

20<sup>th</sup> March 2018

To Whom it may concern

**BRADLEY PARK GOLF CLUB, HUDDERSFIELD (SITES H351 & H1747)  
BRADLEY BAR ROUNDABOUT MODELLING**

Following the EIP on the 12th March – Details on the modelling of the Bradley Bar Roundabout were requested to be provided by Optima Highways and these are set out below.

There was a disagreement over the operation and validation of the junction between Optima and Fore Consulting at the Examination in Public. The results of the Fore Consulting model are shown below with a maximum of 2.9 vehicles on any approach (i.e. 1.45 vehicles per lane on a two lane approach).

Table 17: Bradley Bar Roundabout Junctions9 Model Results

Roundabout Arm	AM		PM	
	Queue (PCU)	RFC	Queue (PCU)	RFC
<b>2017 Base</b>				
1 - Bradley Road	2.10	0.68	1.90	0.65
2 - Bradford Road South	1.80	0.64	1.40	0.59
3 - Fixby Road	2.90	0.75	1.50	0.60
4 - Bradford Road North	2.00	0.67	1.50	0.61
<b>2025 Do Min</b>				
1 - Bradley Road	3.70	0.79	3.20	0.77
2 - Bradford Road South	2.70	0.73	2.00	0.67
3 - Fixby Road	9.50	0.93	2.50	0.72
4 - Bradford Road North	3.80	0.80	2.40	0.71
<b>2025 Z135</b>				
1 - Bradley Road	7.60	0.90	5.20	0.85
2 - Bradford Road South	3.30	0.77	2.50	0.72
3 - Fixby Road	17.80	0.99	4.20	0.82
4 - Bradford Road North	8.50	0.91	3.30	0.77
<b>2025 Z12345</b>				
1 - Bradley Road	13.00	0.95	7.40	0.89
2 - Bradford Road South	3.70	0.79	2.70	0.73
3 - Fixby Road	22.60	1.01	4.80	0.84
4 - Bradford Road North	9.00	0.92	3.60	0.79

Extract of Page 17 of Fore Consultings Transport Scoping Report dated January 2018

The concern from Optima was that the Fore Consulting modelled results above appeared to underestimate the existing queues at the junction. This would lead to the underestimation of the impact of the development.

### Kirklees Council April 2017 Technical Paper and Addendum Transport Model

The junction has also been modelled in the April 2017 Technical Paper and Addendum Transport Model for the base, 2020 and 2030 scenarios. The junction was deemed to be ranked 48th in terms of congestion which increased to 18th in 2020 and 12th in 2030 with delay increasing by almost 10 fold between Base and DM 2030. The results of the modelling are shown in Table 1.

**Table 1 Bradley Bar Roundabout**

	Congestion Ranking	Flows	Delay
Base	48	2587	16.46
DM 2020	18	2904	58.40
DM 2030	12	3032	107.10

Taken from Page 30-33 of April 2017 Kirklees Council Technical Paper and Addendum Transport Model

Just for comparison purposes, Optima's results show junction delay of circa 19.7 (page 3 table 2 of output files) in the 2016 count. The base flow in Table 1 of the Kirklees report is based on 2015 count information which was lower than the Optima count (enclosed).

### Optima Model

The modelling of the Bradley Bar Roundabout has been undertaken by Optima using the ARCADY function within Junctions 9 with the lane allocation analysis tool selected. The lane allocation tool has been selected as the traffic flows recorded on Site show an unequal lane usage, particularly on Bradley Road and Fixby Road.

The results of the modelling with the 2016 survey are summarised in the table below, whilst the traffic survey including queue length survey (spot counts), modelling output file and the assessment of geometric parameters are enclosed.

An RFC value greater than 0.85 is above the desirable capacity, whilst a figure of 1.00 or above is beyond the theoretical capacity of the junction.

### Bradley Bar Roundabout 2016 AM and PM Count – Lane Allocation

Movement	Lane Level	Lane	AM				PM			
			RFC	Recorded Queue	Queue	Delay	RFC	Recorded Queue	Queue	Delay
Bradley Road	1	1	0.757	2	3	15	0.912	5	5	20
		2	0.545	1	1	12	0.477	1	1	12
A641 Bradford Road (S)	1	1	-	-	1	4	-	-	8	21
		2	0.779	4	3	15	0.761	4	2	13
Fixby Road	1	2	0.875	3	4	18	0.814	3	3	14
		1	0.852	5	4	23	0.732	5	2	15
A641 Bradford Road (N)	1	2	0.541	2	1	18	0.453	2	1	13
		1	-	6	4	14	-	-	0	2
A641 Bradford Road (N)	1	1	0.792	6	2	14	0.667	5	1	9
		2	0.703	3	1	12	0.598	5	1	9

The lane level refers to the set back from the junction. Level 1 is the area immediately at the give way line, level 2 refers to the level after the initial flaring from 2 lanes to 1 lane. Where there isn't flaring to more than 1 lane, only lane level 1 is shown.



20<sup>th</sup> March 2018  
Bradley Park Golf Club, Huddersfield

The results in the table above show that the junction operates above the desirable capacity but within absolute capacity in both the AM and PM peak hours. The addition of development traffic associated with the allocations will worsen the operation of the junction as demonstrated by the Kirklees modelling. This will make the Bradford Road access difficult to turn into and out of, due to queuing traffic on the approach. This will also make it undesirable for bus operators who would need to route through the Bradley Bar Roundabout twice on northbound journeys.

I trust that the content of this letter is clear, but should you have any queries please do not hesitate to contact me.

Yours sincerely



Steven Phillips  
**Associate**  
**0113 395 1679**

Encs    Queue Length Survey  
          2016 Traffic Survey  
          Modelling Outputs (AM and PM Count)  
          Assessment of Geometric Parameters (Figure 13)











DATE: TUESDAY 17th MAY 2016

TURNING COUNT LOCATION: A641 BRADFORD ROAD / FIXBY ROAD / BRADLEY ROAD

APPROACHING FROM: A641 BRADFORD ROAD (NORTH)

