Monitoring of cyclists at Agar Grove/St. Pancras Way/Baynes Street

Camden Cycling Campaign
September 2005

Aims To study the way in which cyclists use these junctions and to establish whether the two-way segregated cycle track track in St. Pancras Way is safe for southbound cyclists where it passes Baynes Street. CCC decided to carry out this study as a result of the fatality at the junction in Baynes Street in July.

Context Southbound cyclists arrive at the north end of the two-way segregated cycle track, via either Agar Grove or St Pancras Way (from the north).

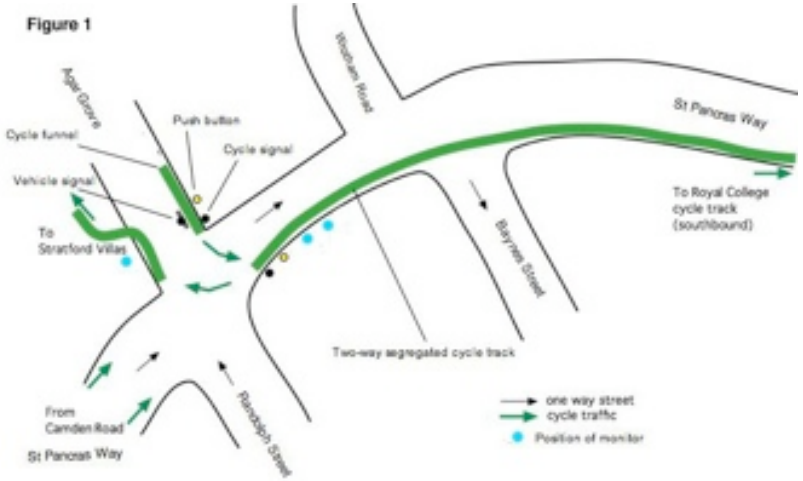


Figure 1 shows the intended routes for cyclists between Agar Grove and the two-way segregated cycle track on St. Pancras Way. Cyclists on the track have priority where it crosses Baynes Street. Many of the vehicles coming from Agar Grove turn right into Baynes Steet.

We use the term 'funnel' to refer to the short section of segregated cycle track on Agar Grove where cyclists are intended to press a button and wait for the cycle signal. When the cycle light is green, cyclists have a cyclist-only phase of 14 seconds to cross St. Pancras Way and get past the junction of Baynes Street.

Note that the instructions by the button show red and green cycle logos and give instructions to 'wait for the light oppose'.

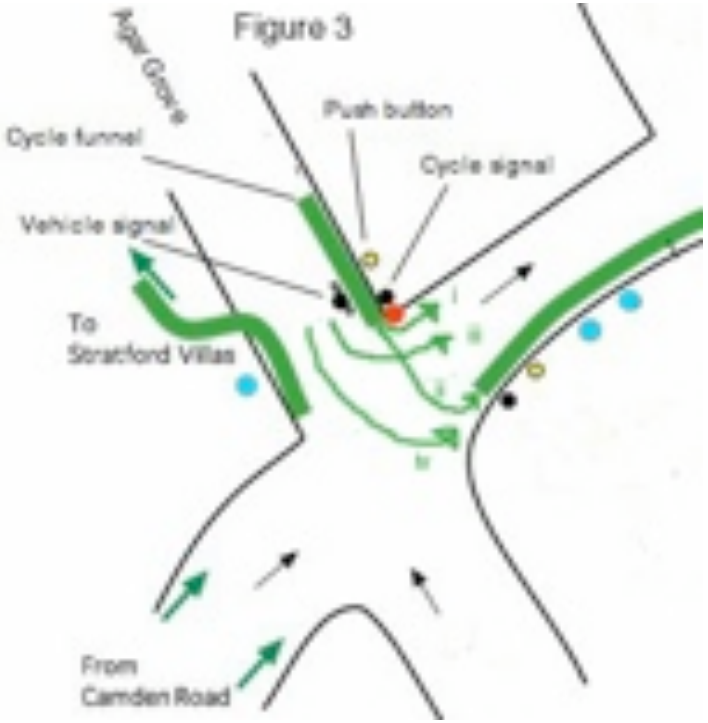
Figure 2

Photos of the instructions by the push button and of the signals seen by cyclists (green arrow on right and red light ahead on left)

Figure 2 shows that i) although there is a red cycle logo on the instructions, there is no red cycle logo on the signal, ii) the signal isn't opposite and iii) cyclists can also see the green left turn arrow on their right.

