Annex 2A – Traffic master data

City of York Council

Average Traffic Speeds
08:00 to 09:00
Before Clifton Br scheme:
Source:Trafficmaster GPS data

MainRoads
MPHHR8B

<10mph
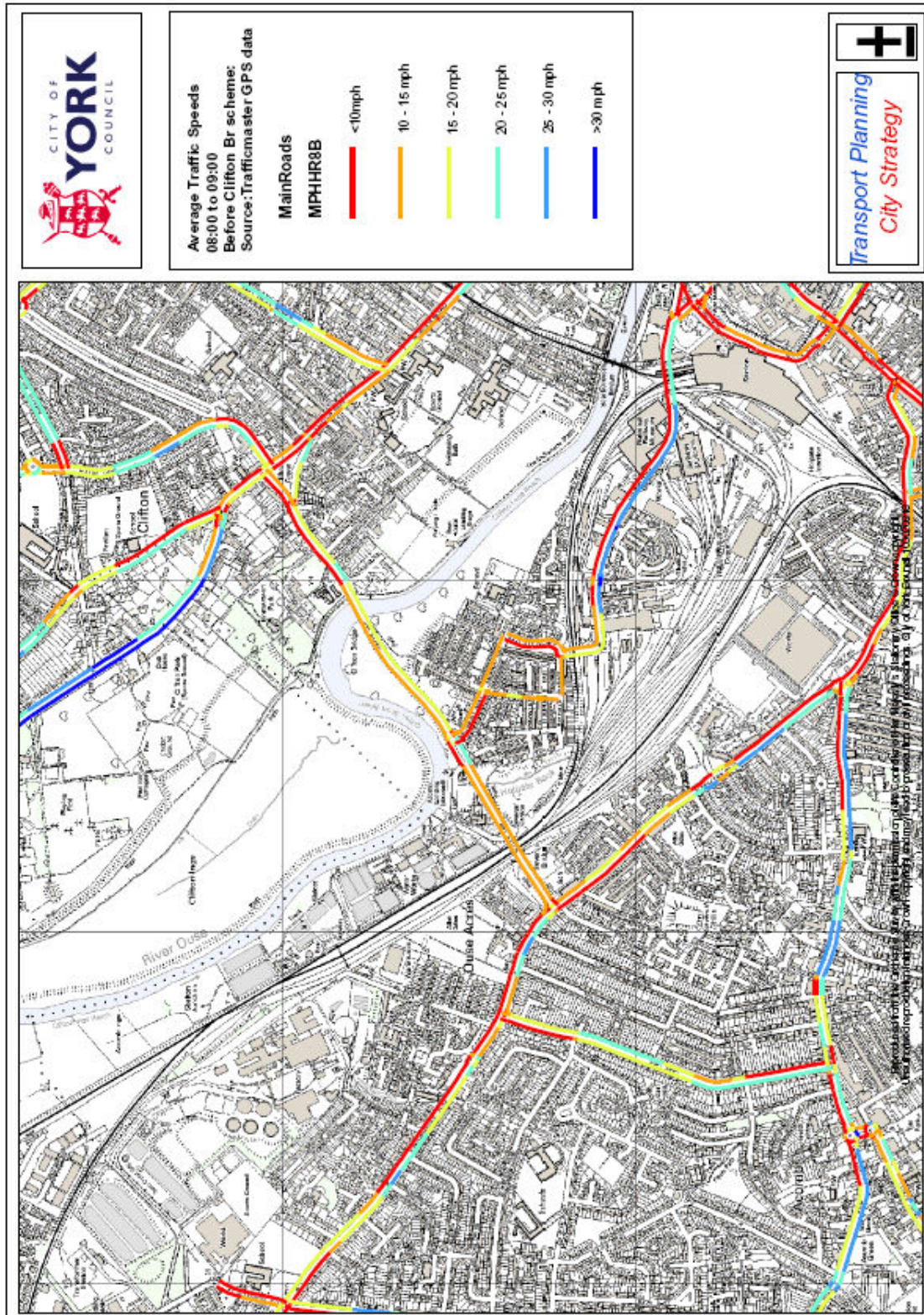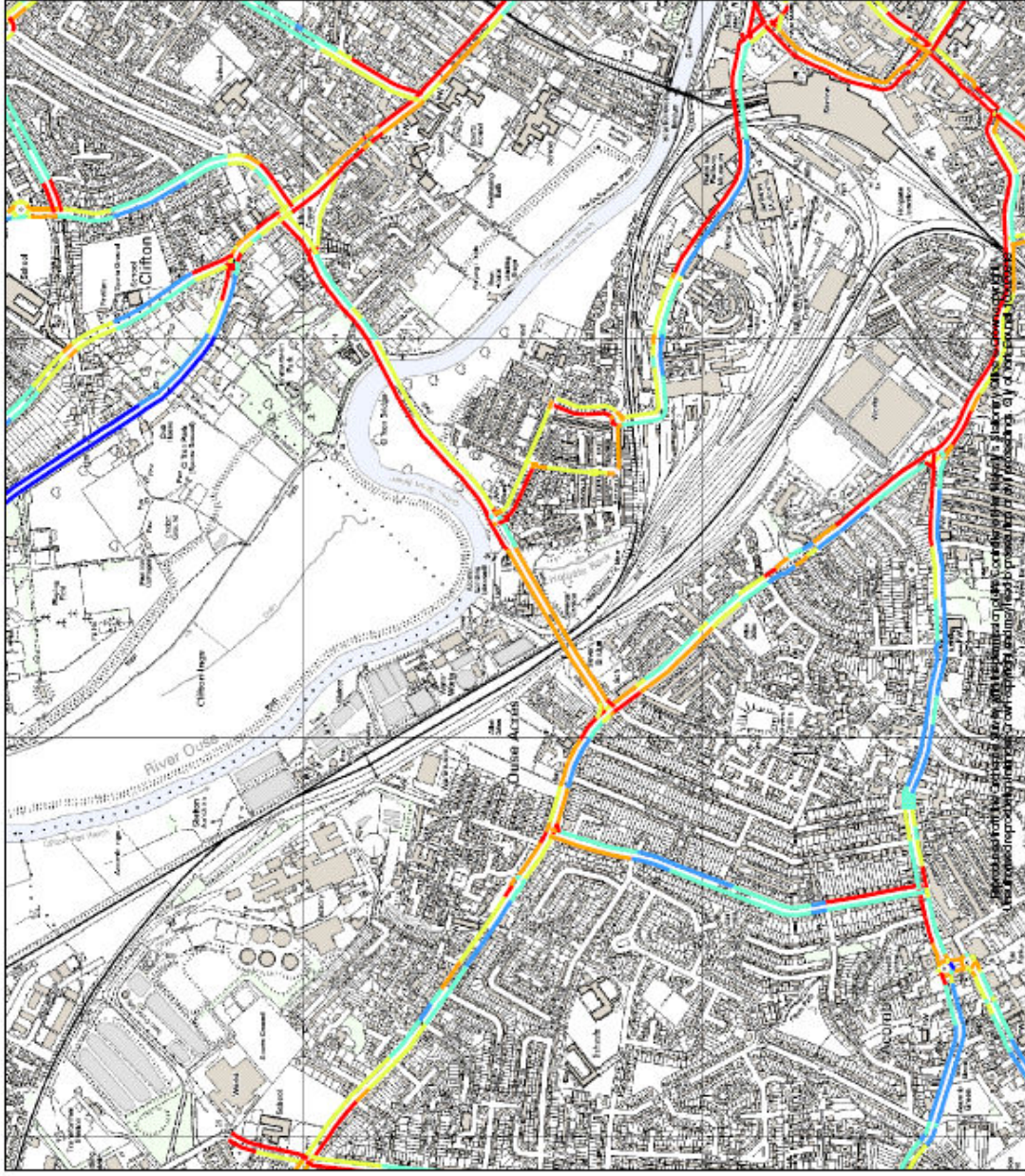10 - 15 mph
15 - 20mph
20 - 25mph
25 - 30 mph
>30 mph