TIME / CLASS	LEFT TO BRADLEY ROAD								STRAIGHT TO A641 BRADFORD ROAD (SOUTH)								RIGHT TO FIXBY ROAD								U-TURN TO A641 BRADFORD ROAD (NORTH)								TOTAL MOVEMENT FROM APPROACH
	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	
07:00 - 07:15	0	1	21	1	1	0	0	24	0	1	99	5	0	0	1	106	0	0	4	3	0	0	0	7	0	0	0	0	0	0	0	0	137
07:15 - 07:30	0	0	47	4	1	1	0	53	0	1	98	12	4	1	2	118	0	0	12	7	0	0	0	19	0	0	1	0	0	0	0	1	191
07:30 - 07:45	0	0	37	5	0	0	0	42	0	1	134	13	5	2	0	155	0	0	7	1	2	1	0	11	0	0	0	0	0	0	0	208	
07:45 - 08:00	0	1	70	3	2	0	0	76	0	1	149	14	7	1	2	174	0	1	8	1	0	0	0	10	0	0	0	0	0	0	0	260	
HOURLY TOTAL	0	2	175	13	4	1	0	195	0	4	480	44	16	4	5	553	0	1	31	12	2	1	0	47	0	0	1	0	0	0	1	796	
08:00 - 08:15	0	1	64	1	2	0	0	68	2	0	153	13	5	1	0	174	0	0	5	2	0	0	0	7	1	0	0	0	0	0	1	250	
08:15 - 08:30	0	1	51	3	0	0	0	55	2	2	139	9	2	0	2	156	0	0	8	4	1	0	0	13	0	0	0	0	0	0	0	224	
08:30 - 08:45	0	0	53	4	0	0	1	58	0	0	150	8	6	2	2	168	0	0	9	0	0	0	0	9	0	0	0	0	0	0	0	235	
08:45 - 09:00	0	0	57	4	1	0	0	62	1	1	141	7	8	1	0	159	0	0	6	1	1	0	0	8	0	0	1	0	1	0	0	231	
HOURLY TOTAL	0	2	225	12	3	0	1	243	5	3	583	37	21	4	4	657	0	0	28	7	2	0	0	37	1	0	1	0	1	0	3	940	
09:00 - 09:15	0	1	68	6	1	1	0	77	0	0	132	12	5	1	3	153	0	0	15	0	1	1	0	17	0	0	2	0	1	0	0	3	250
09:15 - 09:30	0	0	36	5	2	0	0	43	0	0	112	13	3	0	1	129	0	0	7	0	1	0	0	8	0	0	1	0	0	0	0	1	181
09:30 - 09:45	0	0	55	5	2	0	0	62	0	1	88	12	7	0	0	108	0	0	18	0	3	0	0	21	0	0	1	1	0	0	0	2	193
09:45 - 10:00	0	0	30	6	1	1	0	38	0	1	97	11	9	0	2	120	0	0	9	1	0	0	1	11	0	0	1	0	0	0	1	2	171
HOURLY TOTAL	0	1	189	22	6	2	0	220	0	2	429	48	24	1	6	510	0	0	49	1	5	1	1	57	0	0	5	1	1	0	1	8	795
PERIOD TOTAL	0	5	589	47	13	3	1	658	5	9	1492	129	61	9	15	1720	0	1	108	20	9	2	1	141	1	0	7	1	2	0	1	12	2531

15:00 - 15:15	0	0	35	4	2	0	0	41	1	3	75	11	5	3	2	100	0	0	15	3	0	1	0	19	0	0	2	0	0	0	0	2	162
15:15 - 15:30	0	0	42	2	1	0	0	45	0	0	107	9	7	3	1	127	0	0	15	0	2	0	0	17	0	0	1	0	0	0	0	1	190
15:30 - 15:45	0	1	50	4	1	0	0	56	0	2	106	13	3	5	2	131	0	0	27	0	0	0	0	27	0	0	0	0	0	0	0	0	214
15:45 - 16:00	0	0	52	4	1	1	0	58	1	1	133	10	5	1	2	153	0	0	12	8	0	0	0	20	0	0	1	0	0	0	0	1	232
HOURLY TOTAL	0	1	179	14	5	1	0	200	2	6	421	43	20	12	7	511	0	0	69	11	2	1	0	83	0	0	4	0	0	0	0	4	798
16:00 - 16:15	0	0	48	9	0	0	0	57	0	1	118	19	3	2	1	144	0	0	18	3	0	0	0	21	0	0	1	0	0	0	0	1	223
16:15 - 16:30	0	0	43	4	1	0	0	48	0	0	126	10	7	0	2	145	0	0	21	2	0	0	0	23	0	0	2	0	0	0	0	2	218
16:30 - 16:45	0	1	56	6	1	0	0	64	2	2	119	13	1	1	2	140	0	0	27	2	0	0	0	29	0	0	1	0	0	0	0	1	234
16:45 - 17:00	0	0	56	7	0	0	0	63	0	2	149	13	7	1	2	174	0	0	23	1	0	0	0	24	0	0	1	0	0	0	0	1	262
HOURLY TOTAL	0	1	203	26	2	0	0	232	2	5	512	55	18	4	7	603	0	0	89	8	0	0	0	97	0	0	5	0	0	0	0	5	937
17:00 - 17:15	0	1	30	5	2	0	0	38	2	0	102	10	1	0	1	116	1	0	15	0	0	0	0	16	0	0	1	0	0	0	0	1	171
17:15 - 17:30	0	0	49	3	0	0	0	52	0	2	138	10	1	0	4	155	0	0	19	1	0	1	0	21	0	0	1	1	0	0	0	2	230
17:30 - 17:45	0	1	53	4	0	0	0	58	2	2	135	8	0	0	2	149	0	0	15	0	0	1	0	16	0	0	0	0	0	0	0	0	223
17:45 - 18:00	0	0	38	2	0	0	0	40	2	0	133	11	1	0	4	151	0	2	24	1	1	0	0	28	0	0	0	0	0	0	0	2	221
HOURLY TOTAL	0	2	170	14	2	0	0	188	6	4	508	39	3	0	11	571	1	2	73	2	1	2	0	81	0	0	4	1	0	0	0	5	845
18:00 - 18:15	0	0	39	4	0	0	0	43	0	0	141	6	2	1	1	151	0	0	17	1	0	0	0	18	0	0	0	0	0	0	0	0	212
18:15 - 18:30	0	0	30	4	0	0	0	34	1	0	130	5	0	0	2	138	0	0	21	1	0	0	0	22	0	0	0	1	0	0	0	1	195
18:30 - 18:45	0	0	35	2	0	0	0	37	2	0	111	6	1	0	2	122	0	0	16	0	0	1	0	17	0	0	0	0	0	0	0	0	176
18:45 - 19:00	0	0	28	3	0	0	0	31	1	2	121	2	0	0	1	127	0	0	14	1	0	0	0	15	0	0	0	0	0	0	0	0	173
HOURLY TOTAL	0	0	132	13	0	0	0	145	4	2	503	19	3	1	6	538	0	0	68	3	0	1	0	72	0	0	0	1	0	0	0	1	756



DATE: TUESDAY 17th MAY 2016

TURNING COUNT LOCATION: A641 BRADFORD ROAD / FIXBY ROAD / BRADLEY ROAD

APPROACHING FROM: BRADLEY ROAD

TIME / CLASS	LEFT TO A641 BRADFORD ROAD (SOUTH)								STRAIGHT TO FIXBY ROAD								RIGHT TO A641 BRADFORD ROAD (NORTH)								U-TURN TO BRADLEY ROAD								TOTAL MOVEMENT FROM APPROACH
	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	
07:00 - 07:15	0	0	29	2	0	0	2	33	0	0	81	7	0	0	3	91	0	0	24	2	1	3	0	30	0	0	1	0	0	0	0	1	155
07:15 - 07:30	0	0	42	6	1	0	0	49	0	1	80	14	2	1	2	100	0	0	70	4	1	0	0	75	0	0	3	1	0	0	0	4	228
07:30 - 07:45	0	1	50	7	0	0	0	58	0	2	68	13	2	1	0	86	0	0	61	4	1	1	0	67	0	0	8	1	0	0	0	9	220
07:45 - 08:00	0	1	46	5	2	0	0	54	1	0	64	9	1	1	1	77	0	0	61	6	1	0	0	68	0	0	3	0	1	0	0	4	203
HOURLY TOTAL	0	2	167	20	3	0	2	194	1	3	293	43	5	3	6	354	0	0	216	16	4	4	0	240	0	0	15	2	1	0	0	18	806
08:00 - 08:15	0	0	48	9	1	1	0	59	0	2	42	10	5	1	1	61	0	0	59	4	2	0	0	65	0	0	6	0	0	0	0	6	191
08:15 - 08:30	0	1	59	6	0	0	0	66	1	1	57	5	1	2	3	70	0	0	68	4	0	0	0	72	0	0	9	1	0	0	0	10	218
08:30 - 08:45	0	1	70	10	1	0	3	85	0	0	61	7	5	1	4	78	0	0	92	5	2	0	0	99	0	0	6	0	0	0	0	6	268
08:45 - 09:00	0	0	71	3	0	0	2	76	0	1	71	7	3	0	1	83	0	1	59	4	3	0	0	67	0	0	5	0	0	0	0	5	231
HOURLY TOTAL	0	2	248	28	2	1	5	286	1	4	231	29	14	4	9	292	0	1	278	17	7	0	0	303	0	0	26	1	0	0	0	27	908
09:00 - 09:15	0	0	44	5	2	0	1	52	0	0	38	6	4	0	0	48	0	0	31	1	0	0	0	32	0	0	2	0	0	0	0	2	134
09:15 - 09:30	0	0	40	4	0	1	0	45	1	0	45	12	3	0	0	61	0	0	23	2	1	0	0	26	0	0	2	0	0	0	0	2	134
09:30 - 09:45	0	1	47	8	1	1	0	58	0	0	50	3	0	1	0	54	0	0	21	4	0	0	0	25	0	0	1	0	0	0	0	1	138
09:45 - 10:00	0	0	40	5	0	2	0	47	0	0	41	2	2	0	0	45	0	0	23	3	1	0	0	27	0	0	0	0	0	0	0	0	119
HOURLY TOTAL	0	1	171	22	3	4	1	202	1	0	174	23	9	1	0	208	0	0	98	10	2	0	0	110	0	0	5	0	0	0	0	5	525

