrne, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare

2016:464

GRANGE CASTLE SOUTH BUSINESS PARK, BALLYBANE

Early medieval/medieval enclosures

DU 21:108 & 109

16E0531

703029, 730829

The areas tested were identified initially from studies of aerial photography and geophysical survey results and a very close correlation between the test trenching results and the results of the geophysical survey was noted.

AH1 represented a recorded concentric enclosure (DU021-108) with an internal ditched enclosure measuring c.50m east to west and 60m north to south and an outer ditched enclosure measuring c.90m in diameter. The test trenching confirmed the presence of extensive and well preserved internal and external ditches measuring 4m wide and 1.80m in depth below the current ground level. Numerous internal features were identified which comprised a group of linear type features and pits all of which are suggestive of domestic activity within the enclosure. The enclosure is likely to represent an early medieval settlement site.

AH2 was located 100m to the south of AH1 and represented a probable circular enclosure measuring 25m in diameter. The test trenching clearly identified the presence of a single – ditched circular enclosure measuring between 20m to 25m in diameter, with the ditch averaging 3m in width. The ditch was present within three test trenches and probably represents a ringfort or similar enclosure.

AH3 was described in the geophysical survey as a negative band of data oriented southwest-northeast and extending into the adjacent field which may represent a former track-way. The test trenching of this feature

recorded two linear parallel ditches both measuring 3m wide by 1.60m deep that appear to form an old abandoned road or track. Both ditches contained old terracotta land drainage pipes suggestive of a relatively modern date for these two features.

AH4 was located in the east of the northern most field and was identified in the geophysical survey as a cluster of isolated responses which may represent a spread of burnt material or cluster of small pits and larger, isolated pit-type features. Archaeological test trenching in this area failed to identify any features of an archaeological nature. The ground was quite disturbed in this part of the site and it would appear to have been subject to test trenching previously.

AH5 represented an enclosure (DU021-109) located in the southern field, measuring c.44m with a probable entranceway in the east. The archaeological test trenching confirmed the presence of a single-ditched circular enclosure, 44m in diameter with the ditch measuring 3m wide and 1.60m deep. The general appearance of this feature is suggestive of a possible ringfort type enclosure. No internal features were recorded.

AH6 represented a circular internal ditched enclosure measuring c. 37m in diameter encompassed by a larger oval-shaped enclosure measuring c.75m x 42m. The test trenching confirmed the presence of the large elongated oval enclosure measuring approximately 75m north-south by 42m east-west with a smaller associated internal enclosure c. 37m in width containing features suggestive of occupation. The external ditch of this enclosure measured on average 2.60m wide and 1.60m deep. The site is likely to represent a multi-phased early medieval settlement site.

AH7 was identified in the geophysical survey as a series of circular and sub-circular trends and five possible pits which may be archaeological or agricultural in origin. The test trenching failed to identify any features of an archaeological nature. A field boundary was recorded containing old terracotta land drainage pipes suggestive of a relatively modern date.

AH8 was identified in the geophysical survey as a series of linear negative magnetic trends which were suggestive of archaeology. The test trenching of this area failed to identify any features of an archaeological nature. A field boundary was recorded containing old terracotta land drainage pipes suggestive of a relatively modern date.

Within Field 1, two sections of a possible linear double ditched type feature were recorded with curving u-shaped termini (AH 9-10). These two parallel ditches may form a linear boundary and one of the ditches was clearly identified by the geophysical survey. An archaeological section excavated through one of these ditches recorded its width as 2.5m and depth as 1.45m in depth. The deposits recorded within this section appear similar to that recorded within area AH1 and contain no modern materials suggestive of modern field boundaries.

The geophysical survey and the results of archaeological test trenching clearly indicate that the site contains significant archaeological remains including four separate enclosure sites, two of which are scheduled for inclusion in the next revision of the Record of Monuments & Places. Although preservation in situ of archaeological remains should always be the preferred option, where such can be accommodated within any proposed development, the present site is located with a partly developed business park and any future development here is likely to extend to the entirety of the two fields resulting in an inevitable impact on all identified archaeological features. Any proposed development of this site should take into account the surviving archaeological remains and where possible the development should be designed to avoid the archaeology.

Jon Stirland Will O'Siorain Robert Breen, Archaeological Consultancy Services Unit, Unit 21 Boyne Business Park, Greenhills, Drogheda, Co Louth

2016:495

GRIFOLS PHASE 2 SITE #B201, GRANGE CASTLE BUSINESS PARK, GRANGE

Testing, monitoring and excavation (Isolated pits)

SMR n/a

13E0459

703500, 731930

Testing (Phase 2) was undertaken within the footprint of a proposed biopharmaceutical plant at Grange Castle Business Park, Nangor Road, Grange, Dublin 22 in 2016. This testing followed from a previous phase (Phase 1) of testing undertaken in the southern half of the development site (2013:196), under an extension to licence 13E0459. A total of 13 test trenches were excavated within the Phase 2 development area.

One archaeological feature (AA 1: a pit filled with charcoal-rich soils) was identified. Subsequent monitoring of the Phase 2 development area in late 2016 identified an additional six archaeological areas (AA 2–7) all of which are individual pits/spreads similar to AA1. These areas were excavated under an extension to 13E0459 in December 2016.

Fintan Walsh, IAC Ltd, Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow

2016:530

GRANGE CASTLE

Tower-house
DU 17:34
16E0510
703859, 731879

Site investigation works associated with a programme of conservation at Grange Castle, Clondalkin, Dublin 22 (OS Sheet 17) by South Dublin County Council took place in October 2016. IAC Ltd monitored these groundworks.

The original structure of Grange Castle (DU017-034) dates from c. 1580 and has an 18th-century, two-storey addition attached to its western elevation. The overall footprint is 6m x 16m. While the buildings were inhabited until the 1970s, they are now in a state of dilapidation. There is significant build-up of vegetation including tree and shrub growth to the external walls of the castle as well as to the internal floors at ground floor level and at first floor level over a deep arch to the original castle.

Monitoring was carried out in October 2016 and a total of eight pits were excavated. The pits revealed that both the Georgian house and the earlier tower-house possess shallow foundations. Nothing of archaeological significance was identified within the pits surrounding the house and tower-house.

Paul Duffy, IAC Ltd, Unit G1, Network Enterprise Park, Kilcoole, Co. Wicklow

2017:042

BALLYBANE AND MILLTOWN

No archaeology found
SMR n/a
16E0520 ext.
702620, 731140

The development is intended to improve the standard of the existing carriageway on both the Adamstown Road and Nangor Road, and will provide footpaths, cycle tracks, pedestrian crossing facilities, public lighting and two new signalised junctions. The overall length of the scheme is 2.45km. Test trenching in Milltown townland, immediately west of Adamstown Road, in 2016 (Licence No. 16E0520) revealed two associated mortar-bonded stone walls. The walls appeared parallel and were 25m apart, forming the gables of a structure that was orientated north-east/south-west. A concrete floor was continuous throughout the structure at a depth of 0.4m below the existing ground level. A structure is depicted in this location on the First Edition Ordnance Survey map.

Additional test trenching in April 2017 confirmed the structure to be built directly on geologically deposited strata, and no associated or earlier phases of activity were noted. A test trench was also excavated in Ballybane townland in April 2017, and no archaeological features or artefacts were noted.

Dermot Nelis, 36 Fingal Street, Dublin 8

2017:411

BALLYMAKAILY, GRANGE CASTLE BUSINESS PARK

Urban monitoring
SMR n/a
16E0471 ext.
703002, 732209

Testing and monitoring was conducted in advance of a proposed development of a new Data Centre, and associated works, in Ballymakaily Townland, Clondalkin, Dublin 22. The site is in close proximity (800m) to Grange Castle (DU017-034) as well as a range of other upstanding remains and sub-surface archaeological sites. This archaeological work followed a previous phase of testing undertaken by Finola O'Carroll in 2016 in the southern portion of the site. The licence was extended and transferred in January 2017.

Testing and monitoring were required as a condition of planning (Planning Ref. No. SD16A/0345; South Dublin County Council – Condition 12). Testing of the site was completed by mechanical excavator in February 2017. Seven trenches were positioned to investigate anomalies identified during a previous geophysical survey. Monitoring was also undertaken, under the same licence, in April 2017 in advance of a soil strip associated with the construction works (specifically an attenuation pond). No features of archaeological significance were recorded in either phase of works. However, considering the discovery of archaeological remains in the wider region (including Neolithic Houses, Bronze Age Settlement, Ring-Barrows and an Early Medieval Complex) monitoring was recommended for any and all future works.

Denis Shine, CRDS Ltd, Number 2, Saint Brendan Street, Birr

2017:597**GRANGE**

No archaeology found

SMR n/a

17E0257

703293, 731784

Archaeological monitoring and testing were undertaken as a condition of planning prior to the construction of an extension to the existing Takeda Ireland pharmaceutical plant within Grange Castle International Business Park in south Co Dublin. Previous archaeological investigation in the vicinity of the development site exposed a Neolithic house, a Bronze Age ring barrow and numerous fulachta fiadh. Earlier archaeological monitoring and excavation in the vicinity of Grange Castle identified a curving ditch orientated NE/SW with the contents suggesting a date phase of 12th/ 13th century.

The overall site area was approximately 17 hectares and the location of the new production facility as well as lands scheduled for the temporary construction compound and car park were tested in advance of the initial phase of the groundworks. A total of eight test trenches were mechanically excavated. Testing at the site compound and temporary car parking area at the western side of the development site revealed that the area had previously been stripped of topsoil and filled with modern inert material. Monitoring of topsoil removal on the footprint of the production building site exposed the partial remains of a nineteenth century building indicated in the 1st Edition OS map for the area. This survived as a localised spread (2m NS/1.7m EW) of red brick and fragmented limestone. No other features or finds of archaeological or cultural heritage value were exposed during topsoil stripping at the development site.

Margaret McCarthy, Rostellan, Middleton, Co. Cork

2018:458**BALLYBANE/AUNGIERSTOWN AND BALLYBANE/CLONDALKIN**

No archaeological significance

DU 21:109

18E0292

703105, 730807

A total of 38 test trenches were excavated, across three areas (Area A, B and C). Trenches 1-7 were located in Area A, the north-east section of the proposed development site, Trenches 8-27 were located in Area B to the west, north-west and south-west of the excavated enclosure site Area 3 (AH5; RMP DU021-109; Licence No. 17E0577) and Trenches 28-35 were located in Area C to the south of Trenches 1-7 within the property boundaries of Erganagh, Kent Cottage, and Weston Lodge.

No significant sub-surface archaeological remains are present within the areas tested. There were no indications that there were any outlying archaeological features relating to either of the two enclosure sites (Area 4–AH5 and Area 4–AH6). The features that were encountered were generally drainage and cultivation features relating to the post-medieval agricultural usage of the lands.

The geophysical anomalies identified in March 2018 that could be directly investigated proved to have no archaeological significance. However, due to constraints on access, it was not possible to excavate all the trenches originally planned in the south-west quadrant of the site, so a number of the geophysical anomalies have not been assessed. There is still a potential that these anomalies could reflect the presence of subsurface archaeological features.

The only feature of potential interest encountered was the wide linear ditch (027) encountered at the south-west end of Trench 29 running parallel to the townland boundary between Ballybane and Aungierstown and Ballybane. This ditch appears to represent the sub-surface remains of the earlier (pre-1900) configuration of this townland boundary. It appears on historic mapping as a double field boundary and possibly an earlier trackway or laneway.