Transport Planning
City Strategy

Average Traffic Speeds
08:00 to 09:00
After Clifton Br scheme:
Source: Trafficmaster GPS data
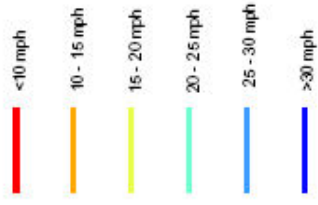
MainRoads

MPHHR8A

▬	<10 mph
▬	10 - 15 mph
▬	15 - 20 mph
▬	20 - 25 mph
▬	25 - 30 mph
▬	>30 mph

Transport Planning
City Strategy

Clifton

River Ouse

Ouse Acomb

City of York Council
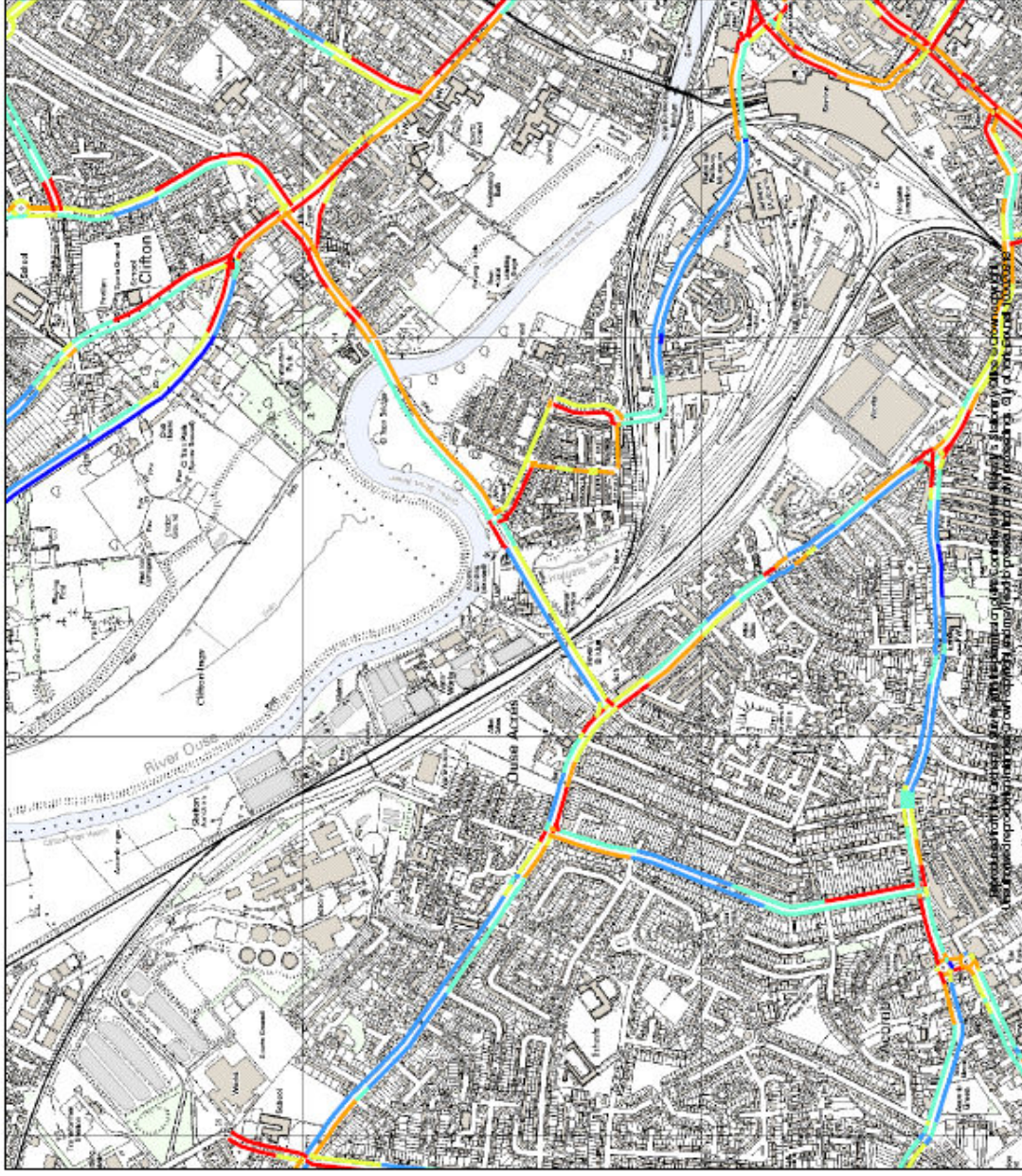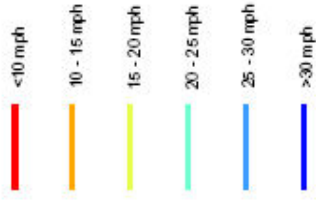
Average Traffic Speeds
17:00 to 18:00
Before Clifton Br scheme:
Source:Trafficmaster GPS data

MainRoads
MPHHR17B

- <10 mph
- 10 - 15 mph
- 15 - 20 mph
- 20 - 25 mph
- 25 - 30 mph
- >30 mph

Transport Planning
City Strategy

Annex 2B

**Economic & City Development Overview &
Scrutiny Committee**

Technical Briefing Note:

**Junction Analysis Modelling of Clifton Green – Westminster Road / The
Avenue Closure.**

Summary

1. This note reports on the highway impacts of the closure of the through route between Water End and Clifton via Westminster Road and The Avenue. It also investigates an option of partially reinstating the left turn lane and filter at the Water End approach to Clifton Green, as mitigation for closure of Westminster Road.

Background

2. The removal of the left turn filter and lane at Water End junction with Clifton Green, as part of the Water End cycle scheme and consequential loss of capacity at the junction resulted in an increase in delay on Water End. Since implementation of the scheme some traffic has redistributed away from the Clifton Green junction to avoid the delays and an element of traffic is using Westminster Road and The Avenue as a through route to avoid queuing at the traffic lights.

3. Modelling work has been undertaken to assess the impact on Clifton Green junction of a closure on Westminster Road or The Avenue. The modelling work is based on traffic surveys undertaken on 29th September 2009 and 5th November 2009. Signal timings used are as provided by the Council's Network Management team.

4. An investigation into the benefits of a partial reinstatement of a short left turn lane and filter on Water End has been made.

Modelling Analysis

5. Ten scenarios were modelled. Table 1 is a summary of the modelling outputs. Practical Reserve Capacity (PRC) is a measure of the capacity of the junction. Negative values indicate that the junction is over capacity and will be experiencing delays. Flow is measured in passenger car units (pcus) where 1 car occupies 1 pcu of road space, a bus occupies 2.5 pcu, HGV = 2.9 pcu.   Total delay is measured in pcu hours, this being a measure of the amount of delay experienced over the hour on all legs of the junction.

6. The queue lengths presented in Table 1 are mean queues. Queues at saturated junctions tend to build as the peak hour progresses therefore observed queues can be up to twice the mean queue. It has also been noted that long queues are longer per vehicle than shorter queues because drivers leave bigger gaps when far back in the queue. For reference Westminster Road is 300m back from the signals at Clifton Green, Clifton Bridge 500m, Salisbury Road 1000m and the Boroughbridge Road junction 1500m.