PERIOD TOTAL	0	5	586	70	8	5	8	682	3	7	698	95	28	8	15	854	0	1	592	43	13	4	0	653	0	0	46	3	1	0	0	50	2239
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15:00 - 15:15	0	0	53	3	2	0	0	58	0	0	64	3	1	1	0	69	0	0	53	6	0	0	0	59	0	0	0	0	1	0	0	1	187
15:15 - 15:30	0	1	79	5	1	1	4	91	0	0	61	10	5	1	2	79	0	0	51	4	2	0	1	58	0	0	2	0	0	1	0	3	231
15:30 - 15:45	0	0	54	7	0	0	2	63	0	0	67	9	1	1	0	78	0	0	40	6	1	0	0	47	0	0	1	0	0	0	0	1	189
15:45 - 16:00	0	0	57	6	0	0	0	63	1	1	52	6	0	0	1	61	0	0	25	6	2	0	0	33	0	0	0	0	0	0	0	0	157
HOURLY TOTAL	0	1	243	21	3	1	6	275	1	1	244	28	7	3	3	287	0	0	169	22	5	0	1	197	0	0	3	0	1	1	0	5	764
16:00 - 16:15	0	0	65	2	2	0	0	69	0	1	83	12	1	1	1	99	0	0	41	2	2	1	0	46	0	0	1	0	0	0	0	1	215
16:15 - 16:30	0	0	56	8	0	0	0	64	0	1	82	15	7	1	0	106	0	0	36	6	1	2	0	45	0	0	1	1	0	0	0	2	217
16:30 - 16:45	1	1	59	11	2	0	0	74	2	2	96	14	2	0	0	116	0	0	53	5	1	0	0	59	0	0	2	0	0	0	0	2	251
16:45 - 17:00	0	1	67	5	3	0	0	76	0	3	64	17	2	2	0	88	0	1	53	6	2	0	0	62	0	0	7	0	0	0	0	7	233
HOURLY TOTAL	1	2	247	26	7	0	0	283	2	7	325	58	12	4	1	409	0	1	183	19	6	3	0	212	0	0	11	1	0	0	0	12	916
17:00 - 17:15	0	0	77	5	1	0	0	83	0	3	103	11	2	0	0	119	0	1	59	5	1	0	0	66	0	0	2	1	1	0	0	4	272
17:15 - 17:30	0	1	58	3	0	0	0	62	1	5	103	11	1	1	0	122	0	1	62	11	0	0	0	74	0	0	3	1	0	0	0	4	262
17:30 - 17:45	0	1	59	4	0	0	0	64	0	0	96	6	3	1	0	106	1	0	64	8	1	0	0	74	0	0	8	0	0	0	0	8	252
17:45 - 18:00	0	2	55	7	0	0	0	64	0	0	99	9	0	0	0	108	0	1	50	3	1	0	0	55	0	0	2	0	0	0	0	2	229
HOURLY TOTAL	0	4	249	19	1	0	0	273	1	8	401	37	6	2	0	455	1	3	235	27	3	0	0	269	0	0	15	2	1	0	0	18	1015
18:00 - 18:15	0	0	70	0	0	0	1	71	0	1	97	11	1	0	0	110	0	0	32	3	1	0	0	36	0	0	3	0	0	0	0	3	220
18:15 - 18:30	0	1	58	5	0	0	0	64	0	2	49	4	0	0	0	55	0	0	33	0	1	0	0	34	0	0	1	0	0	0	0	1	154
18:30 - 18:45	1	0	74	4	1	0	0	80	4	0	59	3	1	0	0	67	0	0	24	0	0	0	0	24	0	0	1	0	0	0	0	1	172
18:45 - 19:00	1	1	46	1	0	0	1	50	1	1	52	7	3	0	0	64	0	1	27	0	0	0	0	28	0	0	0	0	0	0	0	0	142
HOURLY TOTAL	2	2	248	10	1	0	2	265	5	4	257	25	5	0	0	296	0	1	116	3	2	0	0	122	0	0	5	0	0	0	0	5	688





DATE: TUESDAY 17th MAY 2016

TURNING COUNT LOCATION: A641 BRADFORD ROAD / FIXBY ROAD / BRADLEY ROAD

APPROACHING FROM: A641 BRADFORD ROAD (SOUTH)

TIME / CLASS	LEFT TO FIXBY ROAD								STRAIGHT TO A641 BRADFORD ROAD (NORTH)								RIGHT TO BRADLEY ROAD								U-TURN TO A641 BRADFORD ROAD (SOUTH)								TOTAL MOVEMENT FROM APPROACH	
	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL	PEDAL CYCLE	MOTOR CYCLE	CAR TAXI	LGV	OGV1	OGV2	BUS COACH	TOTAL		
07:00 - 07:15	0	0	24	0	0	0	0	24	2	3	126	11	0	0	2	144	0	1	44	5	0	2	1	53	0	0	0	0	0	0	0	0	0	221
07:15 - 07:30	1	0	14	0	0	0	0	15	1	1	167	11	3	0	0	183	0	1	60	5	1	0	3	70	0	0	2	0	0	0	0	0	2	270
07:30 - 07:45	0	0	21	3	1	1	0	26	2	0	192	8	1	0	3	206	1	0	92	8	0	1	1	103	0	0	0	0	0	0	0	0	0	335
07:45 - 08:00	0	0	13	1	0	0	1	15	0	2	187	12	7	1	1	210	0	0	82	8	2	0	0	92	0	0	0	0	0	0	0	0	0	317
HOURLY TOTAL	1	0	72	4	1	1	1	80	5	6	672	42	11	1	6	743	1	2	278	26	3	3	5	318	0	0	2	0	0	0	0	0	2	1143
08:00 - 08:15	0	0	19	1	0	0	0	20	1	0	139	19	8	3	1	171	0	0	91	6	1	0	0	98	0	0	3	0	0	0	0	0	3	292
08:15 - 08:30	0	0	24	3	0	0	0	27	1	3	146	10	4	0	1	165	1	0	118	4	0	0	2	125	0	0	4	0	0	0	0	0	4	321
08:30 - 08:45	1	0	23	1	0	0	0	25	1	0	175	11	4	1	0	192	0	1	88	5	0	1	3	98	0	0	5	0	0	0	0	0	5	320
08:45 - 09:00	0	0	26	1	1	0	0	28	0	0	89	13	2	0	2	106	0	0	88	7	0	1	2	98	0	0	2	0	0	0	0	0	2	234
HOURLY TOTAL	1	0	92	6	1	0	0	100	3	3	549	53	18	4	4	634	1	1	385	22	1	2	7	419	0	0	14	0	0	0	0	0	14	1167
09:00 - 09:15	0	0	22	3	2	0	0	27	0	2	92	16	5	1	1	117	0	1	64	5	1	0	0	71	0	0	1	0	0	0	0	0	1	216
09:15 - 09:30	0	0	23	0	0	1	0	24	0	1	81	11	1	0	1	95	0	0	61	7	2	0	0	70	0	0	1	0	0	0	0	0	1	190
09:30 - 09:45	0	0	22	5	1	0	0	28	0	0	77	8	3	1	2	91	0	0	59	4	1	0	0	64	0	0	1	0	0	0	0	0	1	184
09:45 - 10:00	0	0	17	4	1	0	1	23	0	2	60	9	5	0	2	78	0	0	44	4	4	1	0	53	0	0	1	0	0	0	0	0	1	155
HOURLY TOTAL	0	0	84	12	4	1	1	102	0	5	310	44	14	2	6	381	0	1	228	20	8	1	0	258	0	0	4	0	0	0	0	0	4	745