Jean O'Dowd, Rubicon Heritage Services Ltd, Office 8, Dominick Court, No. 41 Dominick Street Lower, Dublin

2018:538**AUNGIERSTOWN, BALLYBANE AND MILLTOWN**

Medieval linear features

SMR n/a

18E0484

703050, 730780

Development involved installation of 110kv ducts to facilitate operation of a 220kv substation under construction in the Grange Castle Business Park South site. The scheme measured approximately 550m in length north-west/south-east x 15m in width north/south (maximum), and was located immediately north of an existing north-west/south-east orientated road (Grange Castle South Access Road).

Fieldwork previously carried out on site by Rubicon Heritage revealed two roughly parallel ditches, on average 5m apart, running north-east/south-west within the development area. A small sub-circular deposit

of greyish-brown stony silty clay was also revealed within the area of land take. A rough piece of granite measuring 0.25m x 0.2m x 0.1m was recovered from the surface of this deposit; it contained a single evenly-pecked face suggestive of a grinding surface. A shallow arc on the opposite surface is suggestive of part of a broken central perforation. Pending specialist examination, it was suggested that this is a fragment of a rotary quernstone of uncertain type.

A Method Statement was submitted to facilitate excavation of these known archaeological features, and for test trenching of the remainder of the area of land take.

Excavation of these features has now been completed. A report on the pottery prepared by Clare McCutcheon confirmed that of the 60 sherds recovered from the site, 41 are medieval in date. In addition to the household pottery, three sherds of post-medieval unglazed red earthenware roof tile were recovered, one of which is a fragment of pantile. The fabrics and vessel forms are consistent with other sites in the wider Dublin city area. The medieval glazed ware in particular was very worn with all surfaces reduced by post-depositional wear.

No additional archaeological features or artefacts were revealed as a result of carrying out the monitoring.
Dermot Nelis, 36 Fingal Street, Dublin 8

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Appendix 13.3 National Inventory of Architectural Heritage

The recorded archaeological sites within c. 1km of the development are listed below, all noted in the National Inventory of Architectural Heritage (NIAH) for Co. Dublin (www.archaeology.ie).

Peamount, Newcastle, South Dublin County



Reg. No.	11208003
Date	1790 - 1810
Previous Name	N/A
Townland	LOUGHTOWN UPPER
County	South Dublin County
Coordinates	301347, 230820
Categories of Special Interest	ARCHITECTURAL ARTISTIC SOCIAL
Rating	Regional
Original Use	country house
In Use As	office

Description

Detached five-bay three-storey former country house, c.1800, now in use as hospital administrative offices. Pedimented central breakfront bay with steps leading to panelled timber door. Pedimented doorcase having pilasters, with Venetian and Diocletian windows over, the latter now containing a clock. Roughcast rendered walls with cut stone dressings. uPVC casement windows. Blank gables with full-height chimney breasts. Rere elevation has advanced bay with arched and Diocletian windows. M-profile slate roof with chimney stacks to gables. Six-bay three-storey laundry extension to north. Multiple modern annexes to west. Commemorative plaque in hallway.

Appraisal

A handsome, substantial former Palladian country house which, though no longer in domestic use, retains its original imposing form and some internal features. Acts as a focal point within the hospital grounds.

Milltown, South Dublin County

Reg. No.	11208005
Date	1850 - 1900
Previous Name	N/A
Townland	MILLTOWN (NE. BY.)
County	South Dublin County
Coordinates	302185, 230870
Categories of Special Interest	ARTISTIC SOCIAL TECHNICAL
Rating	Regional
Original Use	gates/railings/walls
In Use As	gates/railings/walls

Description

Pair of cylindrical rendered gate piers, c.1870, of squared limestone with conical cement capping. Five-bar wrought-iron gate with arched bar. Former entrance to farm house beyond, now demolished.

Appraisal

A fine intact example of a type of vernacular gateway peculiar to this area of County Dublin. Preserves the old road line and is now set back from the re-aligned section.

Milltown, South Dublin County

Reg. No.	11208006
Date	1840 - 1860
Previous Name	N/A
Townland	MILLTOWN (NE. BY.)
County	South Dublin County
Coordinates	302518, 230958
Categories of Special Interest	ARCHITECTURAL
Rating	Regional

Original Use outbuilding
In Use As outbuilding

Description

Detached two-storey farm outbuilding, c.1850, with two-bay gable ends. Rendered walls. Blind wall to street with chamfered corners. Timber sash and casement windows. Corrugated aluminium pitched roof. Adjoining rubble stone walls of demolished outbuildings to south-east and ruinous cottages to north-east.

Appraisal

The chamfered corners of this outbuilding indicate the volume of horse-drawn traffic originally passing into the farm complex. Such buildings following the road line sheltered the farm yard and were a characteristic feature of Irish agriculture. This farm was associated with the now-demolished Milltown House.

Milltown, South Dublin County

Reg. No. 11208008
Date 1840 - 1870
Previous Name N/A
Townland GRANGE (BA. W BY.)
County South Dublin County
Coordinates 302752 -231546
Categories of Special Interest ARCHITECTURAL
Rating Regional
Original Use farm house
In Use As farm house

Description

Detached four-bay two-storey farm house, c.1850. Roughcast rendered walls. uPVC door and casement windows. Replacement pitched slate roof with terracotta ridge tiles and gable coping. Two central brick chimney stacks. Later drip moulding over northern front window. Lean-to extension to the rere, and shed to side.

Appraisal

A tidy detached farm house which retains its original form and an unusually formal front garden, still serving the farm to the rere.

The Manor, Peamount Hospital, Newcastle, South Dublin County



Reg. No.	11208009
Date	1800 - 1830
Previous Name	N/A
Townland	LOUGHTOWN UPPER
County	South Dublin County
Coordinates	301355, 230863
Categories of Special Interest	ARCHITECTURAL HISTORICAL SOCIAL
Rating	Regional
Original Use	farm house

Description

Detached three-bay two-storey former farm house, c.1815, now disused. Rendered walls. Glazed timber door with leaded overlight. Recent door opening alongside, now blocked. Timber sash windows. Pitched slate roof with stone ridge tiles, gable coping, and two brick chimney stacks to gable ends. Single-storey extension to rere with pitched slate roof. Single-storey farm outbuilding and two-storey stable building in yard opposite, with rendered walls and pitched slate roofs.

Appraisal

A handsome former farm house with a rich history associated with Peamount House and Hospital. The farm formerly provided food for the hospital, before being used as a library and then workers' accommodation.

Milltown, South Dublin County



Reg. No.	11208015
Date	1750 - 1770
Previous Name	N/A
Townland	MILLTOWN (NE. BY.)
County	South Dublin County
Coordinates	302520, 231041

Categories of Special Interest	ARCHITECTURAL
Rating	Regional
Original Use	farm house
In Use As	farm house

Description

Detached four-bay two-storey farm house, c.1760, with attached outbuildings. Rendered rubble stone walls. Glazed timber door in gabled porch. Timber sash windows. Some openings blocked. Possible traces of carriage arch to central bay. Pitched slate roof with two rendered chimney stacks. House possibly originally single-storey. Adjoining outbuildings to north with hayloft, and enlarged openings inserted recently. Partial tubular iron sunburst gate. Original fir tree stand to south.

Appraisal

A fine example of an eighteenth-century farm cottage and barn, demonstrating a classic sequence of vernacular evolution. Retains many period features.

Polly Hop's, Milltown, South Dublin County

Reg. No.	11208016
Date	1780 - 1810
Previous Name	N/A
Townland	MILLTOWN (NE. BY.)
County	South Dublin County
Coordinates	302591, 231012
Categories of Special Interest	ARCHITECTURAL SOCIAL
Rating	Regional
Original Use	house
In Use As	public house

Description

Formerly detached four-bay two-storey former house, c.1790, in use as public house. Roughcast rendered walls with parallel render quoins. Timber casement windows. Timber door with iron fittings. Pitched slate roof with single rendered chimney stack. Series of nineteenth- and twentieth-century extensions to south and west.

Appraisal

This site has long been in use as a public house as shown by the extensions surrounding the original modest rural house. Its presence gives a focus to this important and formerly more developed junction.

St Finian's R.C. Church, Peamount Hospital, Newcastle, South Dublin County

Reg. No.	11208017
Date	1910 - 1920
Previous Name	N/A
Townland	PEAMOUNT
County	South Dublin County
Coordinates	301221, 230786
Categories of Special Interest	ARCHITECTURAL SOCIAL TECHNICAL
Rating	Regional
Original Use	church/chapel
In Use As	church/chapel

Description

Detached gable-fronted church, c.1915, with two single-storey aisles and full-width porch, added c.1930. Corrugated-iron cladding on a timber frame to walls and roof. Timber casement windows. Plain timber doors. One gable half-timbered, the other having a tripartite window with central statue niche. Simple timber truss roof with iron tie bars to interior.

Appraisal

A distinctive, unusual church, displaying an increasingly rare vernacular use of corrugated iron as a building material. Still in regular use, the church adds charm and character to the hospital grounds.

Peamount Hospital, Newcastle, South Dublin County

Reg. No.	11208018
Date	1935 - 1950
Previous Name	N/A
Townland	MILLTOWN (NE. BY.)
County	South Dublin County
Coordinates	301561, 230908

Categories of Special Interest	ARCHITECTURAL SOCIAL TECHNICAL
Rating	Regional
Original Use	church/chapel
In Use As	church/chapel

Description

Detached two-bay single-storey mortuary chapel, c.1945. Roughcast rendered walls with smooth rendered eaves. Narrow openings with original timber sash windows. Timber tongue and groove door. Flat roof with wide eaves.

Appraisal

A simple, virtually intact mortuary chapel, also retaining its original internal features. Discreetly sited in a corner of the hospital grounds.

Peamount Hospital, Newcastle, South Dublin County

Reg. No.	11208019
Date	1910 - 1940
Previous Name	N/A
Townland	LOUGHTOWN UPPER
County	South Dublin County
Coordinates	301469, 230833
Categories of Special Interest	TECHNICAL
Rating	Regional
Original Use	tank/silo
In Use As	tank/silo

Description

Cylindrical riveted iron plate oil tank, c.1925. c.3 metres in diameter and 6 metres in length, supported and surrounded by concrete frame. Portal to top accessed by ladder.

Appraisal

A vigorously articulated oil tank, still in use within the hospital grounds. An unusual intact early twentieth-century feature.

Peamount Hospital, Newcastle, South Dublin County

Reg. No.	11208020
Date	1910 - 1915
Previous Name	N/A
Townland	LOUGHTOWN UPPER
County	South Dublin County
Coordinates	301326, 230801
Categories of Special Interest	ARCHITECTURAL SOCIAL TECHNICAL
Rating	Regional
Original Use	hospital/infirmery
In Use As	restaurant
Additional Use	shop/retail outlet

Description

Single-storey double-gable-fronted pavilion, c.1912, with attached ancillary buildings. Now in use as a dining hall. Timber frame with timber clapboard walls. Full width glazed timber veranda to front. Timber casement windows. M-profile felt roof. Southern wall now roughcast rendered with uPVC casement windows.

Appraisal

This dining hall and shop preserve the form and many materials of the original temporary timber pavilions. Built as a disease control measure by the TB sanatorium, they are a valuable reminder of this phase of the history of the estate.

St Luke's C. of I. Church, Peamount Hospital, Newcastle, South Dublin County

Reg. No.	11208021
Date	1910 - 1920
Previous Name	N/A
Townland	LOUGHTOWN UPPER
County	South Dublin County

Coordinates	301241, 230871
Categories of Special Interest	ARCHITECTURAL ARTISTIC SOCIAL TECHNICAL
Rating	Regional
Original Use	church/chapel
In Use As	library/archive

Description

Detached four-bay gable-fronted former church, c.1915, in use as hospital records store. Timber framed and clad in corrugated-iron sheets throughout. Timber casement windows with decorative surrounds. Pitched roof with a single vent on each pitch.

Appraisal

A charming, distinctive building which, though no longer in religious use, retains the form and features of its former function. A good example of the use of corrugated iron in a vernacular manner.