7. The analysis is based on traffic surveys undertaken on 29th September 2009 and 5th November 2009.

Table 1.

Scenario:	Practical Reserve Capacity	Total delay (pcu hr)	Water End average delay per pcu (mins)	Water End Mean Queue (pcus)	Water End Mean Queue (meters)
1. AM at opening (April 2009)	-111%	270	16.9	263	1576
2. AM peak post scheme (Nov 2009)	-20%	58	3.8	42	253
3. AM peak post scheme + closure	-42%	121	5.7	77	460
4. AM peak post scheme + 8 veh filter	-8%	35	1.0	19	111
5. AM peak post scheme + 8 veh filter + closure	-27%	82	5.0	69	413
6. PM at opening (April 2009)	-94%	195	15.4	186	1115
7. PM peak post scheme (Nov 2009)	-15%	51	2.6	38	230
8. PM peak post scheme + closure	-31%	93	6.1	82	490
9. PM peak post scheme + 8 veh filter	-14%	34	0.9	21	125
10. PM peak post scheme +8 veh filter +closure	-14%	42	1.5	32	191

8. Scenarios 1 and 6 clearly indicate the scale of the delays that were experienced when the scheme was first implemented in April 2009.

9. The changes that have occurred in the months since opening are that traffic has redistributed its self on the network in order to avoid the delays on Water End and some traffic is using Westminster Road and The Avenue to avoid the signals. In terms of traffic volumes during the peaks these are down 10%-15% on Clifton Bridge (Figure 1). It is interesting to note that the post AM peak traffic is up, an indication that people are changing their time of travel to avoid the delays? The signal timings have also been altered to take account of the new arrangement and flows. Scenarios 2 and 7 represent the current situation.

10. It was noted during the analysis that the signal timings that are currently running on the junction are less than optimal particularly for the AM peak. This is due in part to the need to protect the running times on the Rawcliffe Park and Ride service. It is noted however that the latest changes to the signal timings was in April 2009, when there is a possibility that the scheme may still have been 'bedding in'. It is recommended that a further review of the signal timings is made by the Council, making use of the November 2009 survey results. It is also recommended that a Saturday

and Sunday survey be undertaken and that the signal timings be reviewed for these days. It is understood from Network Management that they are planning on linking the Toucan crossing with the signals, the review should take place to coincide with this change.

Figure 1.

Clifton Bridge weekday flows - Water End towards Clifton Green
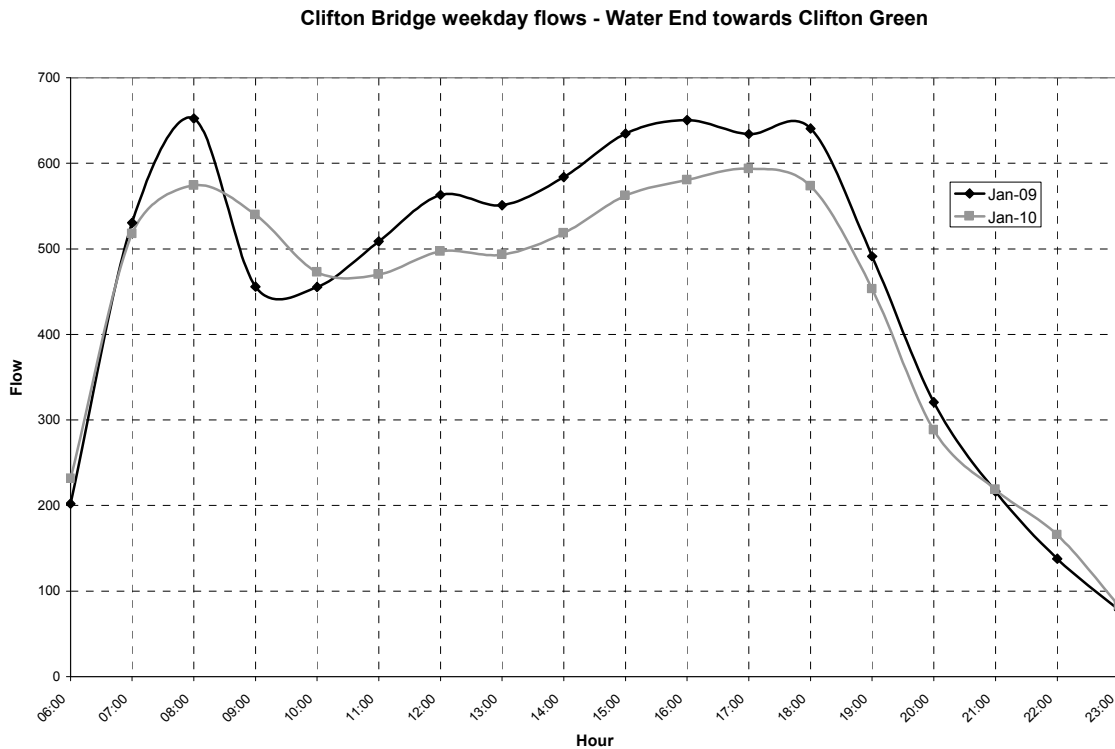
11. Scenarios 3 and 8 indicate the impact of closure of Westminster Road / The Avenue. The assumption has been made that all traffic turning right into Westminster Road from Water End will post closure make the right turn at Clifton Green. This is a 'worst case scenario' dependant on where the closure was implemented this figure could be less. The modelling shows a significant impact on the level of queuing and delay on Water End. It might be expected that some further redistribution of traffic will take place, although it may be that the traffic that has remained using Water End has little alternative or it would have already done so. If this is the case the further reductions in traffic volumes on Clifton Bridge will be small and the delays will remain at this level. Overall in this situation the modelling is indicating a doubling in the level of congestion (queues and delays) at Clifton Green during both peaks. As a consequence it is would likely that there would be a further spreading of the peaks.