PERIOD TOTAL	2	0	248	22	6	2	2	282	8	14	1531	139	43	7	16	1758	2	4	891	68	12	6	12	995	0	0	20	0	0	0	0	20	3055
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15:00 - 15:15	0	0	39	3	2	0	0	44	1	0	116	14	3	1	2	137	0	1	63	2	1	0	0	67	0	0	0	0	0	0	0	0	0	248
15:15 - 15:30	0	0	41	3	1	0	0	45	0	2	111	24	4	0	2	143	0	1	57	7	2	2	2	71	0	0	2	0	0	0	0	0	2	261
15:30 - 15:45	0	0	30	3	1	1	0	35	0	2	108	11	2	3	2	128	0	1	61	6	1	1	1	71	0	0	0	0	0	0	0	0	0	234
15:45 - 16:00	0	0	31	7	1	0	1	40	0	2	102	15	3	0	2	124	0	0	61	6	4	1	0	72	0	0	1	0	0	0	0	0	1	237
HOURLY TOTAL	0	0	141	16	5	1	1	164	1	6	437	64	12	4	8	532	0	3	242	21	8	4	3	281	0	0	3	0	0	0	0	0	3	980
16:00 - 16:15	0	0	30	2	0	1	0	33	0	1	100	11	1	0	1	114	0	1	79	4	2	1	0	87	0	0	1	0	0	0	0	0	1	235
16:15 - 16:30	0	0	31	3	0	0	0	34	1	0	143	16	2	2	2	166	0	1	44	4	1	0	0	50	0	0	4	1	0	0	0	0	5	255
16:30 - 16:45	0	0	27	3	1	1	0	32	2	1	136	21	8	1	1	170	0	0	88	10	2	1	0	101	0	0	3	0	0	0	0	0	3	306
16:45 - 17:00	0	0	35	5	0	0	0	40	0	0	158	15	0	3	1	177	0	1	61	7	0	0	0	69	0	0	4	0	0	0	0	0	4	290
HOURLY TOTAL	0	0	123	13	1	2	0	139	3	2	537	63	11	6	5	627	0	3	272	25	5	2	0	307	0	0	12	1	0	0	0	0	13	1086
17:00 - 17:15	0	0	31	0	0	0	0	31	1	0	140	9	0	1	2	153	0	1	75	3	2	0	0	81	0	0	2	0	0	0	0	0	2	267
17:15 - 17:30	0	0	41	1	0	0	0	42	2	2	154	4	4	0	1	167	0	3	61	3	1	0	0	68	0	0	3	0	0	0	0	0	3	280
17:30 - 17:45	0	0	45	3	0	0	0	48	0	1	170	9	2	0	2	184	0	1	63	6	1	0	1	72	0	0	4	0	0	0	0	0	4	308
17:45 - 18:00	1	0	41	4	0	0	0	46	0	3	154	6	0	0	0	163	0	1	59	2	0	0	0	62	0	0	1	0	0	0	0	0	1	272
HOURLY TOTAL	1	0	158	8	0	0	0	167	3	6	618	28	6	1	5	667	0	6	258	14	4	0	1	283	0	0	10	0	0	0	0	0	10	1127
18:00 - 18:15	0	1	29	0	0	0	0	30	1	3	125	4	2	0	1	136	0	0	63	4	0	0	0	67	0	0	1	0	0	0	0	0	1	234
18:15 - 18:30	0	0	32	2	0	0	0	34	0	1	123	3	4	0	2	133	3	2	56	0	0	0	0	61	0	0	3	0	0	0	0	0	3	231
18:30 - 18:45	0	0	28	2	0	0	0	30	0	1	102	2	0	0	2	107	0	0	71	5	1	0	0	77	0	0	1	0	0	0	0	0	1	215
18:45 - 19:00	0	0	34	1	1	0	0	36	0	0	81	8	0	0	1	90	0	0	54	3	1	0	0	58	0	0	1	0	0	0	0	0	1	185
HOURLY TOTAL	0	1	123	5	1	0	0	130	1	5	431	17	6	0	6	466	3	2	244	12	2	0	0	263	0	0	6	0	0	0	0	0	6	865



# Junctions 9

## ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []  
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**Filename:** Bradley Bar Roundabout Lane Allocation DIRECT.j9

**Path:** O:\Gernhill Avenue, Fixby\ANALYSIS\CAPACITY\Roundabouts\Bradley Bar Roundabout

**Report generation date:** 07/04/2017 10:34:22

### «2017 COUNT, AM

- »Junction Network
- »Arms
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Results
- »Lane Results

### Summary of junction performance

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
	[Lane Simulation] - 2017 COUNT			
1 - Bradley Road	5.0	17.95		C
2 - A641 Bradford Road (S)	6.4	16.61		C
3 - Fixby Road	8.8	34.97		D
4 - A641 Bradford Road (N)	4.1	13.43		B

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.*

### File summary

#### File Description

Title	Bradley Bar Roundabout
Location	Fixby
Site number	
Date	14/03/2017
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	CJR
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	perMin	s	-Min	perMin

### Analysis Options

Vehicle	Calculate Queue	Calculate detailed	Calculate residual	RFC	Average Delay	Queue threshold
---------	-----------------	--------------------	--------------------	-----	---------------	-----------------

length (m)	Percentiles	queueing delay	capacity	Threshold	threshold (s)	(PCU)
5.75				0.85	36.00	20.00

### Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1842144354	923	292.63

### Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2017 COUNT	AM	DIRECT	07:45	08:45	60	15	✓

# 2017 COUNT, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.
Warning	Geometry	3 - Fixby Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Bradley Bar Roundabout	Standard Roundabout	1,2,3,4	19.56	C

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description
1	Bradley Road	
2	A641 Bradford Road (S)	
3	Fixby Road	
4	A641 Bradford Road (N)	

### Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Bradley Road	3.20	9.30	29.0	15.0	56.5	21.0	
2 - A641 Bradford Road (S)	6.75	8.10	2.0	13.5	56.5	37.0	
3 - Fixby Road	3.80	8.00	32.9	21.0	56.5	22.0	
4 - A641 Bradford Road (N)	6.75	7.70	5.3	17.0	56.5	33.0	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/min)
1 - Bradley Road	0.653	35.088
2 - A641 Bradford Road (S)	0.630	34.511
3 - Fixby Road	0.659	35.279
4 - A641 Bradford Road (N)	0.658	36.429