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Appendix 13.4 Archaeological figures

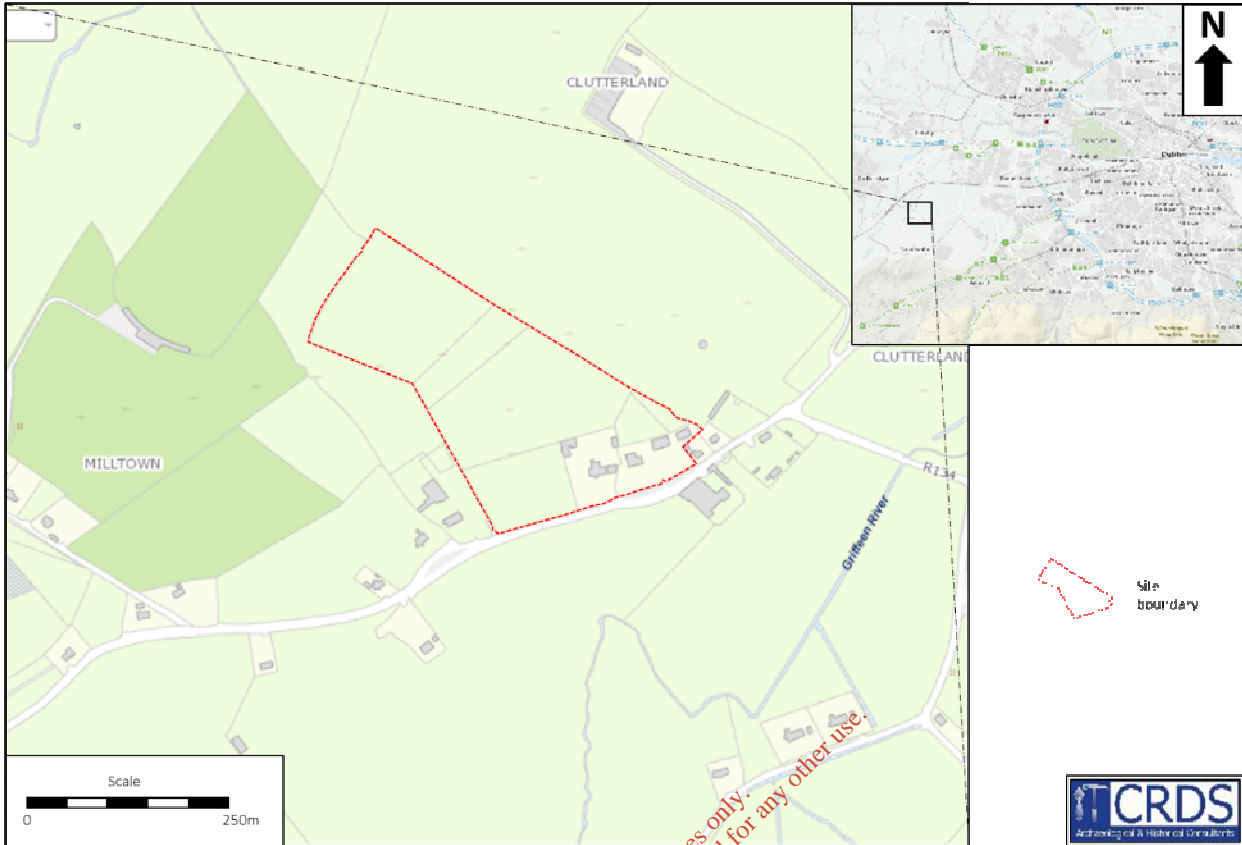


Figure 1. Location of proposed development

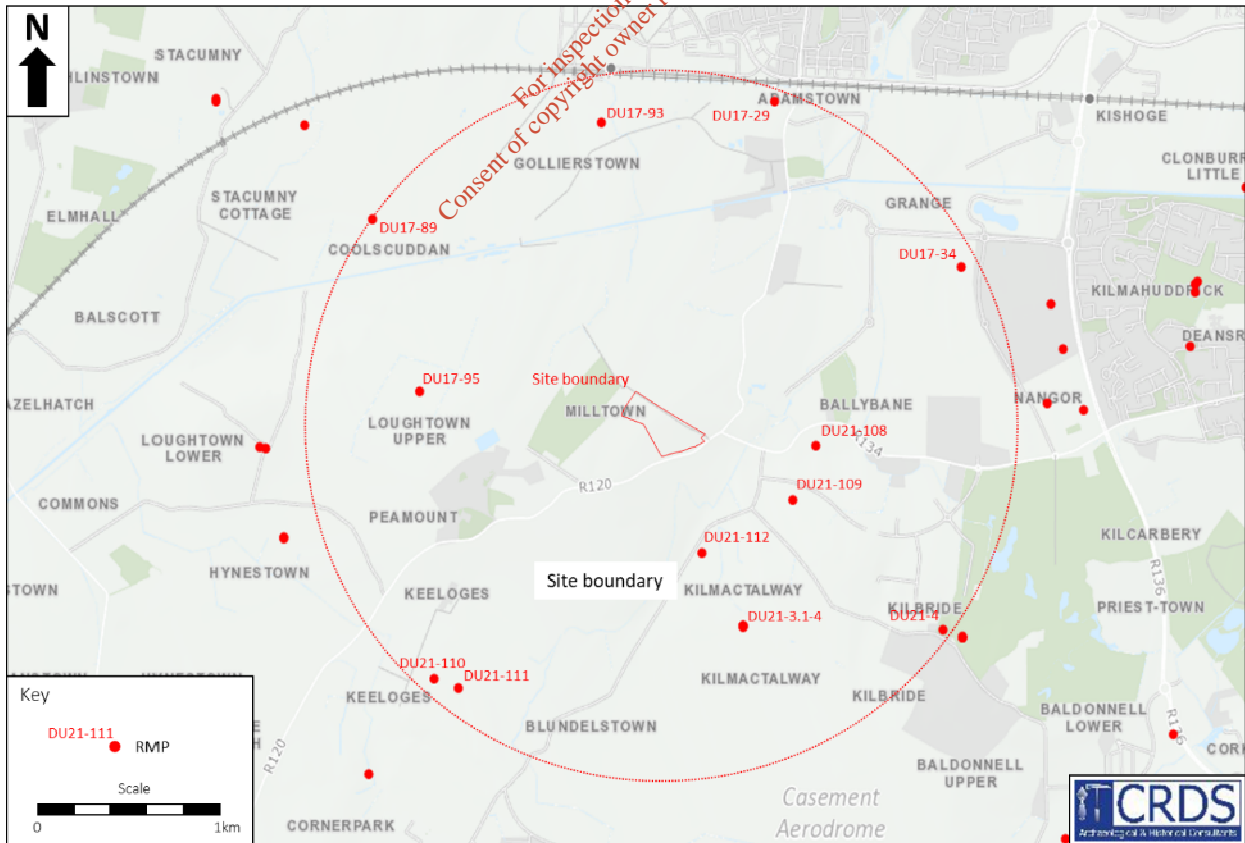


Figure 2. Recorded archaeological sites within the vicinity of the proposed development (source www.archaeology.ie)

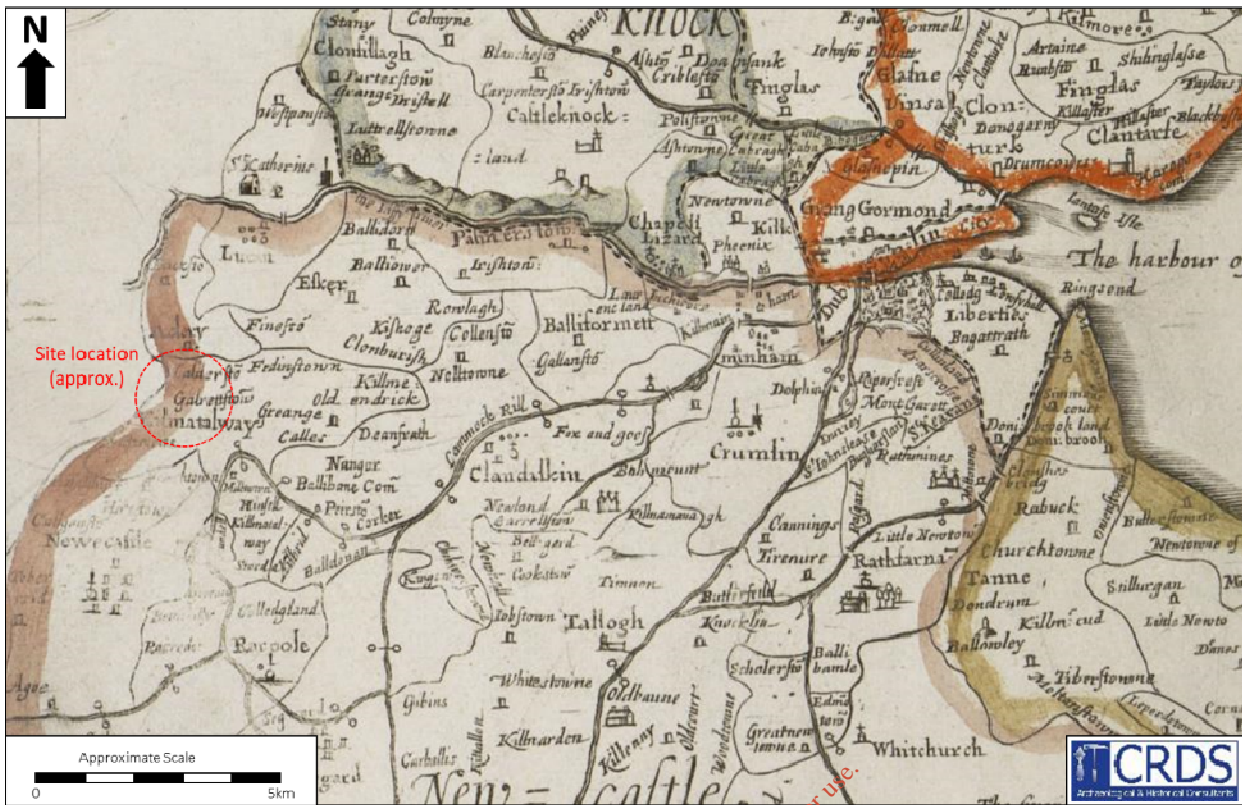


Figure 3. Extract from Down Survey Barony map of Newcastle and Uppercross, c. 1656 (source <http://downsurvey.tcd.ie/down-survey-maps.php>)