12. Scenarios 4 and 9 show the impact of the reinstatement of a filter lane and signal at Clifton Green without the closure. This has been modelled at 7 vehicle lengths (expected use 4 vehicles per cycle of the lights) and is shorter than the pre-scheme situation 18 vehicle lengths (expected use 9 vehicles per cycle). The results indicate a big improvement during the AM peak but only a moderate improvement PM due to there being less

vehicles turning left. It should be noted that whilst improvements would be realised on opening 'day 1' of the proposal it is highly likely that traffic would gravitate back to Water End and the benefits seen would rapidly be reduced. This is not to say that this would not provide some relief on the routes that the traffic has been displaced to i.e. the Outer and Inner Ring Roads.

13. Scenarios 5 and 10 show the impact of closure accompanied by re-instatement of the shorter filter lane. In the AM peak the filter only partially mitigates against the impact of the closure. In the PM peak it more than mitigates and the situation represents an improvement over the current situation. The reason for it not being fully successful in the AM is that there is more traffic displaced onto the right turn with the short lane this blocks the left filter so its benefit is not realised.

Conclusion

14. Point closure on Westminster Road or The Avenue preventing through traffic is demonstrated to have a significant adverse impact on the highway network.

15. The impact of the point closure could be mitigated by the partial reinstatement of the left turn lane and filter at Clifton Green during the evening (and off) peak periods. The morning peak remains problematic, in that the impact of the closure is not fully mitigated by this measure and would see a significant worsening of congestion over the current situation.

16. Should the point closure take place and the left turn be reinstated then ideally these measures should be implemented together so as to avoid traffic trip redistribution taking the benefit of the added capacity afforded by the reinstatement of the left turn.

17. A further review of the signal timings be made following any changes to include Saturdays and Sundays as well as the peak periods.

Contact Details

Author:

Simon Parrett
Principal Transport Modeller
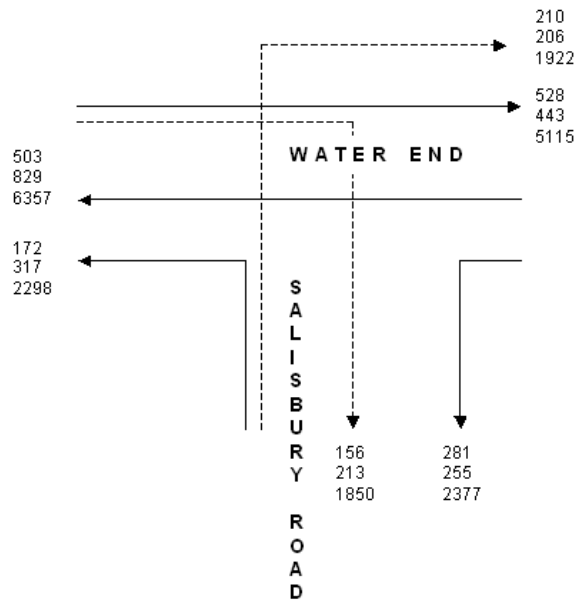Transport Planning Unit
Ext 1631

Annex 2C

Clifton Bridge video surveys				
	Eastbound	**Sep-08**	**Sep-09**	**Nov-09**
AM (8 - 9am)	All traffic	791	816	688
	Cars	627	558	582
	Pedal cycles	85	126	114
	Pedestrians	N/A	46	N/A
PM (5 - 6pm)	All traffic	702	661	666
	Cars	605	548	566
	Pedal cycles	23	39	49
	Pedestrians	N/A	33	N/A
Off-peak (11am - 12pm)	All traffic	362	470	481
	Cars	320	386	392
	Pedal cycles	9	14	17
	Pedestrians	N/A	15	N/A
12-hour (7am - 7pm)	All traffic	6477	7286	7373
	Cars	5241	5688	5888
	Pedal cycles	388	521	491
	Pedestrians	N/A	326	N/A
	Westbound	**Sep-08**	**Sep-09**	**Nov-09**
AM (8 - 9am)	All traffic	753	843	852
	Cars	616	611	699
	Pedal cycles	38	57	50
	Pedestrians	N/A	34	N/A
PM (5 - 6pm)	All traffic	1260	1110	1135
	Cars	1054	850	900
	Pedal cycles	92	98	118
	Pedestrians	N/A	44	N/A
Off-peak (11am - 12pm)	All traffic	544	529	607
	Cars	442	421	510
	Pedal cycles	6	16	20
	Pedestrians	N/A	21	N/A
12-hour (7am - 7pm)	All traffic	8660	9102	9224
	Cars	7075	6942	7435
	Pedal cycles	406	495	537
	Pedestrians	N/A	313	N/A