*The slope and intercept shown above include any corrections and adjustments.*

### Lane Simulation: Arm options

Arm	Lane capacity source	Traffic Considering Secondary Lanes (%)
1 - Bradley Road	Apportion from lane geometry	10.00
2 - A641 Bradford Road (S)	Evenly split	10.00
3 - Fixby Road	Apportion from lane geometry	10.00
4 - A641 Bradford Road (N)	Evenly split	10.00

## Lanes

Arm	Lane level	Lane	Destination arms	Has limited storage	Storage (PCU)	Minimum capacity (PCU/min)	Maximum capacity (PCU/min)
1 - Bradley Road	1 [Give-way line]	1	2,3	✓	6.00	0.00	1666.65
		2	1,4	✓	6.00	0.00	1666.65
	2	1	(1,2,3,4)		Infinity		
2 - A641 Bradford Road (S)	1 [Give-way line]	1	3,4		Infinity	0.00	1666.65
		2	1,2,4		Infinity	0.00	1666.65
3 - Fixby Road	1 [Give-way line]	1	1,4	✓	6.00	0.00	1666.65
		2	2,3	✓	6.00	0.00	1666.65
	2	1	(1,2,3,4)		Infinity		
4 - A641 Bradford Road (N)	1 [Give-way line]	1	1,2		Infinity	0.00	1666.65
		2	2,3,4		Infinity	0.00	1666.65

## Entry Lane Geometry

Arm	Lane level	Lane	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)
1 - Bradley Road	1 [Give-way line]	1	3.20	5.50	7.0	20.0	56.5	21.0
		2	3.20	3.80	1.0	20.0	56.5	21.0
3 - Fixby Road	1 [Give-way line]	1	4.30	4.70	4.5	21.0	56.5	22.0
		2	3.30	3.30	0.0	21.0	56.5	22.0

## Entry Lane slope and intercept

Arm	Lane level	Lane	Final slope	Final intercept (PCU/min)
1 - Bradley Road	1 [Give-way line]	1	0.365	19.623
		2	0.288	15.465
2 - A641 Bradford Road (S)	1 [Give-way line]	1	0.315	17.256
		2	0.315	17.256
3 - Fixby Road	1 [Give-way line]	1	0.384	20.563
		2	0.275	14.716
4 - A641 Bradford Road (N)	1 [Give-way line]	1	0.329	18.215
		2	0.329	18.215

## Lane Movements

Arm	Lane Level	Lane	Destination arm			
			Bradley Road	A641 Bradford Road (S)	Fixby Road	A641 Bradford Road (N)
1 - Bradley Road	1 [Give-way line]	1		✓	✓	
		2	✓			✓
	2	1	✓	✓	✓	✓
2 - A641 Bradford Road (S)	1 [Give-way line]	1			✓	✓
		2	✓	✓		✓
3 - Fixby Road	1 [Give-way line]	1	✓			✓
		2		✓	✓	
	2	1	✓	✓	✓	✓
4 - A641 Bradford Road (N)	1 [Give-way line]	1	✓	✓		
		2		✓	✓	✓

## Traffic Demand

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

## Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
1 - Bradley Road		DIRECT		100.000
2 - A641 Bradford Road (S)		DIRECT		100.000
3 - Fixby Road		DIRECT		100.000
4 - A641 Bradford Road (N)		DIRECT		100.000

## Origin-Destination Data

### Demand (PCU/min)

		To			
		1 - Bradley Road	2 - A641 Bradford Road (S)	3 - Fixby Road	4 - A641 Bradford Road (N)
From	1 - Bradley Road	27.00	272.00	312.00	309.00
	2 - A641 Bradford Road (S)	422.00	12.00	88.00	769.00
	3 - Fixby Road	477.00	232.00	0.00	36.00
	4 - A641 Bradford Road (N)	262.00	702.00	40.00	1.00

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Bradley Road	2 - A641 Bradford Road (S)	3 - Fixby Road	4 - A641 Bradford Road (N)
From	1 - Bradley Road	0	0	0	0
	2 - A641 Bradford Road (S)	0	0	0	0
	3 - Fixby Road	0	0	0	0
	4 - A641 Bradford Road (N)	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/min)	Total Junction Arrivals (PCU)
1 - Bradley Road	17.95	5.0	C	15.30	917.96
2 - A641 Bradford Road (S)	16.61	6.4	C	21.51	1290.72
3 - Fixby Road	34.97	8.8	D	12.40	743.93
4 - A641 Bradford Road (N)	13.43	4.1	B	16.76	1005.34

### Main Results for each time segment

#### 07:45 - 08:00

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	15.40	230.95	16.47	15.35	19.79	0.0	4.2	12.740	B
2 - A641 Bradford Road (S)	21.58	323.72	11.51	21.56	20.32	0.0	5.4	12.443	B
3 - Fixby Road	12.41	186.15	25.73	12.30	7.35	0.0	5.6	19.161	C
4 - A641 Bradford Road (N)	16.85	252.78	19.44	16.83	18.59	0.0	3.6	10.281	B

#### 08:00 - 08:15

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	14.70	220.50	15.86	14.70	19.12	4.2	3.3	13.716	B
2 - A641 Bradford Road (S)	20.66	309.86	10.98	20.73	19.58	5.4	4.2	12.675	B
3 - Fixby Road	11.92	178.87	24.74	11.92	6.97	5.6	4.4	23.410	C
4 - A641 Bradford Road (N)	16.16	242.45	18.82	16.15	17.84	3.6	3.0	10.898	B

#### 08:15 - 08:30

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	15.20	228.06	16.37	15.14	19.69	3.3	4.1	14.853	B

2 - A641 Bradford Road (S)	21.46	321.85	11.33	21.45	20.17	4.2	5.1	13.849	B
3 - Fixby Road	12.35	185.30	25.51	12.38	7.28	4.4	5.6	26.620	D
4 - A641 Bradford Road (N)	16.67	250.00	19.41	16.65	18.47	3.0	3.3	11.730	B

## 08:30 - 08:45

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	15.90	238.45	17.03	15.91	20.42	4.1	5.0	17.949	C
2 - A641 Bradford Road (S)	22.35	335.29	11.88	22.38	21.07	5.1	6.4	16.610	C
3 - Fixby Road	12.91	193.61	26.62	12.79	7.64	5.6	8.8	34.971	D
4 - A641 Bradford Road (N)	17.34	260.11	20.10	17.36	19.31	3.3	4.1	13.433	B

## Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

## Lanes: Main Results for each time segment

## 07:45 - 08:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	9.75	13.61	0.716	9.73	0.0	2.3	11.447	B
			2	1,4	5.63	10.72	0.525	5.62	0.0	1.1	10.473	B
		2	1	(1,2,3,4)	15.40			15.37	0.0	0.8	1.616	A
	Exit	1	1		19.79			19.79	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	10.03	13.63	0.736	10.01	0.0	2.3	10.959	B
			2	1,2,4	11.55	13.63	0.847	11.56	0.0	3.2	13.696	B
	Exit	1	1		20.32			20.32	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.49	10.68	0.796	8.46	0.0	3.0	15.979	C
			2	2,3	3.84	7.64	0.502	3.84	0.0	1.0	13.919	B
		2	1	(1,2,3,4)	12.41			12.33	0.0	1.6	3.703	A
	Exit	1	1		7.35			7.35	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	9.00	11.82	0.761	8.98	0.0	2.1	10.966	B
			2	2,3,4	7.85	11.82	0.665	7.85	0.0	1.5	9.478	A
	Exit	1	1		18.59			18.59	0.0	0.0	0.000	A