Cyclists in Agar Grove planning to travel south on St. Pancras Way can go with the vehicle signal. Many of these use the funnel as an inside lane allowing them to come up inside the line of vehicles waiting at this junction.

Other cyclists riding in the road cross to the track on the vehicle green. During the survey, our monitors were positioned at the small blue circles shown in Figs 1 and 3.



Observations on the signalling system at Agar/St.Pancras Way

The following phase sequence and approximate timings were observed on 20th September at 9.30 am:

a. St Pancras Way green ~ 40 secs

b. All red for a few seconds

c. Agar Grove green ~ 30 secs or ~ 15 secs if cycle signal operated

d. Cycle signal in Agar Grove funnel green ~14 secs.

e. All red for a few seconds

The entire signal cycle takes ~70 seconds, irrespective of whether the cycle signal is operated. And it appears that the cycle signal time is subtracted from the Agar Grove phase. Cyclists can wait for > 70 seconds (on some occasions when the button is pressed during phase (c), phase (d) is not entered until the following cycle). However the maximum waiting time for a vehicle is ~55 seconds, not accounting for the queues that arise in Agar Grove.

The effect of the pedestrian button on Agar Grove on the phasing is not included above, nor is the effect of the cyclists button on St. Pancras Way. Pedestrians on Randolph Road and St. Pancras Way north of the junction get green lights automatically on every cycle.

Preliminary monitoring

A visit on 20th September confirmed that cyclists' use of this junction is very complex. We observed the following cyclists movements.

Cyclists leaving Agar Grove junction at junction with St. Pancras Way

The following cyclist movements are shown in Figure 3:

i. Funnel -> St. Pancras Way roadway
either on *vehicle signal* or *cycle signal* (phase c or d)

ii. Funnel -> St. Pancras Way cycle track
either on *vehicle signal* or *cycle signal* (phase c or d);

iii Roadway -> St. Pancras Way roadway;

iv Roadway -> St. Pancras Way cycle track.

A fifth movement is popular. It involves waiting on the corner, at the point indicated by a small red circle on Figure 3. Cyclists stop there during signal phase (c) and then go in phase (d) or (e) depending on whether someone has pushed the button. Other cyclists stop there during signal phase (a) and then go either when they see a gap in the traffic or in phase (b). We refer to all of these as " waiting downstream to cross on red".

Since the person monitoring in Agar Grove cannot see the cycle signal and also distinguish the destinations, we decided to omit the latter from our counts.

Cyclists emerging from St. Pancras Way (north of the junction)

Cyclists bound for the cycle track ride on the west side of St. Pancras Way and the remainder use the feeder lane on the east side.

Survey Results - the counts

Date 21st September 2005, 8.30-9.30 am, a dry fine day.

Figure 4

Position of monitor: north side Agar Grove opposite cycle signal

Cyclists leaving Agar Grove	8.40-9.00	9.00-9.35	T	%
Cyclist in funnel goes on vehicle signal (phase c)	26	20	46	20.8
Cyclist in funnel goes on cycle signal (phase d)	34	33	67	30.3
Cyclist using roadway goes on vehicle signal (phase c)	12	27	39	17.6
Cyclist 'goes on red'	34	35*	69	31.2
Totals	106	115	221	

* the majority of these (27:8) used the funnel.

Figure 5

Position of monitor: west side St Pancras Way, north of Baynes St

Cyclists from St Pancras Way	8.30-9.10	9.10-9.30	Total
To St. Pancras Way cycle track	47	24	71
To St. Pancras Way roadway	46	19	65
To Agar Grove	6	6	12
Total			148

A study of potential collisions at Baynes Street junction

Potential collisions may occur when the driver of a vehicle fails to give way to cyclists before crossing the cycle track. An inspection of Figure 1 and the signal cycle on page 2 indicates that cyclists in the segregated track on St. Pancras Way are likely to ride parallel to vehicles in the road in the following states:

1. All cyclists coming from St. Pancras Way during signal phase (a)
2. Those cyclists coming from Agar Grove during signal phase (c)

Our survey was designed to study the potential for collisions in these two states and to confirm that cyclists "'waiting downstream to cross on red'" or using the cycle signal were not at risk. In addition we planned to study in fine detail the interactions near Baynes Street.