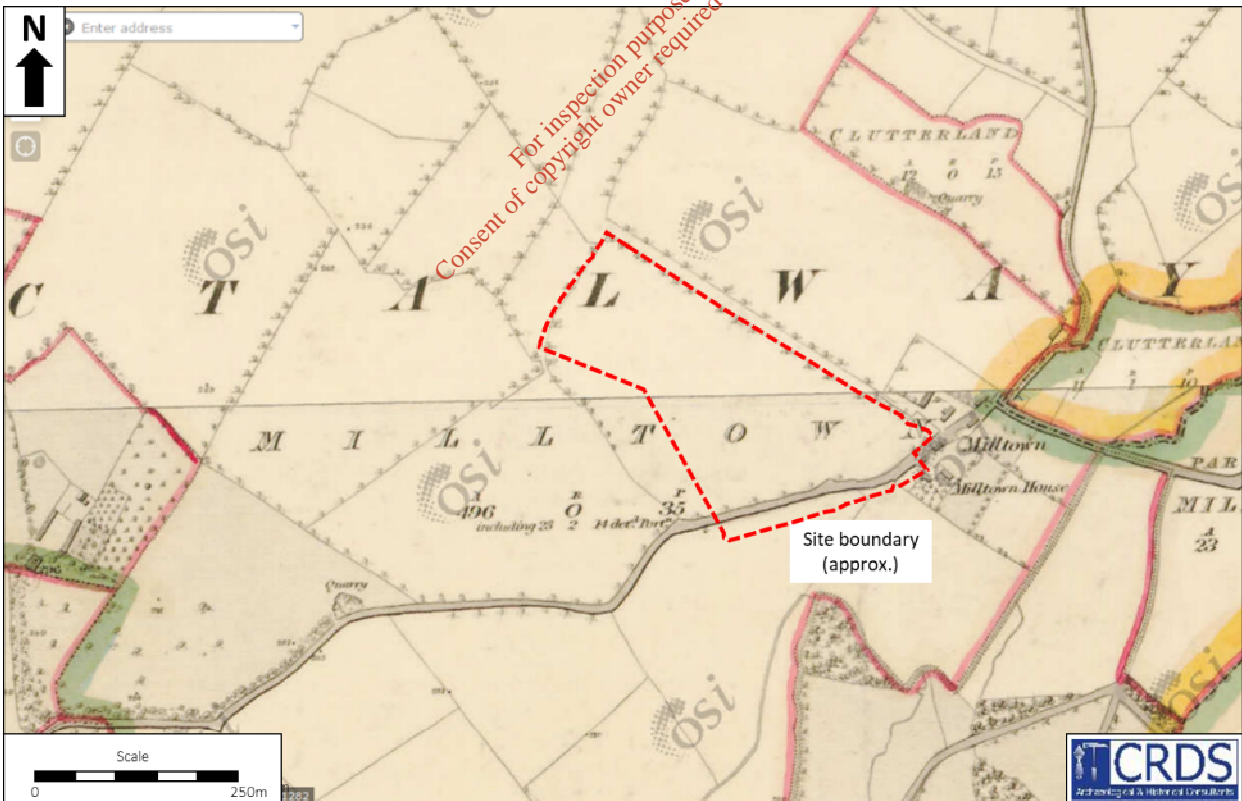


Figure 4. Extract from 1st edition Ordnance Survey Map of Dublin, c. 1830s (source www.archaeology.ie)

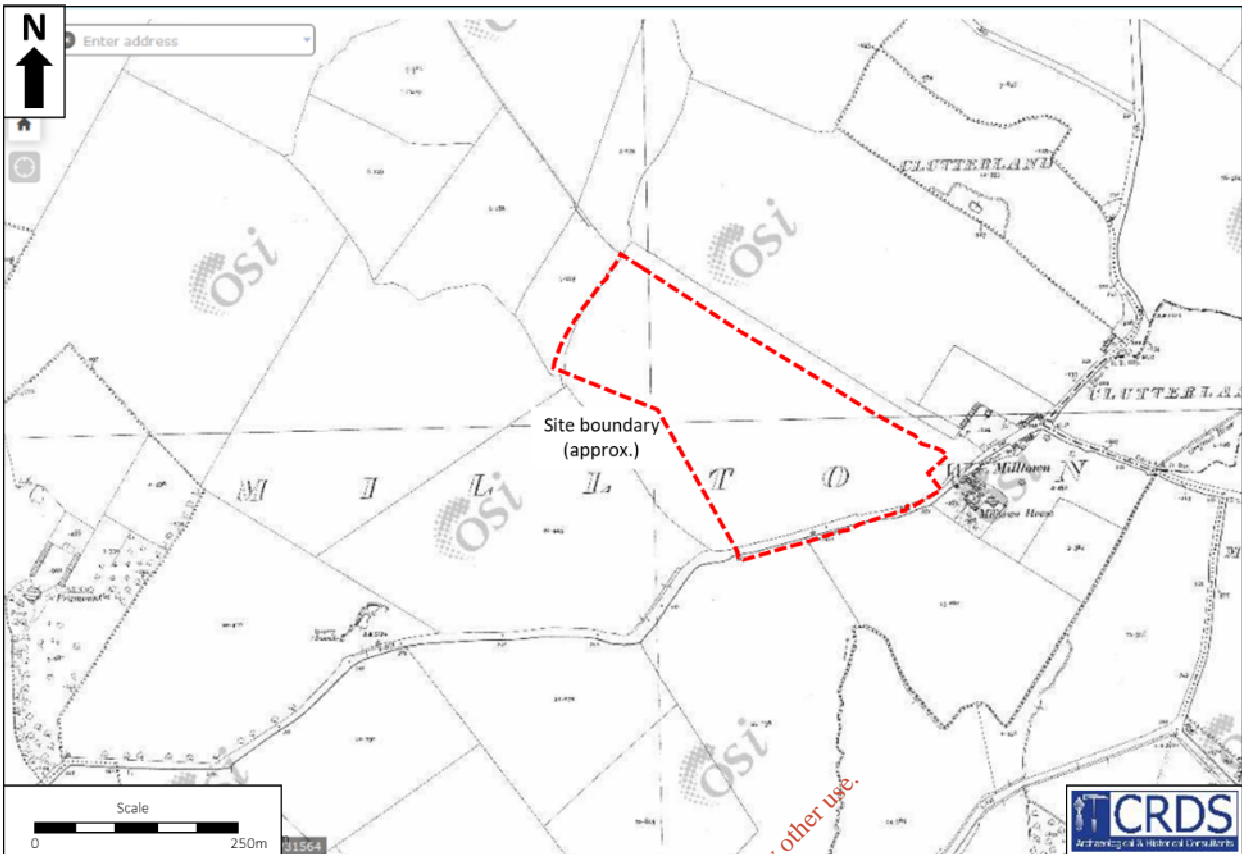


Figure 5. Extract from 2nd edition Ordnance Survey Map of Dublin, c. 1910s (source www.archaeology.ie)

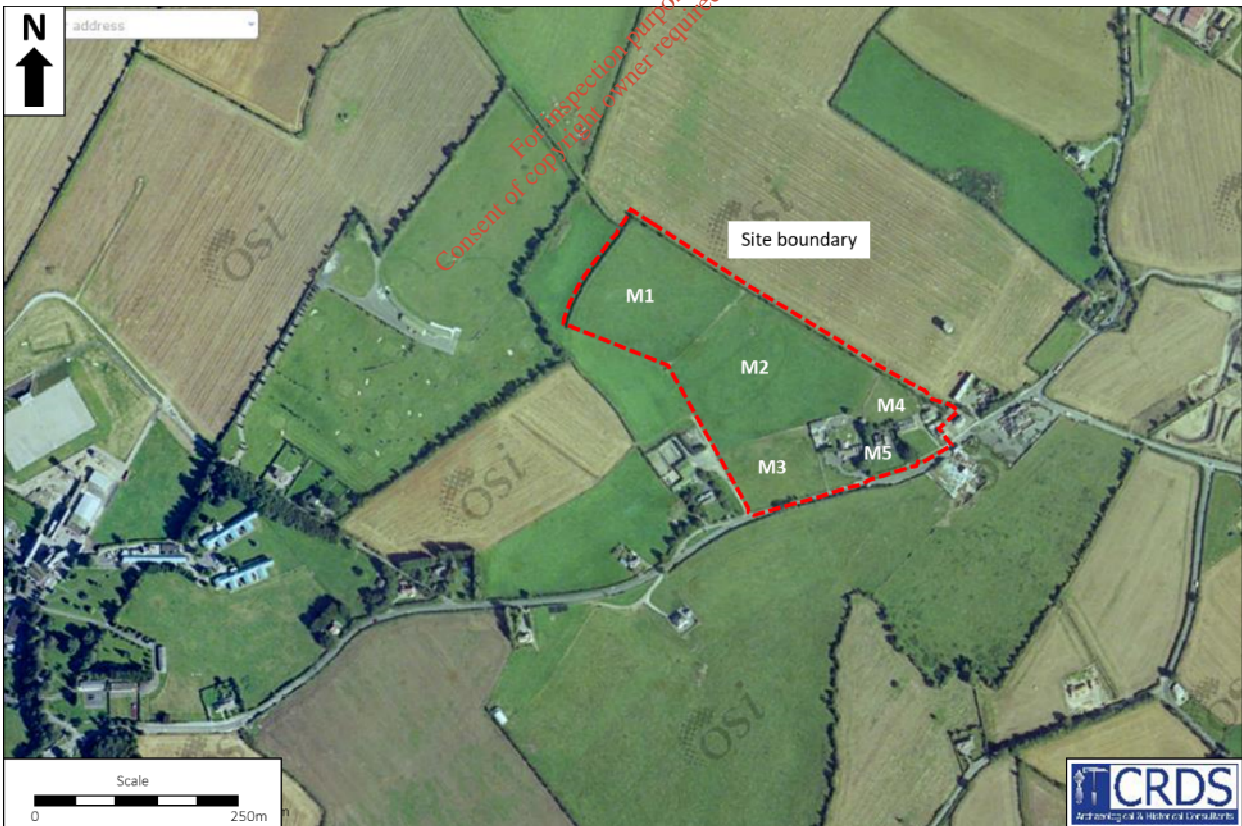


Figure 6. Aerial photograph of the proposed development (source www.archaeology.ie)

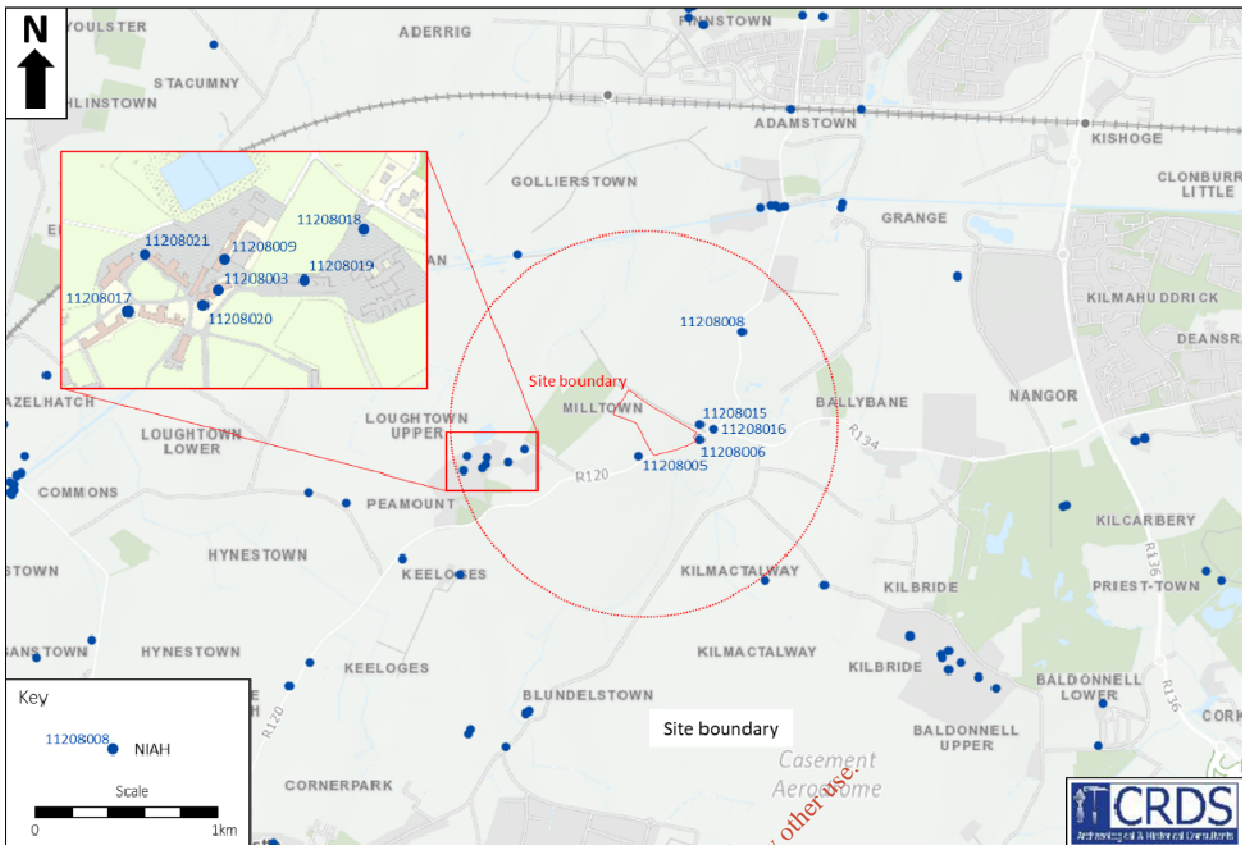


Figure 7. Recorded architectural heritage sites within the vicinity of the proposed development (source www.archaeology.ie)