## 08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	9.33	13.83	0.675	9.34	2.3	1.9	12.445	B
			2	1,4	5.35	10.90	0.491	5.36	1.1	1.0	11.128	B
		2	1	(1,2,3,4)	14.70			14.69	0.8	0.4	1.769	A
	Exit	1	1		19.12			19.12	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	9.44	13.80	0.684	9.46	2.3	1.7	11.062	B
			2	1,2,4	11.22	13.80	0.813	11.27	3.2	2.5	14.046	B
	Exit	1	1		19.58			19.58	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.17	11.06	0.739	8.20	3.0	2.5	18.781	C
			2	2,3	3.76	7.91	0.475	3.73	1.0	1.0	15.402	C
		2	1	(1,2,3,4)	11.92			11.93	1.6	0.9	5.742	A
	Exit	1	1		6.97			6.97	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	8.69	12.02	0.723	8.67	2.1	1.7	11.679	B
			2	2,3,4	7.48	12.02	0.622	7.49	1.5	1.2	9.990	A
	Exit	1	1		17.84			17.84	0.0	0.0	0.000	A

## 08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	9.65	13.65	0.707	9.63	1.9	2.2	13.034	B
			2	1,4	5.53	10.75	0.514	5.51	1.0	1.2	11.778	B
		2	1	(1,2,3,4)	15.20			15.18	0.4	0.7	2.265	A
	Exit	1	1		19.69			19.69	0.0	0.0	0.000	A



2 - A641 Bradford Road (S)	Entry	1	1	3,4	9.95	13.69	0.727	9.95	1.7	2.0	12.215	B
			2	1,2,4	11.51	13.69	0.841	11.50	2.5	3.1	15.254	C
	Exit	1	1		20.17			20.17	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.52	10.76	0.791	8.52	2.5	2.9	20.140	C
			2	2,3	3.87	7.70	0.502	3.86	1.0	1.1	15.948	C
	Exit	1	1	(1,2,3,4)	12.35			12.38	0.9	1.7	7.730	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	8.91	11.82	0.753	8.90	1.7	1.9	12.548	B
			2	2,3,4	7.76	11.82	0.656	7.74	1.2	1.4	10.790	B
	Exit	1	1		18.47			18.47	0.0	0.0	0.000	A

## 08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	10.14	13.40	0.757	10.14	2.2	2.6	14.851	B
			2	1,4	5.76	10.56	0.545	5.77	1.2	1.2	12.331	B
		2	1	(1,2,3,4)	15.90			15.90	0.7	1.3	4.066	A
	Exit	1	1		20.42			20.42	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	10.53	13.51	0.779	10.54	2.0	2.7	14.810	B
			2	1,2,4	11.82	13.51	0.875	11.84	3.1	3.7	18.202	C
	Exit	1	1		21.07			21.07	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.80	10.34	0.852	8.81	2.9	3.6	23.305	C
			2	2,3	4.00	7.40	0.541	3.98	1.1	1.3	17.580	C
		2	1	(1,2,3,4)	12.91			12.81	1.7	4.0	13.699	B
	Exit	1	1		7.64			7.64	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	9.19	11.60	0.792	9.20	1.9	2.3	14.332	B
			2	2,3,4	8.15	11.60	0.703	8.16	1.4	1.8	12.413	B
	Exit	1	1		19.31			19.31	0.0	0.0	0.000	A

# Junctions 9

## ARCADY 9 - Roundabout Module

Version: 9.0.1.4646 []  
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**Filename:** Bradley Bar Roundabout Lane Allocation DIRECT.j9

**Path:** O:\Gernhill Avenue, Fixby\ANALYSIS\CAPACITY\Roundabouts\Bradley Bar Roundabout

**Report generation date:** 07/04/2017 10:37:52

### «2017 COUNT, PM

- »Junction Network
- »Arms
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Results
- »Lane Results

### Summary of junction performance

	PM			
	Queue (PCU)	Delay (s)	RFC	LOS
	[Lane Simulation] - 2017 COUNT			
1 - Bradley Road	13.1	38.73		E
2 - A641 Bradford Road (S)	4.9	13.65		B
3 - Fixby Road	4.0	16.01		C
4 - A641 Bradford Road (N)	2.4	9.02		A

*There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Arm and junction delays are averages for all movements, including movements with zero delay.*

### File summary

#### File Description

<b>Title</b>	Bradley Bar Roundabout
<b>Location</b>	Fixby
<b>Site number</b>	
<b>Date</b>	14/03/2017
<b>Version</b>	
<b>Status</b>	(new file)
<b>Identifier</b>	
<b>Client</b>	
<b>Jobnumber</b>	
<b>Enumerator</b>	CJR
<b>Description</b>	

### 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	perMin	s	-Min	perMin

### Analysis Options

Vehicle	Calculate Queue	Calculate detailed	Calculate residual	RFC	Average Delay	Queue threshold
---------	-----------------	--------------------	--------------------	-----	---------------	-----------------

length (m)	Percentiles	queueing delay	capacity	Threshold	threshold (s)	(PCU)
5.75				0.85	36.00	20.00

### Lane Simulation options

Stop criteria (%)	Stop criteria time (s)	Stop criteria number of trials	Random seed	Results refresh speed (s)	Individual vehicle animation number of trials	Use crossings quick response	Last run random seed	Last run number of trials	Last run time taken (s)
1.00	100000	100000	-1	3	1	✓	1356800772	484	140.54

### Analysis Set Details

ID	Use Lane Simulation	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	✓	100.000	100.000

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D2	2017 COUNT	PM	DIRECT	07:45	08:45	60	15	✓

# 2017 COUNT, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Lane Simulation	A1 - [Lane Simulation]	This analysis set uses Lane Simulation mode. This is provided as an investigative tool and the user should apply judgement when interpreting the results.
Last Run	Lane Simulation	1 - Bradley Road - Lane Simulation	Arm 1: Queue at end of modelled period is greater than 10 PCU. Delay is likely to have been underestimated.
Warning	Geometry	3 - Fixby Road - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	Bradley Bar Roundabout	Standard Roundabout	1,2,3,4	19.81	C

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description
1	Bradley Road	
2	A641 Bradford Road (S)	
3	Fixby Road	
4	A641 Bradford Road (N)	

### Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Bradley Road	3.20	9.30	29.0	15.0	56.5	21.0	
2 - A641 Bradford Road (S)	6.75	8.10	2.0	13.5	56.5	37.0	
3 - Fixby Road	3.80	8.00	32.9	21.0	56.5	22.0	
4 - A641 Bradford Road (N)	6.75	7.70	5.3	17.0	56.5	33.0	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/min)
1 - Bradley Road	0.653	35.088
2 - A641 Bradford Road (S)	0.630	34.511
3 - Fixby Road	0.659	35.279
4 - A641 Bradford Road (N)	0.658	36.429

*The slope and intercept shown above include any corrections and adjustments.*

### Lane Simulation: Arm options

Arm	Lane capacity source	Traffic Considering Secondary Lanes (%)
1 - Bradley Road	Apportion from lane geometry	10.00
2 - A641 Bradford Road (S)	Evenly split	10.00

3 - Fixby Road	Apportion from lane geometry	10.00
4 - A641 Bradford Road (N)	Evenly split	10.00

## Lanes

Arm	Lane level	Lane	Destination arms	Has limited storage	Storage (PCU)	Minimum capacity (PCU/min)	Maximum capacity (PCU/min)
1 - Bradley Road	1 [Give-way line]	1	2,3	✓	6.00	0.00	1666.65
		2	1,4	✓	6.00	0.00	1666.65
	2	1	(1,2,3,4)		Infinity		
2 - A641 Bradford Road (S)	1 [Give-way line]	1	3,4		Infinity	0.00	1666.65
		2	1,2,4		Infinity	0.00	1666.65
3 - Fixby Road	1 [Give-way line]	1	1,4	✓	6.00	0.00	1666.65
		2	2,3	✓	6.00	0.00	1666.65
	2	1	(1,2,3,4)		Infinity		
4 - A641 Bradford Road (N)	1 [Give-way line]	1	1,2		Infinity	0.00	1666.65
		2	2,3,4		Infinity	0.00	1666.65