Results - counts

Figure 6

Position of monitor: west side St Pancras Way, north Baynes Street, time 8.30-9.30 am

cyclist origin	count of potential collisions
Agar Grove " 'waiting downstream to cross on red'"	0
Agar Grove phase (d)	0

That is, cyclists performing the manoeuvre that we describe as "waiting downstream to cross on red" were not likely to come into conflict with vehicles at the Baynes Street junction. Nor were those that used the cycle signal.

Figure 7

Position of monitor: west side St Pancras Way, north Baynes Street, time 8.30-9.30 am

cyclist origin	cyclist gives way	driver gives way	cyclist pauses	both give way	total
St Pancras Way (phase a)	0	0	0	0	
Agar Grove (phase c)	7	7	6	(2)	18

Note that there were no interactions in signal phase (a). Of the seven incidents where the driver of a vehicle failed to give way (forcing the cyclists to give way), three were particularly close. Photographs of these three incidents are shown in Figure 9 (i-iii). The 6 cyclists that *paused* or delayed their approach to the junction did so because vehicles crossing caused them to perceive the need to delay. The two cases where both gave way are included in the earlier counts.

Results - analysis of interactions at the junction

Lionel Shapiro was positioned on the west side St Pancras Way, north of Baynes Street and in addition to recording the above counts, took sequences of photographs to show the potential for conflicts between cyclists and vehicles turning across the cycle track into Baynes Street. These are presented in a series of figures on pages 4-7 of this report. All photographs ® Lionel Shapiro.

Figure 8 illustrates some examples of correct usage of this junction where the vehicles give way and one or more cyclists proceed.

Figure 9 illustrates scenarios where a vehicle fails to give way. The first three sequences shown were the closest to an actual collision - the Range Rover event being the worst.

Figure 10 shows scenarios where one vehicle crosses and is followed by others, although cyclists are now at the junction. We noted four occasions where the cyclist[s]'s pause resulted in follow through by cars, when they should have stopped.

Figure 11 illustrates scenarios where vehicles are crossing the junction and cyclists approaching, but that we did not include in our count of potential conflicts.

Figure 12 illustrates the case where both give way. The driver of the cementation truck paused, then crossed while the 3 cyclists waited by 'agreement' – only to have another vehicle follow through!

Survey carried out by CCC members George Coulouris. Jean Dollimore and Lionel Shapiro.

Summary: we present a summary of our monitoring exercise at the end of this report.

Illustrations of potential conflicts at the junction of Baynes Street

Figure 8 - correct usage of the junction of Baynes Street and the segregated cycle track

i) Car gives way and cyclists go through

ii) Car waiting while cyclist goes through

Illustrations of potential conflicts at the junction of Baynes Street

Figure 9 - incorrect usage - vehicles fail to give way

i) driver of the white truck follows through, forcing the cyclist to give way

ii) driver of the red van fails to give way, cyclist stops

ii) Driver of Range Rover barges through

iii) Driver of BT van fails to give way

Illustrations of potential conflicts at the junction of Baynes Street

Figure 10 - incorrect usage multiplied; one driver goes through and a line of others follows

i) one car crosses and several others follow through although a cyclist appears and has to wait

ii) follower barges through in spite of a cyclist having priority

Illustrations of potential conflicts at the junction of Baynes Street

Figure 4 - we did not consider the following types of scenario as conflicts, but it's close

i) Truck is sufficiently far ahead of cyclist for a safe crossing, neither give way;

ii) Long van is safe

iii) Long van crosses, cyclist arrives

Figure 5: 'Both Give Way'

i) Cement truck stops then cyclist stops, so truck goes on

Summary

The results of our monitoring exercise show the following:

- that the way cyclists use the Agar Grove junction is very complex;
- potential conflicts occur frequently and hence the segregated cycle track in St. Pancras Way is unsafe for southbound cyclists.

Cyclists' usage of the Agar Grove junction

A cycle-only phase (d) was added to the signal sequence at this junction in order
(i) to protect cyclists as they cross to the segregated track and
(ii) to ensure that they arrive at the Baynes Street junction before any vehicles from the following phase arrive.

Figures 4 and 6 show that the signal works as designed for the 30% of cyclists that use it. The person monitoring Agar Grove observed an occasional conflict between the first cyclists leaving in phase (d) and the last over running vehicles in phase (c) (Agar Grove Green) – cyclists may not check as they expect a safe crossing when the cycle signal is displayed.