Annex 2D

<u>ALL MOTORISED MOVEMENT – 06/05/2008</u>
<u>WATER END / SALISBURY ROAD</u>

Key:
AM
PM
12-hr

210
206
1922

528
443
5115

W A T E R   E N D

503
829
6357

172
317
2298

S
A
L
I
S
B
U
R
Y

R
O
A
D

156
213
1850

281
255
2377

<u>ALL MOTORISED MOVEMENT – 05/11/2009</u>
<u>WATER END / SALISBURY ROAD</u>

Key:
AM
PM
12-hr

118
168
1723

446
423
4700

W A T E R   E N D

519
833
6425

162
275
2184

S
A
L
I
S
B
U
R
Y

R
O
A
D

160
211
1929

250
137
2065

Annex 2E

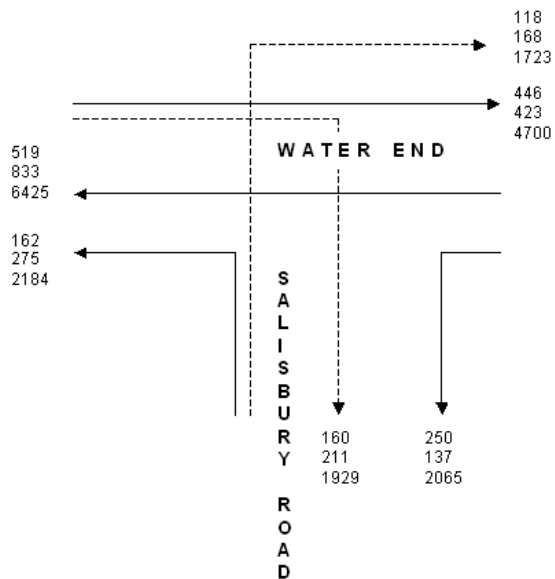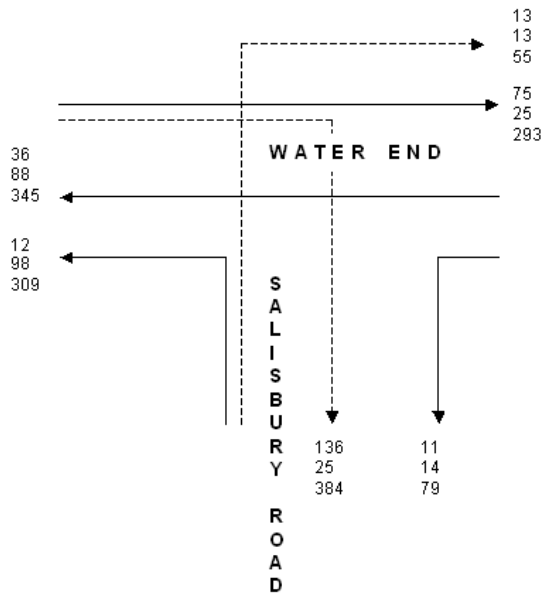## PEDAL CYCLE MOVEMENT – 06/05/2008
WATER END / SALISBURY ROAD

Key:
AM
PM
12-hr

```
                                                    13
                                                    13
                                                    55

                                                    75
                                                    25
                                                    293

                    W A T E R   E N D
36
88
345

12
98
309
                    S
                    A
                    L
                    I
                    S       136      11
                    B       25       14
                    U       384      79
                    R
                    Y

                    R
                    O
                    A
                    D
```

