steer davies gleave

Driver behaviour at continuous footways research

Transport for London

Report
March 2018

Our ref: 23118001

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Prepared by:

Steer Davies Gleave
28-32 Upper Ground
London
SE1 9PD

+44 20 7910 5000
www.steerdaviesgleave.com

Prepared for:

Transport for London

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Executive Summary

Definition of continuous footway

A continuous footway describes a junction layout where:

> A side road joins a major road, i.e. a priority junction, at which the footway parallel to the major road continues uninterrupted at the same grade and with the same (or visually similar) surfacing treatment (no kerb edge or tactile paving indicates a change of function).

Research aims and approach

Transport for London (TfL) commissioned Steer Davies Gleave to undertake a research study with the following main aim:

> To determine how continuous footways influence driver behaviour and the consequent level of risk for pedestrians and cyclists

Sitting within this overall aim, the research has five specific objectives:

1. Analyse if drivers give way to pedestrians using the continuous footway (at each site and on average across all sites)
2. Analyse if drivers give way to cyclists using the major road (at each site and on average across all sites)
3. Evaluate the effect of different volumes of pedestrians or cyclists on driver behaviour
4. Understand if the direction of traffic flow affects driver behaviour (i.e. one-way in or out of the priority junction, or two-way flow)
5. Evaluate whether certain design elements and the junction's geometry influences driver behaviour and compliance with that geometry

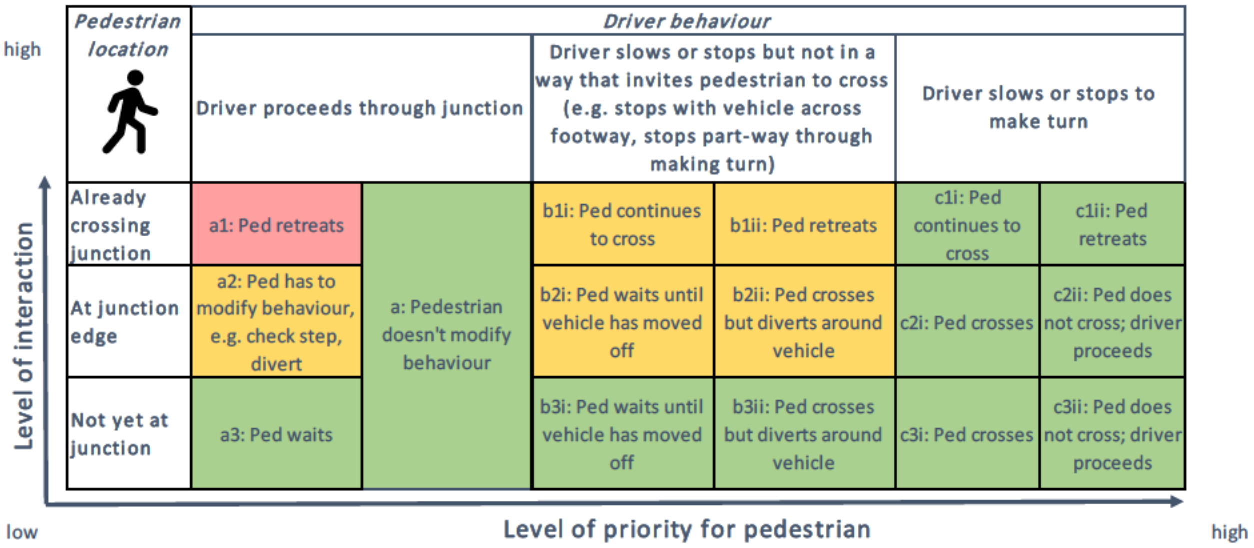
To answer the research aim and objectives, we assessed seven case study junctions located in inner south London, at which continuous footway treatments were already in place:

1. Kennington Park Road / Magee Street
2. Clapham Old Town / Lydon Road
3. Clapham Old Town / Grafton Square (north of Scout Lane)
4. Clapham Old Town / Grafton Square (south of Polygon)
5. Coldharbour Lane / Cambria Road
6. The Pavement / Bromell's Road
7. Upper Tooting Road / Stapleton Road

All case study sites are priority junctions with a minor road joining a major road. There is a mix of one-way in, one-way out and two-way junctions. Land use around the junctions tends to be residential or local retail (i.e. small supermarkets, café). All junctions are relatively quiet in terms of traffic, with much higher volumes of pedestrians than vehicles (20-80 vehicles per hour during the day time - of which 1-6 bicycles per hour - and 200 – 1,000 pedestrians per hour). The flow of bicycles crossing the junction mouth ranges from 20 – 400 cycles per hour.