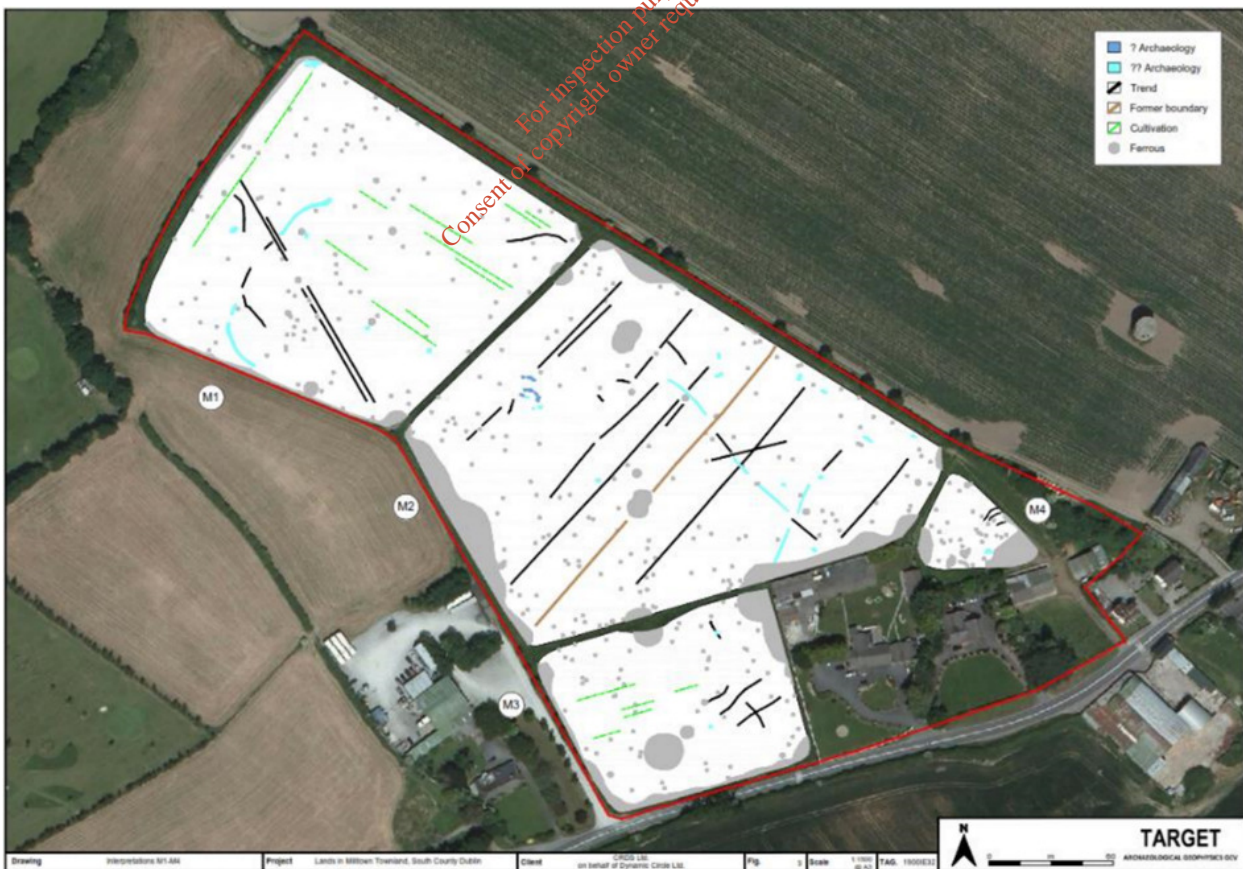


Figure 8. Summary of results of geophysical survey (source Target Ltd; License no 19R0190)

Appendix 13.5 Geophysical survey report

Geophysical Survey Report
**Lands in Milltown (Newcastle By.) Townland,
South County Dublin**

Detection License
19R0190

Author
John Nicholls MSc

Client
AMS-CRDS

On behalf of
Dynamic Circle Ltd.

Date
September 2019

Project
TAG1900IE32



TARGET
ARCHAEOLOGICAL GEOPHYSICS GCV

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TARGET REPORT 1900IE32 LANDS IN MILLTOWN (NEWCASTLE BY.) TOWNLAND, SOUTH COUNTY DUBLIN

PROJECT BACKGROUND

Geophysical survey was undertaken in connection with a proposed development located in Milltown (Newcastle By.) Townland, South County Dublin, c.1km SW of Grange Castle Business Park, 0.6km NE of Peamount Hospital, immediately E of the Newcastle Golf Centre and the Hinde Exports site. The site of the proposed development, which encompasses a total c.8.3ha of land, comprises of 4 adjacent pasture fields bound to the N, S, and W by agricultural land, with two private dwellings, gardens and stables also located within the site boundary facing the R120 to the E-SE. A total 6.4 hectares of land available within the proposed development was subjected to geophysical survey.

This geophysical was conducted as part of a pre-planning archaeological assessment being undertaken by AMS-CRDS on behalf of Dynamic Circle Ltd., and was commissioned with the following aims:

- to identify any geophysical anomalies of possible archaeological origin within the proposed development boundary
- accurately locate these anomalies and present the findings in graphical format
- describe the anomalies and discuss their likely provenance in a written report

ITM Coordinates	702183 731077 (central coordinate)
Townland	Milltown (Newcastle By.)
County	South County Dublin
Landuse	Pasture
Landscape, soils geology	Mostly flat agricultural land occupied by loamy drift of the Straffan (700D) association, with bedrock comprising of dark limestone and shale (calp) of the Lucan formation (Irish National Soils Map, 1:250,000, V1b, 2014; Geological Survey Ireland Spatial Resources, Public Data Viewer Series)
Archaeology	No recorded monuments (RMPs) are located within the proposed development boundary. Several RMPs are, however, located within a 1.5km radius as detailed in the table below, with further enclosure remains recorded immediately to the NE from previous geophysical survey (2018, Nicholls J & Murphy D, detection license 18R0222):

SMR NO.	CLASS	TOWNLAND	ITM EAST	ITM NORTH
DU017-089----	Enclosure	Coolscuddan	700640	732116
DU017-093----	Enclosure	Gollierstown	701891	732600
DU017-095----	Enclosure	Loughtown Upper	700900	731258
DU021-003001-	Church	Kilmactalway	702669	730091
DU021-003002-	Graveyard	Kilmactalway	702665	730084
DU021-003003-	Ecclesiastical enclosure	Kilmactalway	702667	730086
DU021-003004-	Font	Kilmactalway	702669	730089
DU021-108----	Concentric enclosure	Ballybane	703060	730985
DU021-109----	Enclosure	Ballybane	702937	730716
DU021-112----	Enclosure	Kilmactalway	702444	730450
DU017-089----	Enclosure	Coolscuddan	700640	732116
DU017-093----	Enclosure	Gollierstown	701891	732600
DU017-095----	Enclosure	Loughtown Upper	700900	731258
DU021-003001-	Church	Kilmactalway	702669	730091

Lands in Milltown (Newcastle By.) Townland, South County Dublin

2

Fieldwork	27 th & 29 th August 2019
Report issue	9 th September 2019
Author	John Nicholls MSc
Detection License No.	19R0190
Client	AMS-CRDS on behalf of Dynamic Circle Ltd.
Geophysical technique	High resolution magnetic gradiometry

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1.1 Methodology

- 1.1.1 High resolution magnetic gradiometer survey was undertaken throughout the available lands within the proposed development boundary, completing a total 6.4 hectares investigating parts of 4 adjacent pasture fields (M1-M4).
- 1.1.2 The survey employed an advanced multichannel fluxgate gradiometer system combined with cm precision GPS, recording magnetic gradiometer and GPS data simultaneously at rates of 75Hz and 1Hz respectively, conducting parallel instrument traverses 2.7m in width throughout M1-M4, with the instrumentation installed in tow configuration for use with an ATV.

1.2 Instrumentation

- 1.2.1 Details of the geophysical instrumentation employed for this survey are provided below:

Technique	Sensor spacing	Sample rate	Instrumentation	Sensitivity / precision	No. of measurements recorded
Magnetic (fluxgate) gradiometry	0.30m	75Hz	10 x Foerster Ferex CON650 Archaeology fluxgate gradiometers, 15 channel data logger	<75pT / VHz at 1Hz (650mm baseline)	883,208
GPS	3.00m	1Hz	Trimble R10 GPS (VRS)	<0.1m (vertical & horizontal)	12,922

- 1.2.2 The field instrumentation and software used during this geophysical survey were configured to apply a spatial resolution of c.80-100 magnetometer gradiometer measurements per m² which exceeds the 'Level 3 – Characterisation' EAC Guidelines recommendation for geophysical survey in archaeology, (Schmidt et al, 2016).

1.3 Data processing

- 1.3.1 Post fieldwork magnetic gradiometer data processing was performed as follows:

Process	Description
1	Positioning of magnetic gradiometer data based on real-time GPS measurements
2	Zero median transect processing for multi-sensor magnetometer data collected along parallel transects
3	Gridding (nearest neighbor interpolation)
4	Export of georeferenced greyscale images at optimum range

- 1.3.2 To ensure integrity of the processed geophysical data, and maintain close correlation with the original raw on-site measurements, no additional smoothing, low or high pass filters were applied preceding steps 1-4.

1.4 Data display

- 1.4.1 Figure 1 presents a site location diagram (scale 1:7500), highlighting the area of proposed development immediately NW of the R120 with RMPs in 1.5km proximity indicated.
- 1.4.2 Figure 2 presents the results from survey in M1-M4 in greyscale format at a scale of 1:1500.
- 1.4.3 Figure 3 presents the interpretations of the results from survey in M1-M4 at a scale of 1:1500.

2 GENERAL CONSIDERATIONS & COMPLICATING FACTORS

2.1 Access & ground conditions

- 2.1.1 The proposed development extends across mostly level agricultural land. Fieldwork in M1-M4 was undertaken either side of cutting and baling of silage. Bales remaining in M1-M2 during the latter stages of fieldwork precluded survey, and consequently several gaps in the data exist, most notably in M1.
- 2.1.2 Survey across the south-eastern portion of the proposed development was not undertaken due to large-scale ferrous disturbance from private dwellings and stables, which would ultimately obscure any subtle contrasts associated with buried archaeological remains, if present.

2.2 Modern interference

- 2.2.1 The results from survey in M1-M4 highlight numerous small-scale ferrous responses throughout. Ferrous responses are a common occurrence in magnetic survey data, and in most cases represent modern metal debris contained within the topsoil.
- 2.2.2 Broad ferrous responses are also apparent in the results, mostly notably at the perimeters of survey and in proximity to the private dwellings and stables which occupy the south-eastern portion of the site. Large-scale sub-circular ferrous responses traversing M2-M3 represent the locations of a number of electricity pylons oriented approximately N-S.