Our study indicates that this low usage of the cycle signal is due to the fact that this rather unusual use of this type of signal leads to the following complexities:

- The possibility for cyclists to use either the vehicle green signal (phase c) or the cycle signal (phase d). This leads to the four movements shown in Figure 3 of which (i), (iii) and (iv) use the vehicle signal and (ii) the cycle signal.
- Cyclists using movement (i) logically use the vehicle signal to go down the roadway in St. Pancras Way; those using (iii) and (iv) originate from the roadway and must use the vehicle signal. The latter must use the vehicle signal to go to the track because they are on the roadway, sometimes on the outside of the vehicles. Figure 4 shows that 17% of cyclists used the roadway in phase (c).
- Some of the cyclists that ride in the roadway may be unaware of the cycle signal.
- Cyclists waiting in the funnel for the cycle signal see others proceeding in phase (c) and may be unwilling to wait. They will not know whether the people they follow will be crossing to the track or cycling down the roadway in St. Pancras Way. Figure 4 shows that 20% of cyclists used the funnel in phase (c).
- The deployment of a push button further complicates the situation, particularly as the facility is so heavily used. Many cyclists may see the cycle signal light up without having pushed the button. Also as we pointed out on page 1, the instructions are confusing and the green arrow on the right is misleading.
  - Other similar cycle signals (e.g. at Royal College Street/Crowndale Road) are automatic; this is what cyclists expect.
  - An automatically operated cycle signal would remove this last cause for confusion. It would also have the advantage that cyclists who wait on the corner until the end of phase (c) will always be able to benefit from an automatic phase (d) (provided that a cyclist had been already detected), thus reducing the 30% of cyclists who 'go on red'.
  - We recognise that reordering the phases (exchanging (c) and (d)) would be detrimental - the last cyclists leaving would be unlikely to reach Baynes Street before the first vehicles in the subsequent phase.

Conflicts

We studied the potential conflicts at the junction of Baynes Street and made the following observations:

- these conflicts affect only those cyclists coming from Agar Grove on green (phase c). See Figure 7. From observation, this affects a large proportion of the 38% of cyclists who use this phase (Figure 4). Our counts did not enable us to calculate this proportion.
- cyclists coming from the northern part of St Pancras Way were not seen to be at risk of conflict, possibly because few of these vehicles turned into Baynes Street in phase (a).

Final remark

It is not the purpose of this survey to make recommendations as to how to improve this junction. But it appears that its complexity is a major cause of the danger to cyclists on the segregated track at Baynes Street. Simply altering the junction priority would not be an adequate measure; we would expect there to be further cycle casualties.

Work for a future Survey

We were unable to produce all the statistics that we would have liked for this study. It would be very worthwhile perform counts to assess the following:

- the proportion of cyclists that cross to the segregated track during phase (c) in the morning rush hour;
- the comparative numbers of vehicles and cyclists emerging from Agar Grove in the morning rush hour;
- the proportion of those vehicles that turn into Baynes Street.
- the potential for conflicts between vehicles and northbound cyclists at the Baynes Street junction in the evening rush hour.

JD 25 September 2005

Appendix - Survey of northbound cyclists in the evening rush hour

We carried out a second survey on 13th October 2005 between 5.30 and 6.30 pm. Our aims were i) to study the safety of northbound cyclists on the segregated track on St Pancras Way at the approach to Baynes Street and ii) to observe cyclists' use of the push button signal at the north end of this track. On a preliminary visit we established that the pair of cycle signals work together. That is, the cycle signal in St Pancras Way is green during phase (d) - see page 2.

One monitor was positioned on the south east corner of the St Pancras Way/ Wrotham Road junction to make the counts shown in Figure A1.

Figure A1. Count of cyclists on St Pancras Way. 17.25-18.25 pm

northbound			southbound	
on track continued north	40		on track, continued south	15
into Wrotham St	4		on track, into Baynes St	3
from Baynes St	3		on roadway	16
other (pavement)	3		roadway into Baynes St	2
Total	50		roadway then track	3
			Total	39

The second monitor was positioned on the west side of St Pancras Way just south of the push button to make the counts in Figures A2 and A3.

Figure A2. Use if the push button by northbound cyclists. 17.27-18.27 pm

push button and wait to go on signal	14	29%
use signal after another cyclist pushed button	7	14%
push button and wait in forward position	7	14%
ignore button and wait in forward position	21	43%
Total	49	

Our morning rush figures had shown much larger numbers southbound in St Pancras Way than we were seeing coming north in the evening rush hour. We therefore counted the cyclists crossing from Randolph Street to Agar Grove for a period of 10 minutes. As this made the monitor rather conspicuous, which could affect behaviour with the button/signal we decided not to do this for any longer

Figure A3. Count of cyclists from Randolph Street to Agar Grove

6.05-6.15 pm	16

This appears to indicate that the majority of cyclists choose to return via Randolph Street rather than Georgiana Street and the track in St Pancras Way.