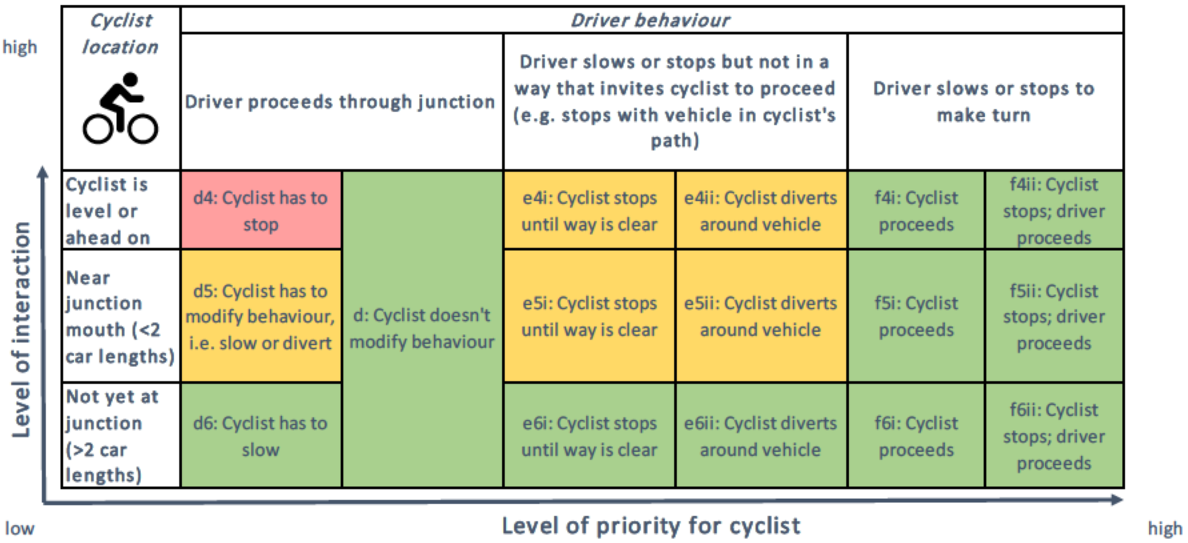
We undertook initial site visits at each site, carried out classified counts of pedestrian, cyclist and drivers for a three-day period in April 2017, and then analysed and coded interactions between pedestrians and drivers and cyclists and drivers from the video footage of these three days. Observed interactions were coded into two matrices shown below

Pedestrian / driver interactions



Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross (e.g. stops with vehicle across footway, stops part-way through making turn)		Driver slows or stops to make turn	
Already crossing junction	a1: Ped retreats	a: Pedestrian doesn't modify behaviour	b1i: Ped continues to cross	b1ii: Ped retreats	c1i: Ped continues to cross	c1ii: Ped retreats
At junction edge	a2: Ped has to modify behaviour, e.g. check step, divert		b2i: Ped waits until vehicle has moved off	b2ii: Ped crosses but diverts around vehicle	c2i: Ped crosses	c2ii: Ped does not cross; driver proceeds
Not yet at junction	a3: Ped waits		b3i: Ped waits until vehicle has moved off	b3ii: Ped crosses but diverts around vehicle	c3i: Ped crosses	c3ii: Ped does not cross; driver proceeds

Cyclist / driver interactions



Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed (e.g. stops with vehicle in cyclist's path)		Driver slows or stops to make turn	
Cyclist is level or ahead on	d4: Cyclist has to stop	d: Cyclist doesn't modify behaviour	e4i: Cyclist stops until way is clear	e4ii: Cyclist diverts around vehicle	f4i: Cyclist proceeds	f4ii: Cyclist stops; driver proceeds
Near junction mouth (<2 car lengths)	d5: Cyclist has to modify behaviour, i.e. slow or divert		e5i: Cyclist stops until way is clear	e5ii: Cyclist diverts around vehicle	f5i: Cyclist proceeds	f5ii: Cyclist stops; driver proceeds
Not yet at junction (>2 car lengths)	d6: Cyclist has to slow		e6i: Cyclist stops until way is clear	e6ii: Cyclist diverts around vehicle	f6i: Cyclist proceeds	f6ii: Cyclist stops; driver proceeds

Summary of findings

Objective 1: Analyse if drivers give way to pedestrians using the continuous footway (at each site and on average across all sites)

Drivers are more likely to give way to pedestrians who are on or very near the continuous footway. 78% of drivers slowed or stopped to give way to pedestrians who were already crossing the continuous footway, compared to 17% of drivers who gave way to pedestrians who were not yet at the continuous footway.

Overall it is apparent that there are low levels of interaction between drivers and pedestrians, which means the likelihood of a negative interaction occurring is small, and therefore consequent risk is considered low. 77.1% of all recorded interactions involved the pedestrian or driver giving priority to the other with little or no change of behaviour required (coded green in the matrices). For a further 22.5% of interactions, pedestrians had to slightly alter their behaviour to accommodate the driver, e.g. check their step or divert (coded yellow in the matrices). In only 0.4% of cases did the pedestrian have to make a sudden change of behaviour (coded red).