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3 MAGNETIC GRADIOMETRY SURVEY RESULTS

3.1 M1

- 3.1.1 Remnants of a former boundary traversing M1 NW-SE are evident W of survey centre, with responses from past cultivation visible as parallel linear responses aligned mostly NW-SE.
- 3.1.2 Fragmented and poorly defined curvilinear anomalies (1-2), c.90m at their greatest extent, which extend through the western portion of M1, may be of archaeological interest, perhaps forming part of a levelled enclosure. However, the potential that anomalies 1-2 may derive from more recent equestrian activity within the site boundary should not be excluded, Google aerial imagery indicating a large circular exercise ring to the SE in M2.
- 3.1.3 Magnetically weak small-scale positives and weak trends of possible significance are also evident in M1, notably W of survey centre (3-4), to the E and SE. The significance of these anomalies is uncertain. They are poorly defined, at the limits of instrument detection, and a recent landuse, modern ferrous or natural soil/geological explanation should also be considered.
- 3.1.4 No further responses of significance are indicated by the results from survey in M1.

3.2 M2

- 3.2.1 Remnants of a former boundary traversing M2 NE-SW have been recorded, with multiple weakly magnetic linear trends of similar alignment reflecting past cultivation/landuse throughout this central portion of the proposed development.
- 3.2.2 Two probable pit/posthole concentrations (5-6), are highlighted by the results from M2 NW of survey centre. These are magnetically strong, within 4-5m proximity of one another, and semi-curvilinear in arrangement. The possibility that 5-6 together form part of a levelled enclosure or structure should not be ignored.
- 3.2.3 Weakly magnetic interconnecting linear responses 7-9 traversing the eastern/south-eastern portion of M2 NW-SE and NE-SW are expected to represent remains of an early field system.
- 3.2.4 Discrete positive responses 10-12, located W and NE of survey centre in M2, may be of interest, potentially representing pit/linear remains. Interpretation of responses 11-12 is cautious in view of the previous existence of a large circular exercise ring in this location as shown by Google aerial imagery.
- 3.2.5 No further responses of note have been recorded from survey in M2.

3.3 M3

- 3.3.1 The results from M3 display no responses of archaeological interest in this southern portion of the proposed development. Weakly magnetic trends and poorly defined small-scale positives are evident in this location and expected to be of limited significance. A natural soil/geological, recent landuse or modern ferrous origin is expected for these anomalies.

3.4 M4

- 3.4.1 A possible archaeological interpretation for an irregular shaped response (13) to the SE in M4 should not be excluded. Weak linear trends of expected natural soil/geological origin are also evident E of survey centre in M4.
- 3.4.2 No further responses of interest are indicated by the results from survey in M4.

4 CONCLUSION

- 4.1 No responses of definite archaeological character have been recorded within the site boundary. A generally quiet magnetic background within the +/-1.5nT range is indicated by the results from survey in M1-M4, each survey location displaying an abundance of small-scale modern ferrous debris, with remains of former field boundaries and past cultivation also present, notably in M1 and M3.
- 4.2 Responses of potential interest recorded within the proposed development include a weakly magnetic curving linear response, potentially part of a levelled enclosure ditch to the W in M1, and several outlying small-positives; a curving arrangement of probable pit/posthole remains to the NW in M2, with weak linear anomalies and trends suggesting part of an early field system to the E-SE; and a strongly magnetic discrete positive to the SE in M4. Interpretation of these responses is tentative in view of more recent landuse within the site boundary.

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Schmidt A, (2002), Archaeology Data Service. Geophysical Data in Archaeology. A guide to good practice.

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ONLINE RESOURCES

Archaeological Survey of Ireland SMR Database
<http://webgis.archaeology.ie/historicenvironment/>

Geological Survey of Ireland Spatial Resources, Public Data Viewer Series
<https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

Irish National Soils Map, 1:250,000k, V1b (2014). Teagasc, Cranfield University. Jointly funded by the EPA STRIVE Research Programme 2007-2013 & Teagasc. <http://gis.teagasc.ie/soils/map.php>

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APPENDICES

Appendix 1 Technical Information: Magnetometry

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Technical Information

T1

MAGNETOMETRY**Introduction**

Magnetometry represents one of a suite of geophysical techniques employed in archaeological prospection to inform invasive investigations such as trial trenching and excavation.

Frequently used to determine the often non-visible boundaries of archaeological remains, magnetometer surveys enable archaeologists to identify the location, form and extent of a diverse array of archaeological features no longer visible at the surface.



1. Advanced multi-channel magnetometer survey mapping the buried foundation of a 14th century castle (towed configuration with ATV).

Buried archaeological remains successfully identified using magnetometry include sites such as enclosure systems and deserted villages, hillforts and military encampments, henges and tumuli, villa/castle foundations, and ecclesiastical settlements.

Background to application

The basis for use of magnetometry in archaeological prospection derives from the abundance of natural iron oxides in most soils, and our ability to measure subtle variations in the magnetic properties of these iron oxides caused by human activity. Discrete variations in soil magnetism associated with buried archaeological remains derive typically from in situ burning and organic enrichment of the soil, through activities such as cooking and heating; pottery manufacture and metal working; as well as use of fired building materials such as ceramic tiles and brick. These burnt, fired and organic rich deposits create subtle magnetic contrasts visible as discrete magnetic anomalies superimposed on the earth's geomagnetic field.



2. Results from magnetometer survey presented in greyscale format highlighting pit remains bordering an enclosure site and Roman villa.



3. Burnt & fired debris revealed following excavation of pit remains bordering an enclosure site and Roman villa.

Magnetometer surveys conducted in both commercial and research archaeological investigations enable determination of the location, form and extent of buried archaeological remains. Data acquired from these surveys can be quickly generated into georeferenced images and interpretation layers to inform subsequent trial trenching and excavation.

Technical Information

T2

Technology

TARGET provides precise mapping and characterization of buried archaeological remains by employing an array of highly stable and sensitive fluxgate gradiometers, combined with an advanced data logging system and cm precision GPS. This state-of-the-art geophysical instrumentation, which is capable of collecting extremely dense data sets, permits detailed high resolution survey of archaeological sites from as small as 1ha in size, to larger scale investigation of sites up to 150ha or more.



4. Advanced multi-channel gradiometer system for magnetometer survey (manual configuration).



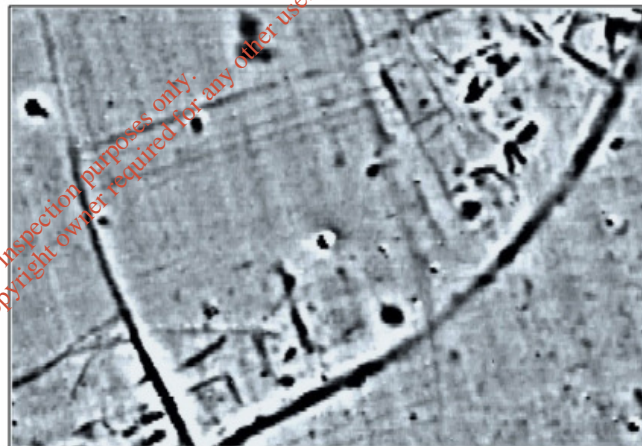
5. GPS tracks (red) highlighting lines of data collection & results from magnetometer fieldwork at a suspected burial ground.

TARGET undertakes high resolution magnetometer surveys as standard, recording data at c.5cm intervals with probe separations of 0.28m or 0.5m, for precise measurement and characterization of buried archaeological remains.

Data Display

Greyscale plots are the most common format for displaying magnetometer data. This display format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within a given data set. This display method also enables the identification of discrete responses barely visible above natural 'background' magnetic variation on site.