## Entry Lane Geometry

Arm	Lane level	Lane	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)
1 - Bradley Road	1 [Give-way line]	1	3.20	5.50	7.0	20.0	56.5	21.0
		2	3.20	3.80	1.0	20.0	56.5	21.0
3 - Fixby Road	1 [Give-way line]	1	4.30	4.70	4.5	21.0	56.5	22.0
		2	3.30	3.30	0.0	21.0	56.5	22.0

## Entry Lane slope and intercept

Arm	Lane level	Lane	Final slope	Final intercept (PCU/min)
1 - Bradley Road	1 [Give-way line]	1	0.365	19.623
		2	0.288	15.465
2 - A641 Bradford Road (S)	1 [Give-way line]	1	0.315	17.256
		2	0.315	17.256
3 - Fixby Road	1 [Give-way line]	1	0.384	20.563
		2	0.275	14.716
4 - A641 Bradford Road (N)	1 [Give-way line]	1	0.329	18.215
		2	0.329	18.215

## Lane Movements

Arm	Lane Level	Lane	Destination arm			
			Bradley Road	A641 Bradford Road (S)	Fixby Road	A641 Bradford Road (N)
1 - Bradley Road	1 [Give-way line]	1		✓	✓	
		2	✓			✓
	2	1	✓	✓	✓	✓
2 - A641 Bradford Road (S)	1 [Give-way line]	1			✓	✓
		2	✓	✓		✓
3 - Fixby Road	1 [Give-way line]	1	✓			✓
		2		✓	✓	
	2	1	✓	✓	✓	✓
4 - A641 Bradford Road (N)	1 [Give-way line]	1	✓	✓		
		2		✓	✓	✓

## Traffic Demand

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

## Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
1 - Bradley Road		DIRECT		100.000
2 - A641 Bradford Road (S)		DIRECT		100.000

3 - Fixby Road		DIRECT	100.000
4 - A641 Bradford Road (N)		DIRECT	100.000

## Origin-Destination Data

### Demand (PCU/min)

		To			
		1 - Bradley Road	2 - A641 Bradford Road (S)	3 - Fixby Road	4 - A641 Bradford Road (N)
From	1 - Bradley Road	24.00	289.00	447.00	280.00
	2 - A641 Bradford Road (S)	295.00	13.00	161.00	697.00
	3 - Fixby Road	454.00	225.00	0.00	50.00
	4 - A641 Bradford Road (N)	213.00	613.00	79.00	4.00

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Bradley Road	2 - A641 Bradford Road (S)	3 - Fixby Road	4 - A641 Bradford Road (N)
From	1 - Bradley Road	0	0	0	0
	2 - A641 Bradford Road (S)	0	0	0	0
	3 - Fixby Road	0	0	0	0
	4 - A641 Bradford Road (N)	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/min)	Total Junction Arrivals (PCU)
1 - Bradley Road	38.73	13.1	E	17.39	1043.33
2 - A641 Bradford Road (S)	13.65	4.9	B	19.42	1164.99
3 - Fixby Road	16.01	4.0	C	12.11	726.32
4 - A641 Bradford Road (N)	9.02	2.4	A	15.18	910.85

### Main Results for each time segment

#### 07:45 - 08:00

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	17.92	268.79	16.19	17.59	17.00	0.0	12.2	27.591	D
2 - A641 Bradford Road (S)	20.20	302.94	14.09	20.17	19.70	0.0	4.9	12.396	B
3 - Fixby Road	12.57	188.52	22.57	12.55	11.69	0.0	4.0	15.063	C
4 - A641 Bradford Road (N)	15.78	236.77	17.41	15.78	17.70	0.0	2.4	8.384	A

#### 08:00 - 08:15

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	16.25	243.72	14.31	16.38	15.17	12.2	6.3	28.246	D
2 - A641 Bradford Road (S)	17.97	269.58	13.08	17.98	17.62	4.9	3.0	10.639	B
3 - Fixby Road	11.28	169.18	20.31	11.29	10.75	4.0	2.3	13.098	B
4 - A641 Bradford Road (N)	13.94	209.03	15.53	13.95	16.07	2.4	1.6	7.659	A

#### 08:15 - 08:30

Arm	Total Demand	Junction Arrivals	Circulating flow	Throughput (PCU/min)	Throughput (exit side)	Start queue	End queue	Delay (s)	LOS
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	(PCU/min)	(PCU)	(PCU/min)		(PCU/min)	(PCU)	(PCU)		
1 - Bradley Road	17.52	262.84	15.83	17.41	16.66	6.3	9.9	30.349	D
2 - A641 Bradford Road (S)	19.76	296.34	13.99	19.78	19.26	3.0	4.5	13.212	B
3 - Fixby Road	12.31	184.62	22.21	12.35	11.56	2.3	3.4	15.629	C
4 - A641 Bradford Road (N)	15.41	231.17	17.14	15.35	17.41	1.6	2.4	8.709	A

## 08:30 - 08:45

Arm	Total Demand (PCU/min)	Junction Arrivals (PCU)	Circulating flow (PCU/min)	Throughput (PCU/min)	Throughput (exit side) (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	17.87	267.99	15.97	17.65	16.65	9.9	13.1	38.734	E
2 - A641 Bradford Road (S)	19.74	296.12	14.16	19.71	19.46	4.5	4.6	13.646	B
3 - Fixby Road	12.27	184.01	22.28	12.24	11.59	3.4	3.2	16.013	C
4 - A641 Bradford Road (N)	15.59	233.88	17.00	15.62	17.52	2.4	2.3	9.024	A

## Lane Results

Lane Level notation: Lane Level 1 is always closest to the junction.

## Lanes: Main Results for each time segment

## 07:45 - 08:00

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	12.50	13.71	0.912	12.47	0.0	4.5	17.015	C
			2	1,4	5.14	10.80	0.476	5.12	0.0	1.1	10.169	B
		2	1	(1,2,3,4)	17.92			17.64	0.0	6.7	12.398	B
	Exit	1	1		17.00			17.00	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	9.76	12.82	0.761	9.74	0.0	2.2	11.788	B
			2	1,2,4	10.43	12.82	0.814	10.43	0.0	2.7	12.958	B
	Exit	1	1		19.70			19.70	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.70	11.89	0.732	8.69	0.0	2.4	13.402	B
			2	2,3	3.86	8.51	0.453	3.86	0.0	0.9	11.605	B
		2	1	(1,2,3,4)	12.57			12.56	0.0	0.8	2.162	A
	Exit	1	1		11.69			11.69	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	8.32	12.48	0.667	8.31	0.0	1.4	8.811	A
			2	2,3,4	7.46	12.48	0.598	7.47	0.0	1.0	7.906	A
	Exit	1	1		17.70			17.70	0.0	0.0	0.000	A