PEDAL CYCLE MOVEMENT – 05/11/2009
WATER END / SALISBURY ROAD

Key:
AM
PM
12-hr

```
                                                    21
                                                    18
                                                    96

                                                    95
                                                    25
                                                    365

                    W A T E R   E N D
19
80
325

16
95
325
                    S
                    A
                    L
                    I
                    S       124      13
                    B       15       16
                    U       354      85
                    R
                    Y

                    R
                    O
                    A
                    D
```
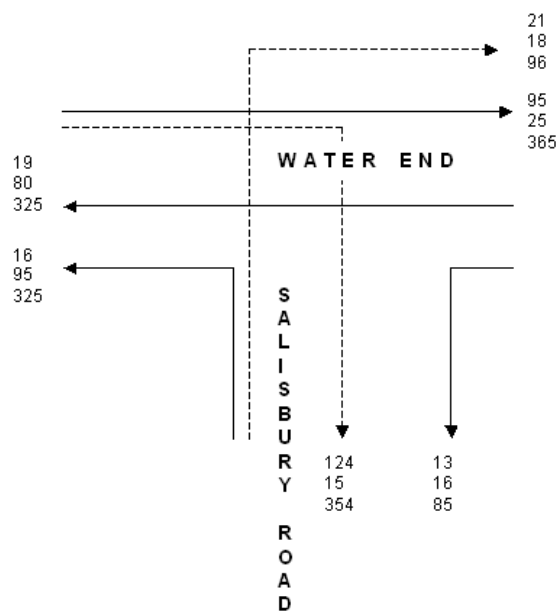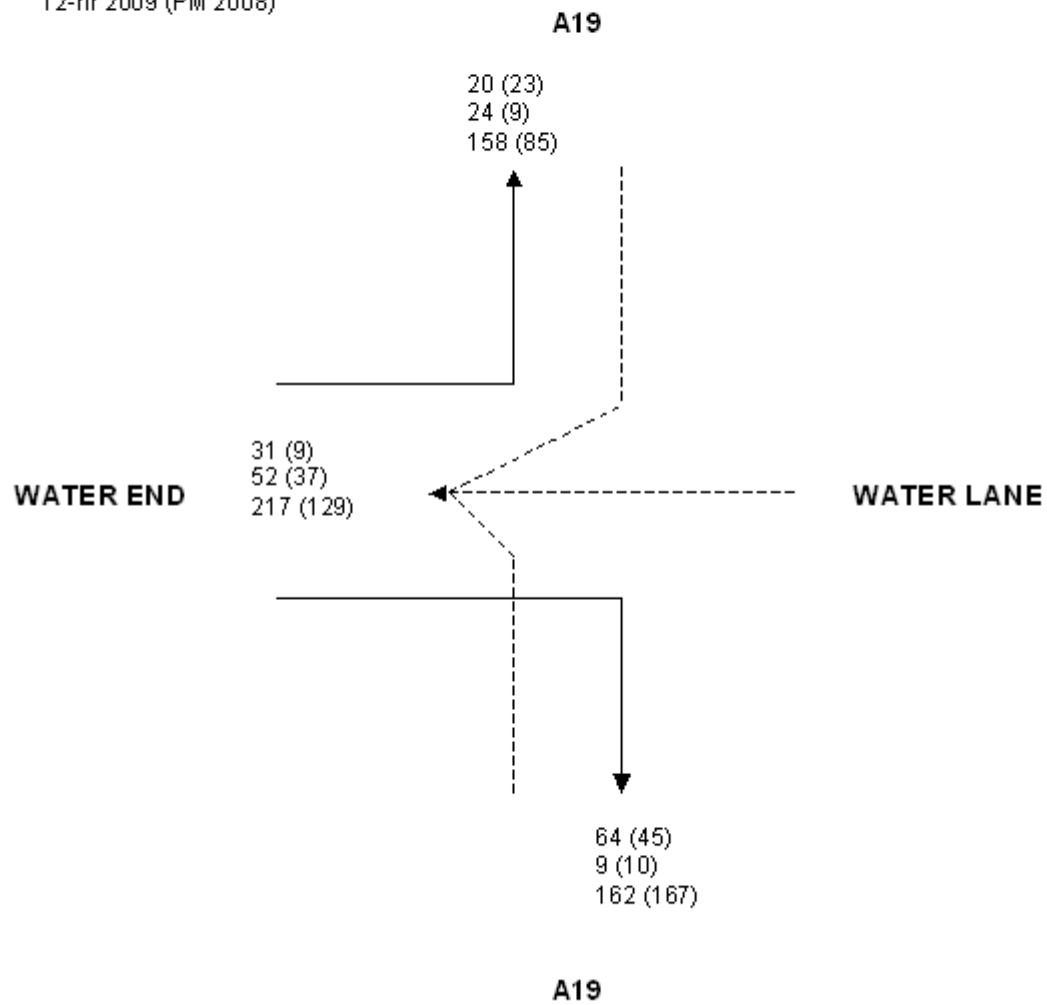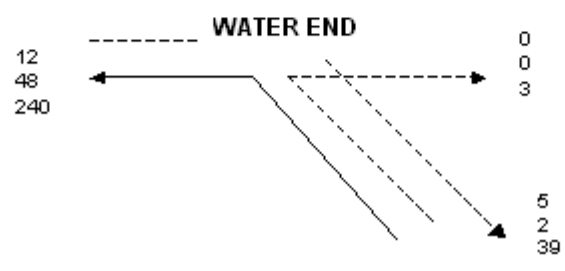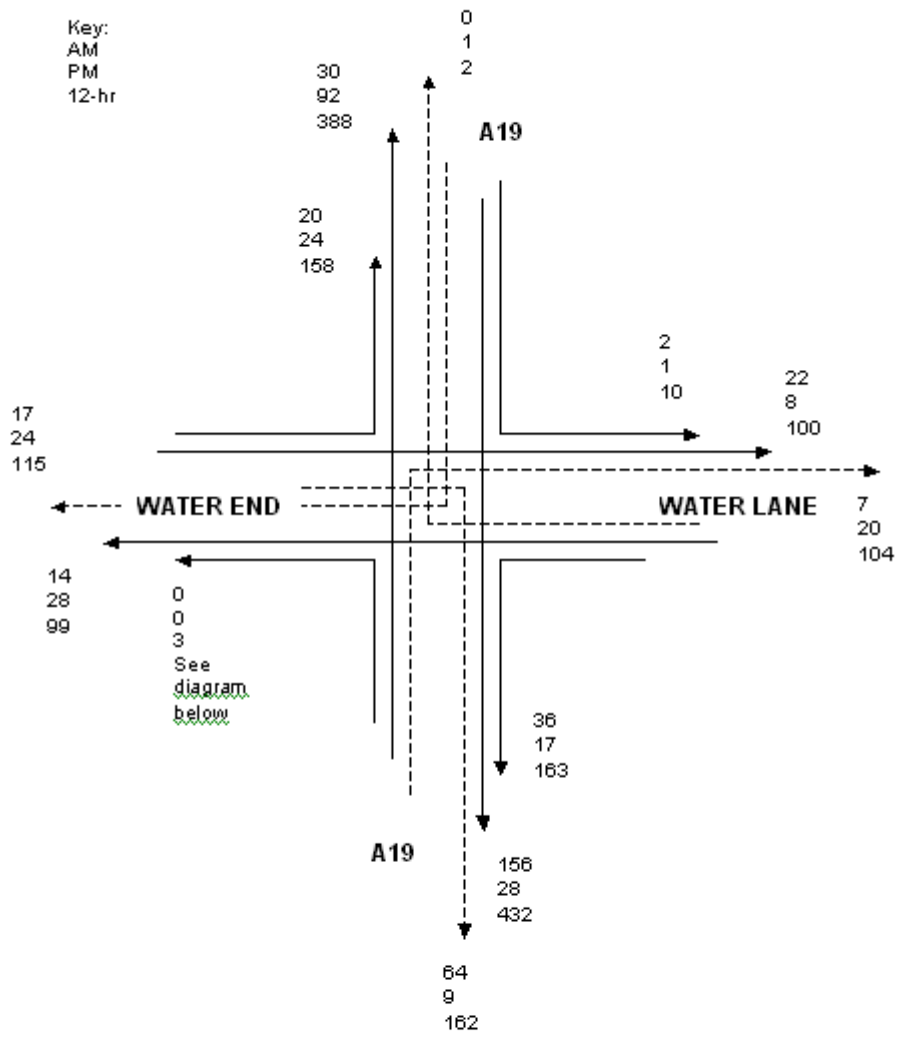
PEDAL CYCLE MOVEMENT – 05/11/2009 & 05/02/2008
IN & OUT OF WATER END