6. Greyscale from survey at the site of a deserted medieval village.

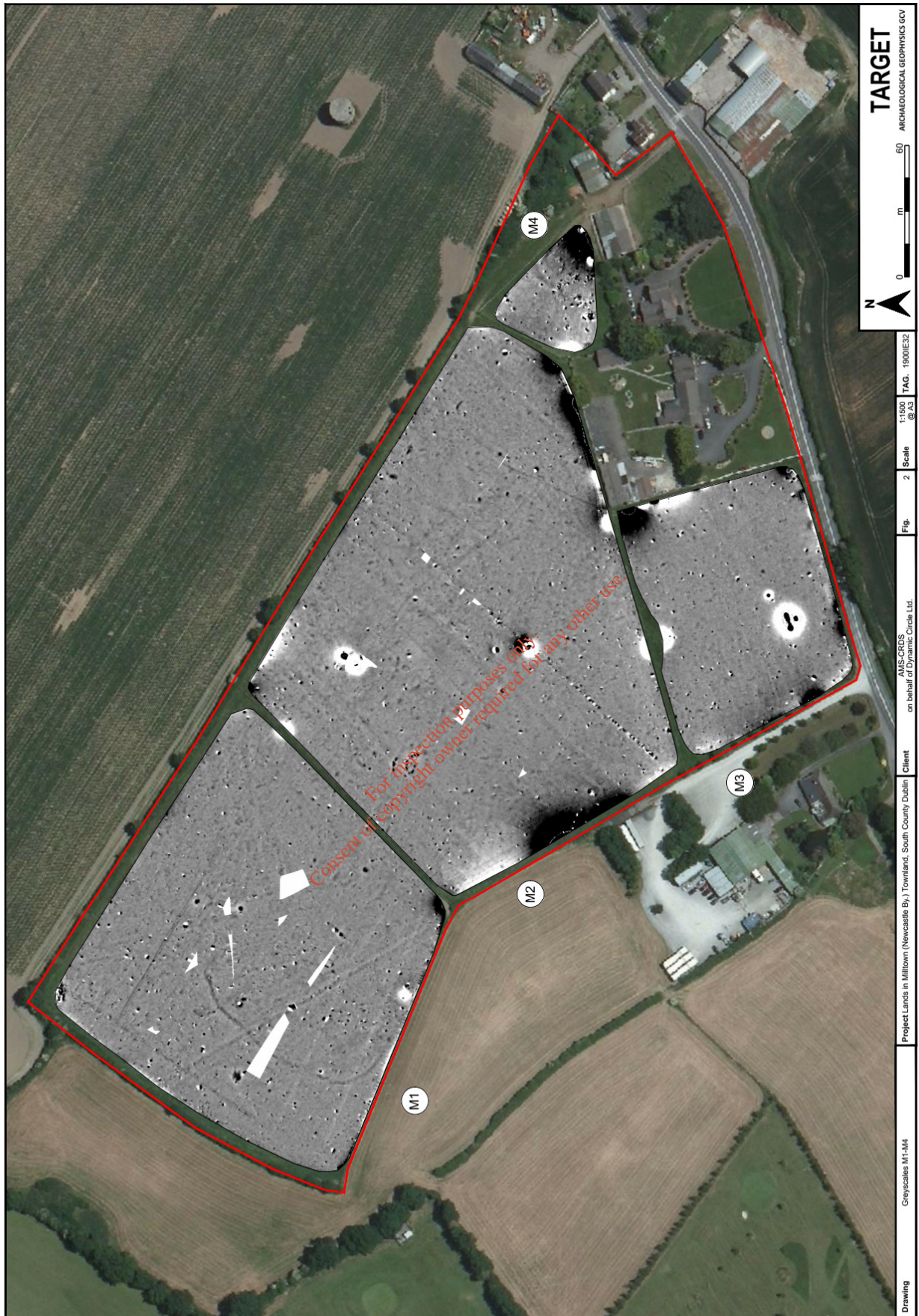


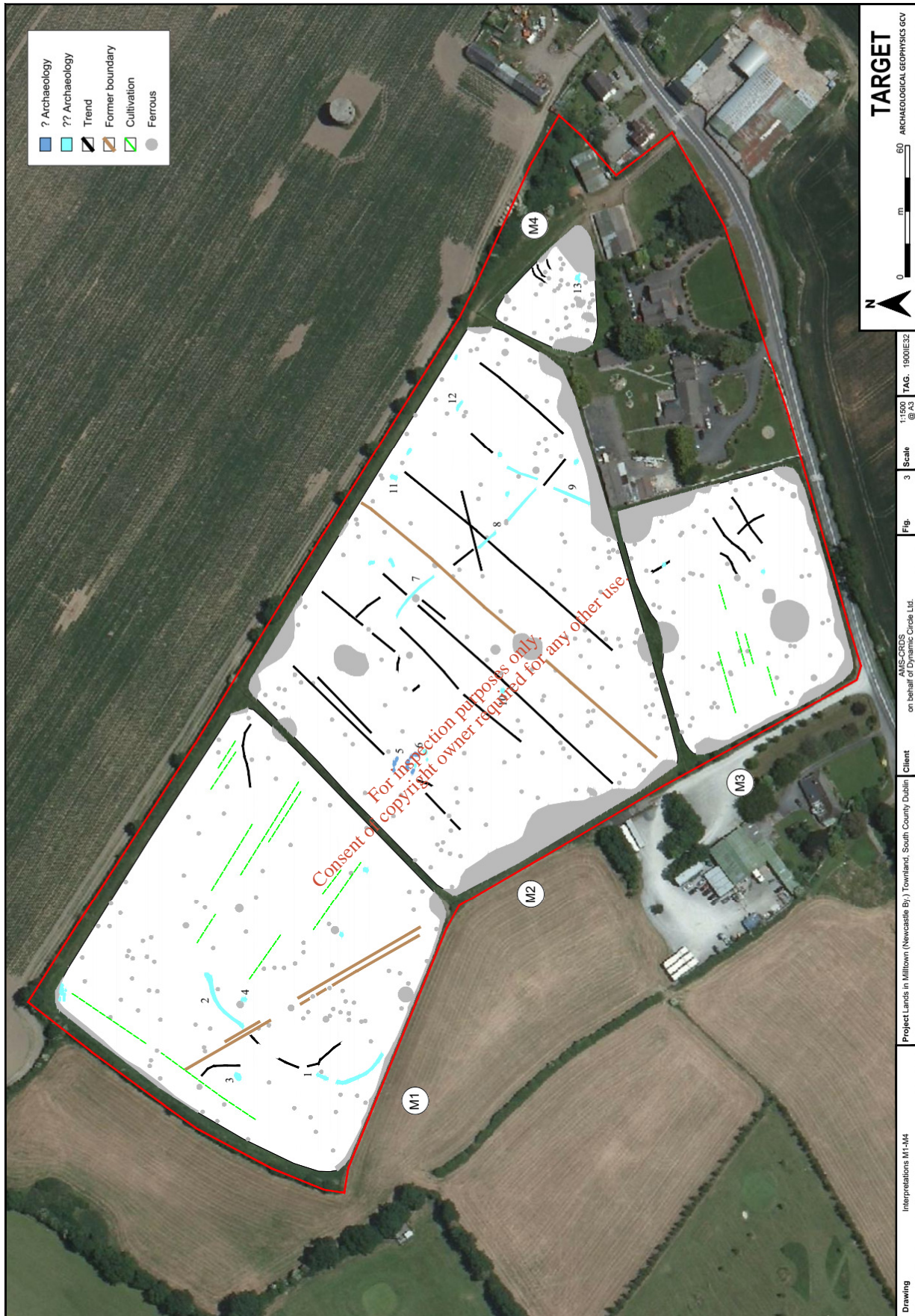
XY trace plots provide a near-perspective representation of measurements along individual lines of data recorded from each of the magnetometer sensors. The XY trace format is used as a conventional method for identifying responses which derive from modern ferrous debris. The XY trace display is particularly when identifying magnetically strong anomalies indicative of buried hearths, kilns and furnaces.

7. XY trace from survey at the site of a deserted medieval village.









CHAPTER 14 – WASTE MANAGEMENT

Appendix 14.1 Outline Construction and Demolition Waste Management Plan



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**APPENDIX 14.1
CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN**

Technical Report Prepared For
Data and Power Hub Services Ltd

Report Prepared By
**Jonathan Gauntlett, Environmental
Consultant**

Our Reference
JG/20/11309WMP01

Date of Issue
20 November 2020

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AWN Consulting Limited

Document History

Document Reference		Original Issue Date	
JG/20/11309WMR01		20 November 2020	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
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Date	20 November 2020	20 November 2020

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1.0 INTRODUCTION

AWN Consulting Ltd (AWN) has prepared this Construction and Demolition (C&D) Waste Management Plan (WMP) for the proposed information and communication technology (ICT) development which comprises two ICT buildings along with associated infrastructure. The development works include the demolition of the existing two storey dwelling of Bulmer and associated outbuildings; and demolition of the existing single storey house of Little Acre and its associated garage and other buildings; as well as the demolition of the single storey stable building on the overall site.

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

The purpose of this report is to provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Acts 1996-2011* and associated Regulations¹, *Protection of the Environment Act 2003* as amended², *Litter Pollution Act 1997* as amended³ and the *Eastern-Midlands Region Waste Management Plan 2015-2021*⁴. In particular, this report aims to ensure maximum recycling, re-use and recovery of waste with diversion from landfill, where possible. It also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

In the preparation of this report consideration has been given to the requirements of National and Regional waste policy, legislation and other guidelines (referred to in Section 2.0). However, in determining the structure and content of the document, the following two publications have been referenced in particular:

- Department of the Environment, Heritage and Local Government (DoEHLG), Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)⁵.
- FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and Site Managers, (2002)⁶.

The above guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 NATIONAL LEVEL

The Irish Government issued a policy statement in September 1998 titled as *'Changing Our Ways'*⁷ which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this Strategy was to recycle at least 50% of C&D waste within a five-year period (by 2003), with a progressive increase to at least 85% over fifteen years (by 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report titled *Recycling of Construction and Demolition Waste*⁸ concerning the development and implementation of a voluntary construction industry programme to meet the governments objectives for the recovery of construction and demolition waste.

The policy document '*A Resource Opportunity*'⁷ was published in July 2012⁹. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste - it commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

In September 2020 the government released a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan '*A Waste Action Plan for a Circular Economy*'¹⁰ was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities.

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already being used (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection & Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* in July 2006 in conjunction with the Department of the Environment, Heritage and Local Government (DoEHLG).

The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted construction and demolition wastes;
- Procedures to prevent and minimise wastes;
- Options for reuse/recycling/recovery/disposal of construction and demolition wastes;
- Provision of training for Waste Manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of proposed consultation with relevant bodies i.e. waste recycling companies, Local Authority, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m²; and
- Demolition/renovation/refurbishment projects generating in excess of 100m³ in volume, of C&D waste

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 REGIONAL LEVEL

The proposed development is located in the Local Authority area of South Dublin County Council (SDCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan for the SDCC area published in May 2015. The regional plan sets out the following strategic targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*.

The *South Dublin County Council Development Plan 2016 – 2022*¹¹ sets out a number of objectives and actions for the South Dublin area in line with the objectives of the waste management plan.

Waste objectives and actions with a particular relevance to the proposed development are as follows:

Objectives:

- **IE5 Objective 1:** To support the implementation of the Eastern–Midlands Region Waste Management Plan 2015-2021 by adhering to overarching performance targets, policies and policy actions.

- **IE5 Objective 2:** To support waste prevention through behavioural change activities to de-couple economic growth and resource use.
- **IE5 Objective 3:** To encourage the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.
- **IE5 Objective 8:** To secure appropriate provision for the sustainable management of waste within developments, including the provision of facilities for the storage, separation and collection of such waste.

Actions:

- Support and facilitate the separation of waste at source into organic and non-organic streams or other waste management systems that divert waste from landfill and maximise the potential for each waste type to be re-used and recycled or composted and divert organic waste from landfill, in accordance with the National Strategy on Biodegradable Waste (2006).
- Implement the objectives of the National Waste Prevention Programme at a local level with businesses, schools, householders, community groups and within the Council's own activities.
- Promote an increase in the amount of waste re-used and recycled consistent with the Regional Waste Management Plan and Waste Hierarchy and facilitate recycling of waste through adequate provision of facilities and good design in new developments.
- Implement the South Dublin Litter Management Plan 2015 - 2019.

In terms of physical waste infrastructure, three municipal solid waste landfills remain operational in the Eastern Midlands Region (EMR) and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the EMR including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second facility in Poolbeg in Dublin.

2.3 LEGISLATIVE REQUIREMENTS

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended, as well as subordinate legislation¹.
- Environmental Protection Act 1992 (No. 7 of 1992) as amended².
- Litter Pollution Act 1997 (No. 12 of 1997) as amended³.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the Waste Management Acts 1996 – 2011 and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for waste from the time it is generated through until its legal reuse, recycling,

recovery and/or disposal (including its method of reuse, recycling, recovery and/or disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final waste reuse, recycling, recovery and/or disposal site. Following on from this is the concept of "Polluter Pays" whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the appointed construction contractor(s) are legally compliant with respect to waste transportation, reuse, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and reuse/recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended, or a waste or Industrial Emissions (IE) licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE PROJECT

3.1 LOCATION, SIZE AND SCALE OF THE DEVELOPMENT

A detailed description of the development is provided in Chapter 2 (Characteristics of the Proposed Development) of the EIA Report. The Proposed Development consists of the construction of 2 no. two storey Information Communication Technology (ICT) facilities each with three storey plant levels and associated ancillary development that will have a gross floor area of 30,518sqm.

The development works include the demolition of the existing two storey dwelling of Bulmer and associated outbuildings; and demolition of the existing single storey house of Little Acre and its associated garage and other buildings; as well as the demolition of the single storey stable building on the overall site. The total gross floor area of demolition is c. 1,382sqm.

The associated structures and infrastructure include; emergency generators and associated flues and storage of diesel fuel, new internal roads and vehicle parking, soft landscaping and ecology measures, underground foul and storm water drainage network including SuDS measures.

A description of the characteristics of the development relevant to waste are described in Section 14.22 – 14.41 of Chapter 14 (Waste Management).

3.2 OVERVIEW OF THE NON-HAZARDOUS WASTES TO BE PRODUCED

There will be waste materials generated from the demolition of some of the existing buildings, hardstanding areas on site, as well as from the excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete etc.

Site preparation, excavations and levelling works will be required to facilitate construction of foundations, access roads and the installation of services will generate c. 16,200m³ of soil and stones, as advised by the project engineers, JB Barry Consulting Engineers. It is currently proposed that all excavated material will be reused on site.

The main buildings at the site will be constructed from structural steel. It is expected that throughout the construction phase, waste will be produced from surplus steel and other metal materials and broken/off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials are also likely to be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 POTENTIAL HAZARDOUS WASTES ARISING

3.3.1 Contaminated Soil

Geotechnical and environmental site investigations were carried out by Ground Investigation Ireland in September 2020 during the preparation of the EIAR. 14.26 Geotechnical and environmental site investigations were carried out by Ground Investigation Ireland (GII) in October to November 2020 during the preparation of the EIAR. Eleven (11) no. trial pits were excavated to a maximum depth of c.1.60 m. Three (3) no. groundwater monitoring wells were installed as part of these investigations. Eight (8) No. representative soil samples were also recovered from a number of the pits for laboratory analysis. The ground investigation report shows there was no evidence of subsurface contamination encountered during the site investigation works. Environmental analysis was carried out on eight soil samples and all were below the inert threshold concentration for waste as per Waste Acceptance Criteria (WAC) specified in the *European Communities (EC) Council Decision 2003/33/EC*¹² which establishes the criteria for the acceptance of waste at landfills. Further details on the soil quality at the site is provided in Chapter 7 of the EIAR (Land, Soils, Geology and Hydrogeology).