## 08:00 - 08:15

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	11.58	14.39	0.805	11.59	4.5	3.1	17.255	C
			2	1,4	4.78	11.34	0.422	4.79	1.1	0.9	10.223	B
		2	1	(1,2,3,4)	16.25			16.36	6.7	2.3	13.167	B
	Exit	1	1		15.17			15.17	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	8.57	13.14	0.652	8.58	2.2	1.3	10.092	B
			2	1,2,4	9.41	13.14	0.716	9.40	2.7	1.6	11.138	B
	Exit	1	1		17.62			17.62	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	7.84	12.76	0.614	7.85	2.4	1.5	12.298	B
			2	2,3	3.43	9.13	0.375	3.43	0.9	0.6	11.407	B
		2	1	(1,2,3,4)	11.28			11.27	0.8	0.2	1.131	A
	Exit	1	1		10.75			10.75	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	7.49	13.10	0.572	7.50	1.4	0.9	8.044	A
			2	2,3,4	6.44	13.10	0.492	6.45	1.0	0.7	7.217	A
	Exit	1	1		16.07			16.07	0.0	0.0	0.000	A

## 08:15 - 08:30

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	12.29	13.84	0.888	12.28	3.1	3.9	18.669	C
			2	1,4	5.11	10.91	0.468	5.13	0.9	0.9	11.041	B

		2	1	(1,2,3,4)	17.52			17.40	2.3	5.0	13.837	B
	Exit	1	1		16.66			16.66	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	9.50	12.85	0.739	9.52	1.3	2.0	12.618	B
			2	1,2,4	10.25	12.85	0.798	10.26	1.6	2.4	13.761	B
	Exit	1	1		19.26			19.26	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.52	12.03	0.708	8.56	1.5	2.1	14.346	B
			2	2,3	3.79	8.61	0.440	3.79	0.6	0.8	12.568	B
	Exit	1	1	(1,2,3,4)	12.31			12.30	0.2	0.4	1.809	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	8.13	12.57	0.647	8.10	0.9	1.3	9.120	A
			2	2,3,4	7.28	12.57	0.579	7.25	0.7	1.1	8.247	A
	Exit	1	1		17.41			17.41	0.0	0.0	0.000	A

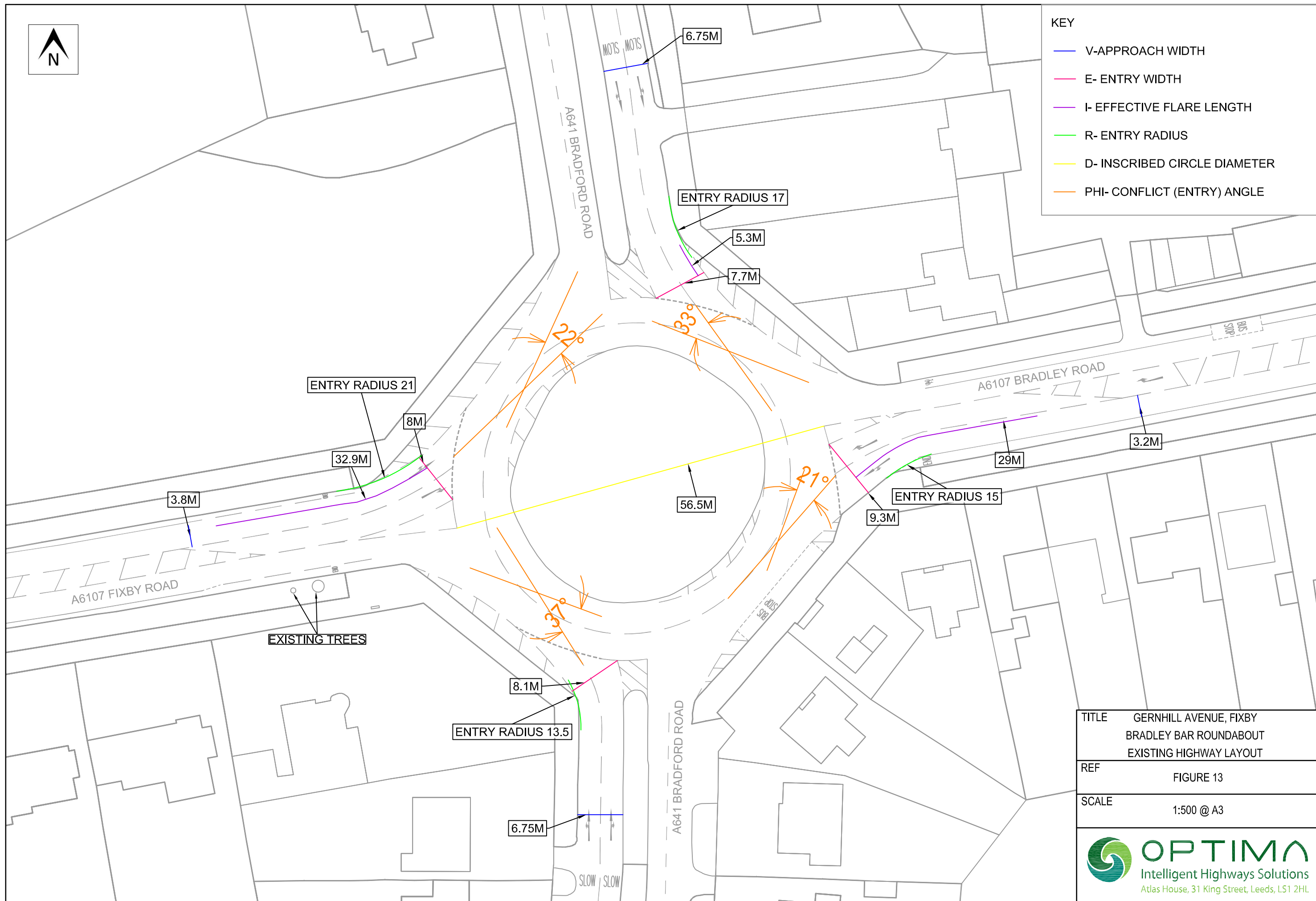
## 08:30 - 08:45

Arm	Side	Lane level	Lane	Destination arms	Total Demand (PCU/min)	Capacity (PCU/min)	RFC	Throughput (PCU/min)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Bradley Road	Entry	1	1	2,3	12.48	13.79	0.905	12.46	3.9	4.2	20.232	C
			2	1,4	5.19	10.87	0.477	5.19	0.9	1.0	11.512	B
			2	1	(1,2,3,4)	17.87			17.67	5.0	7.9	21.320
	Exit	1	1		16.65			16.65	0.0	0.0	0.000	A
2 - A641 Bradford Road (S)	Entry	1	1	3,4	9.53	12.80	0.744	9.51	2.0	2.1	13.001	B
			2	1,2,4	10.22	12.80	0.798	10.20	2.4	2.5	14.248	B
	Exit	1	1		19.46			19.46	0.0	0.0	0.000	A
3 - Fixby Road	Entry	1	1	1,4	8.46	12.00	0.705	8.42	2.1	2.1	14.489	B
			2	2,3	3.81	8.59	0.443	3.82	0.8	0.8	12.878	B
			2	1	(1,2,3,4)	12.27			12.27	0.4	0.3	2.052
	Exit	1	1		11.59			11.59	0.0	0.0	0.000	A
4 - A641 Bradford Road (N)	Entry	1	1	1,2	8.25	12.62	0.654	8.26	1.3	1.3	9.489	A
			2	2,3,4	7.34	12.62	0.581	7.35	1.1	1.0	8.505	A
	Exit	1	1		17.52			17.52	0.0	0.0	0.000	A





- KEY
- V-APPROACH WIDTH
  - E- ENTRY WIDTH
  - I- EFFECTIVE FLARE LENGTH
  - R- ENTRY RADIUS
  - D- INSCRIBED CIRCLE DIAMETER
  - PHI- CONFLICT (ENTRY) ANGLE



TITLE	GERNHILL AVENUE, FIXBY BRADLEY BAR ROUNDABOUT EXISTING HIGHWAY LAYOUT
REF	FIGURE 13
SCALE	1:500 @ A3