Study of potential collisions at Baynes Street junction

The third monitor was positioned with a camera south of the Baynes Street junction. He attempted to count the potential collisions as in Figure 7 of the earlier survey. But he reported no potential collisions. Lionel Shapiro's photographs are shown in Figures A4-A7 below. They illustrate some of the close interactions between cyclists and vehicles at this junction.

Survey carried out by CCC members Lionel Shapiro, Meade McCloughan and Jean Dollimore.

Summary

The Baynes Street junction appears to be safe for northbound cyclists. Drivers on St Pancras Way have a clear view of the northbound cyclists on the segregated track. But the much smaller number of cyclists using the track may be a factor. In the morning period we counted 221 in 55 minutes compared with 47 in one hour in the evening. We did not count the vehicles on either visit but it is likely that there were less in the evening.

Only 43% (29+14) of cyclists use the push button and cycle signal in the way that was intended by the designers - some of these waited for more than 70 seconds. Another 14% push the button and then move forward so that if the light changes they will benefit from it, otherwise they are in the same situation as the remaining 21% who wait on the corner of Randolph Street, generally going in the "all red" phase (b). Two measures could help with this:

- the use of automatic signals fired by sensors that detect the presence of cyclists a bit further back
- making the signal itself visible to cyclists who have moved forward.

Appendix - Survey of northbound cyclists in the evening rush hour

Illustrations of potential conflicts at the Baynes Street junction

Figure A4

Northbound cyclist turning right, (into Wrotham Street) gets safely past the waiting red car, and they turn the correct nose-to-tail way. SAFE. Perhaps the cyclist should have turned a little further north, through a little 'plug' there?

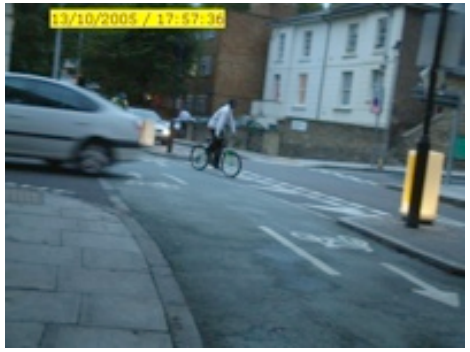
Figure A5

As the signalling car prepares to turn, from the centre of the road, a northbound cyclist is approaching (behind the camera). The driver waits at the appropriate place and then crosses behind the cyclist. SAFE.

Appendix - Survey of northbound cyclists in the evening rush hour

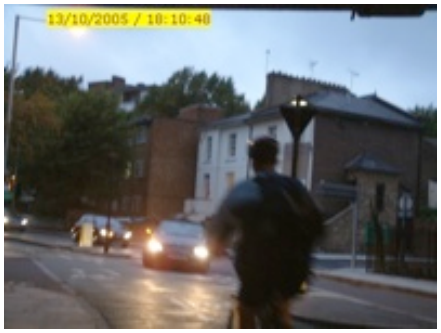
Illustrations of potential conflicts at the Baynes Street junction

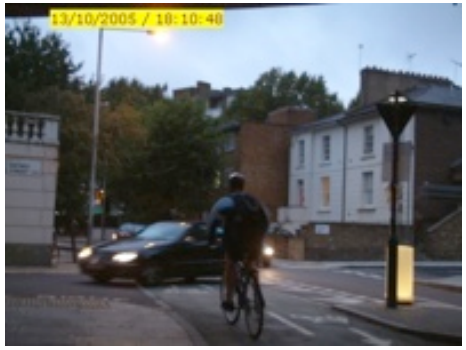
Figure A6



The white car may or may not have known what was coming southbound, but goes across the front of the nearer bike, which has slowed to turn left; the following cyclist may have had to slow down. No collision; Safe?

Figure A7





A powerful car, having paused at the correct point, dashes over the road ahead of an approaching northbound cyclist; SAFE though a faster cyclist might have had to slow down. THEN a second car, immediately behind the first, does NOT just follow-through, but waits to let a second northbound cyclist through. SAFE.

JD 19th October 2005