No asbestos was identified in the soil samples collected. If, however asbestos or asbestos containing material (ACMs) are identified in any further soil samples or during excavation,

the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010*. All asbestos will be taken to a suitably licensed or permitted facility.

All excavations should still be carefully monitored by a suitably qualified person to ensure that, if encountered, potentially contaminated soil is identified and segregated from clean/inert material. In the event that any potentially contaminated material is encountered, it will need to be tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'*¹³ using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *Decision 2003/33/EC*.

Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated in accordance with the above procedure.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil waste generated at the site.

3.3.3 Invasive Species

Ecological site surveys have been undertaken by Scott Cawley (SC) at this site and in the surrounding area as part of the site ecological assessment. This included walkover surveys of the entire site and the perimeter of the site. There were no Schedule 3 non-native invasive species recorded during baseline surveys.

3.3.4 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, waste electrical and electronic equipment (WEEE) containing hazardous components, printer/toner cartridges and batteries (Lead, Ni-Cd or Mercury) may be generated from the temporary site offices during construction works. These wastes will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 MAIN CONSTRUCTION AND DEMOLITION WASTE CATEGORIES

The main non-hazardous and hazardous waste streams that may typically be generated by the construction activities at the proposed site are presented in Table 1. The List of

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Waste code (also referred to as the European Waste code or EWC) for each waste stream is also shown.

Table 3.1 Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)

Waste Material	List of Waste Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

* individual waste type may contain hazardous substances

4.0 ESTIMATED WASTE ARISING

4.1 DEMOLITION WASTE GENERATION

Demolition works at the site will involve the demolition of existing structures on site. Demolition figures published by the EPA in the 'National Waste Reports'¹⁴ and data from previous projects have been used to estimate the approximate break-down for indicative reuse (offsite), recycling and disposal targets of demolition waste. This breakdown is shown in Table 4.1.

Table 4.1 Estimated off-site reuse, recycle and disposal rates for demolition waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	77.2	0	0.0	85	65.6	15	11.6
Concrete, Bricks, Tiles, Ceramics	437.3	30	131.2	65	284.2	5	21.9
Plasterboard	34.3	30	10.3	60	20.6	10	3.4
Asphalts	8.6	0	0.0	25	2.1	75	6.4
Metals	128.6	5	6.4	80	102.9	15	19.3

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Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Slate	68.6	0	0.0	85	58.3	15	10.3
Timber	102.9	10	10.3	60	61.7	30	30.9
Total	857.4		158.2		595.5		103.7

The appointed demolition contractor will be required to prepare a detailed demolition management plan prior to work commencing which should refine the above estimated waste figures.

4.2 CONSTRUCTION WASTE GENERATION

The below Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports, the GMIT¹⁵* and other research reports.

Table 4.2 Waste materials generated on a typical Irish construction site

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	100

An assessment has been undertaken to estimate the quantity of construction waste likely to be generated from the proposed development.

Table 3 below shows the estimated construction waste generation for the development based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated waste amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m², using the waste breakdown rates shown in Table 4.2.

Table 4.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	599	10	60	80	479	10	60
Timber	508	40	203	55	280	5	25
Plasterboard	182	30	54	60	109	10	18
Metals	145	5	7	90	131	5	7

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Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete	109	30	33	65	71	5	5
Other (includes cabling, ducting, conduits, packaging and plastics)	272	20	54	60	163	20	54
Total	1816		412		1233		171

In addition, as noted in Section 3.2, the quantity of excavated material that will be generated has been estimated by JB Barry the project engineers to be c. 16,200m³ of subsoil material. It is currently proposed that all the excavated material will be reused on site.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

All waste arising during the construction phase will be transported off-site by an approved waste contractor holding a current waste collection permit. All waste arising requiring reuse, recycling, recovery or disposal off-site will be brought to facilities holding the appropriate COR, licence or permit, as required.

4.3 PROPOSED WASTE MANAGEMENT OPTIONS

4.3.1 Waste Management Options for Excavated Materials

The Waste Management Hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. Any excavations carried out will be required to facilitate construction works. However, it is currently proposed that all the excavated material will be reused on site and therefore will not require removal from site and therefore the preferred option of waste prevention is proposed for the excavated material.

In the event that any excavated material is removed off-site for reuse as a by-product (and not as a waste), it will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA via their online notification form. However, it is not currently anticipated that any excavated material will be removed offsite for reuse as a by-product. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27.

If any excavated material requires removal from site and is deemed to be a waste, then removal and reuse/recycling/ recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. The volume

of waste removed will dictate whether a COR, permit or licence is required by the receiving waste facility. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the unlikely event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

4.3.2 Waste Management Options for other Construction Wastes

Waste materials generated will be segregated on-site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring reuse, recycling, recovery or disposal off-site will be transferred to a facility holding the appropriate COR, permit or licence, as required.

Mixed C&D waste (classified under the List of Waste code 17 09 04) is permitted for acceptance at a number of waste facilities in the region including Integrated Material Solutions landfill in north Dublin and a number of waste transfer stations.

Written records will be maintained by the contractor detailing the waste arising throughout the construction phase, the classification of each waste type, the contact details and waste collection permit number of all waste contractors who collect waste from the site and the end destination details for all waste removed and disposed offsite.

Dedicated storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc., as required. The containers used for storing hazardous liquids will be appropriately banded or will be stored on suitably sized spill pallets.

The management of the main construction waste streams are detailed as follows:

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be placed into a dedicated skip and recycled off-site. Clean timber is typically recycled as chipboard.

Metal

Metals will be segregated and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

Plasterboard from the construction phase will be stored in a separate skip, pending collection for recycling. The site manager and project engineers will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment

Waste electrical and electronic equipment (WEEE) will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling off site.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed offsite.

Non-Recyclable Waste

Construction waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 6.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil in the unlikely event that it is encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

It should be noted that until the main contractor is appointed, it is not possible to provide information on the specific destinations of each waste stream. Prior to commencement construction of the proposed development and removal of any waste off-site, details of the proposed destination of each waste stream will be provided to the local authority.

4.4 TRACKING AND DOCUMENTATION PROCEDURES FOR OFF-SITE WASTE

All waste will be documented prior to leaving the site. Waste will be weighed by the waste contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the contractor.

All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Management Acts 1996 – 2011 as amended, Waste Management (Collection Permit) Regulations 2007 as amended and Waste Management (Facility Permit & Registration) Regulations 2007 as amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority COR, waste permit or EPA Waste/IE Licence for that site will be provided to the nominated project Waste Manager. If the waste is being shipped abroad, a copy of the TFS document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

If any surplus soil or stone is being removed from the site for reuse on another construction site as a by-product, this will need to be done in accordance with Article 27 of the *EC (Waste Directive) Regulations, 2011*. Similarly, if any soil or stone are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27. It is not currently envisaged the Article 27 will be used for this development.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below. The total cost of construction waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 REUSE

By reusing materials on site, there will be a reduction in the transport and offsite recycling/recovery/disposal costs associated with the requirement for a waste contractor to take the material away to landfill.

Clean and inert excavated material which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries, etc. as previously discussed. This material is often taken free of charge for such purposes, reducing final waste disposal costs. However, it is not currently anticipated that there will be surplus excavated material.

5.2 RECYCLING

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips. Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will typically charge less to take segregated wastes, such as recyclable waste, from a site than mixed waste streams.

5.3 DISPOSAL

Landfill charges in the Eastern-Midlands region are currently at around €130-150 per tonne (which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015*). In addition to disposal costs, waste contractors will also charge a fee for provision and collection of skips.

Collection of segregated construction waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a registered, permitted or licensed facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill.

6.0 DEMOLITION PROCEDURES

The demolition stage will involve the removal of the existing buildings and hard standing areas. A formal demolition plan including safety procedures will be prepared by the demolition contractor; however, in general, the following sequence of works should be followed during the demolition stage.

Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including asbestos, asbestos-containing Materials, electric power lines or cables, gas reticulation systems, telecommunications, unsafe structures and fire and explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily include metal however may also include timbers, doors, windows, wiring and metal ducting, etc.

Removal of Roofing

Steel roof supports, beams etc. will be dismantled and taken away for recycling/salvage.

Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

7.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the Waste Manager to ensure commitment, operational efficiency and accountability during the construction phase of the project.

7.1 WASTE MANAGER TRAINING AND RESPONSIBILITIES

The nominated Waste Manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site. The Waste Manager will have overall responsibility to oversee, record and provide feedback to the Project Manager on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to subcontractors, where necessary, and to coordinate with suppliers, service providers and subcontractors to prioritise waste prevention and material salvage.

The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The Waste Manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

7.2 SITE CREW TRAINING

Training of the site crew is the responsibility of the Waste Manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the waste storage areas. A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

8.0 RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arising's on site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or waste manager with a waste docket (or WTF for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC/LoW

The waste transfer dockets will be transferred to the site waste manager on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the SDCC Waste Regulation Unit when requested.

Alternatively, each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets/WTF maintained on file and available for inspection on site by the main contractor as required.

A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR/permit/licence for the receiving waste facilities and maintain a copy on file available for inspection on site as required.

9.0 OUTLINE WASTE AUDIT PROCEDURE

9.1 RESPONSIBILITY FOR WASTE AUDIT

The appointed waste manager will be responsible for conducting a waste audit at the site during the C&D phase of the development.

9.2 REVIEW OF RECORDS AND IDENTIFICATION OF CORRECTIVE ACTIONS

A review of all the records for the waste generated and transported off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

10.0 CONSULTATION WITH RELEVANT BODIES

10.1 LOCAL AUTHORITY

Once the main contractor has been appointed and prior to removal of any waste materials offsite, details of the proposed destination of each waste stream will be provided to the local authority for their approval.

The local authority will also be consulted, as required, throughout the construction phase in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

10.2 RECYCLING/SALVAGE COMPANIES

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation, the means by which the wastes will be collected and transported off-site and the recycling/reclamation process each material will undergo off site.

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11.0 REFERENCES

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1 Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (No. 36 of 2001), 2003 (No. 27 of 2003) and 2011 (No. 20 of 2011). Subordinate and associated legislation includes:

- European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended 2008 (S.I. No. 87 of 2008) and 2016 (S.I. No. 24 of 2016)
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) as amended 2008 (S.I. No. 86 of 2008), 2014 (S.I. No. 310 and S.I. No. 546 of 2014) and 2015 (S.I. No. 198 of 2015)
- Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004) and 2010 (S.I. No. 350 of 2010)
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended 1998 (S.I. No. 164 of 1998), 2001 (S.I. No. 356 of 2002) and 2011 (S.I. No. 126 and No. 192 of 2011)
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- European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
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- European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
- European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended 2015 (S.I. No. 542 of 2015)
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended 2014 (S.I. No. 349 of 2014) and 2015 (S.I. No. 347 of 2015)
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended 2000 (S.I. No. 73 of 2000)
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2 Environmental Protection Act 1992 (Act No. 7 of 1992) as amended by the Protection of the Environment Act 2003 (Act No. 27 and S.I. No. 413 of 2003) and amended by the Planning and Development Act 2000 (Act No. 30 of 2000) as amended.

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4 Eastern-Midlands Waste Region, Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).

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- 5 Department of the Environment, Heritage and Local Government (DoEHLG), Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, (2006).
- 6 FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and Site Managers, (2002).
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- 8 Forum for the Construction Industry, Recycling of Construction and Demolition Waste (1999).
- 9 Department of Environment, Communities and Local Government (DoECLG), A Resource Opportunity - Waste Management Policy in Ireland (2012).
- 10 Department of Communications, Climate Action and Environment (DCCA), Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025 (Sept 2020).
- 11 South Dublin County Council (SDCC), Development Plan 2016-2022 (2016)
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