Key:
AM 2009 (AM 2008)
PM 2009 (PM 2008)
12-hr 2009 (PM 2008)

A19

20 (23)
24 (9)
158 (85)

31 (9)
52 (37)
217 (129)

WATER END

WATER LANE

64 (45)
9 (10)
162 (167)

A19

PEDAL CYCLE MOVEMENT – 05/11/2009
A19 / WATER END / WATER LANE

Key:
AM
PM
12-hr

0
1
2

30
92
388

A19

20
24
158

2
1
10

22
8
100

17
24
115

WATER END

WATER LANE

7
20
104

14
28
99

0
0
3
See
diagram
below

36
17
163

A19

156
28
432

64
9
162

WATER END

12
48
240

0
0
3

5
2
39

Annex 2F

Traffic Survey data (previously reported to January 2009 Decision Session Meeting)

24 Hour Traffic Flow (taken from the speed survey information)

	The Avenue (w/c 19/1/09)	Westminster Rd (w/c 15/6/09)	Diff +/-	% Diff +/-
To Water End				
AM	96	164	68	70
PM	62	107	45	72
Weekday Av	444	779	335	75
From Water End				
AM	38	93	55	145
PM	138	190	52	38
Weekday Av	456	995	539	118
Combined				
AM	134	257	123	92
PM	200	297	97	49
Weekday Av	900	1774	874	97

Note: These figure represent all traffic i.e. no allowance made for residential/ school related traffic or traffic that may have entered and left via the same street.

12 hour Traffic Survey - 7am to 7pm

Traffic entering Westminster Road from Water End

Total traffic	837
Through traffic	744 (89%)
School traffic	43 (5%)
Residential traffic	50 (6%)

Traffic entering The Avenue from Clifton

Total traffic	603
Through traffic	515 (85%)
School traffic	34 (6%)
Residential traffic	54 (9%)

Both directions combined

Total traffic	1440
Through traffic	1259 (87.5%)
School traffic	77 (5.5%)
Residential traffic	104 (7%)

AM Peak hours Traffic - 8am to 10am	PM Peak Hours Traffic - 4pm to 6pm
Traffic entering Westminster Road from Water End Total traffic 300 Through traffic 282 School traffic 14 Residential traffic 4	Traffic entering Westminster Road from Water End Total traffic 156 Through traffic 139 School traffic 4 Residential traffic 13
Traffic entering The Avenue from Clifton Total traffic 138 Through traffic 118 School traffic 17 Residential traffic 4	Traffic entering The Avenue from Clifton Total traffic 249 Through traffic 229 School traffic 3 Residential traffic 19