These findings are consistent across all case study junctions, however there are notable differences in driver behaviour between junctions (see further findings below).

Objective 2: Analyse if drivers give way to cyclists using the major road (at each site and on average across all sites)

It is important to note that the sample of cyclist / driver interactions is limited due to the relatively small number of cyclists and drivers: 154 interactions recorded across all three days at all seven junctions, compared to 3,537 pedestrian / driver interactions. Findings for the following Objectives 3 and 4 are therefore limited to pedestrians only.

Among our sample, the vast majority of drivers gave way to cyclists who are using the main road. 97% of drivers gave way to cyclists who are level or ahead on the carriageway, while 61% of drivers gave way to a cyclist who is two or more car lengths away from the junction.

Similar to Objective 1, this indicates that the likelihood of a negative interaction occurring is small, and there is a low level of consequent risk for cyclists when drivers use junctions with a continuous footway treatment. 91% of recorded interactions involved the cyclist or driver giving priority with little or no change of behaviour (green); with only 9% requiring a slight change in the cyclist's behaviour to accommodate the driver (yellow). No sudden changes of behaviour (red interactions) were recorded.

Objective 3: Evaluate the effect of different volumes of pedestrians or cyclists on driver behaviour

Drivers are more likely to give way to pedestrians when pedestrian volumes are higher: at the site with the highest number of pedestrians, 46% of drivers gave way to pedestrians versus 15% at the site with the fewest pedestrians. The consequent risk for pedestrians appears to be lower when overall pedestrian flows are higher. This pattern interacts with junction type, which appears to play a key role in whether or not drivers are more likely to give way.

Objective 4: Understand if the direction of traffic flow affects driver behaviour (i.e. one-way in or out of the priority junction, or two-way flow)

Drivers are more likely to give way to pedestrians when they are turning out of a side road, rather than turning in; and they are more likely to give way when turning left than right.

87% of drivers turning left out of a side road gave way to a pedestrian already crossing the continuous footway. This proportion falls to 58% of drivers who took a right turn in. When a pedestrian was not yet at the continuous footway, 19% of drivers gave way to them when turning left out of a side road, versus 0% of drivers who were turning right in.

The respective likelihood of drivers giving way at these junction types means that the consequent risk for pedestrians is lowest when vehicles are turning left out of a side road, second lowest for right turn out and third lowest for left turn in. It is highest when vehicles are turning right in to a side road.

Objective 5: Evaluate whether certain design elements and the junction's geometry influences driver behaviour and compliance with that geometry

A ramp and give way lines set behind the continuous footway appear to encourage drivers to slow and stop before the continuous footway. However, at very deep footways, drivers are less likely to stop at the give way markings behind the footway. At two sites with the deepest footways (approximately 7m), 26% of drivers slowed or stopped at the give way line. This compares to 45.6% of drivers at two comparator sites with narrower footways (approx. 2.5m).

From observations from site visits and made during the analysis of video footage, tight corner radii and restricted sightlines help encourage drivers to slow when turning, making them more likely to give way to pedestrians and cyclists. Vertical deflections on corner radii such as kerb upstands or items of street furniture can help make sure drivers comply with the geometry.

1 Introduction

Background

1.1 Many of London's streets are undergoing changes to make them more pedestrian and cyclist friendly. This includes new infrastructure and improved junction layouts incorporating such measures as segregated cycle tracks, the removal of guardrails, re-phasing of traffic lights, and new forms of pedestrian crossings. One example of a new pedestrian crossing type is a continuous footway, sometimes also known as a 'Copenhagen crossing', due to their prevalence in Danish cities.

1.2 A continuous footway describes a junction layout where:

> A side road joins a major road, i.e. a priority junction, at which the footway parallel to the major road continues uninterrupted at the same grade and with the same (or visually similar) surfacing treatment (no kerb edge or tactile paving indicates a change of function).

1.3 The design intent is to prioritise pedestrian movement along the continuous footway; drivers are expected to modify their behaviour accordingly. At the time of this research, continuous footways are still relatively rare in London; examples can be found in Clapham Old Town and in Waltham Forest as part of the mini-Holland scheme.

Figure 1.1: A continuous footway treatment in Clapham, south London

The Highway Code

1.4 Rule 170 of the Highway Code stipulates driver behaviour at priority junctions, which applies equally at continuous footways. They are expected to watch out for pedestrians, cyclists, wheelchair users and motorcyclists; and if a pedestrian has started crossing the junction mouth, they have priority, so drivers are expected to give way. Figure 1.2 is taken from the Highway Code and illustrates a driver giving way to a crossing pedestrian.

Figure 1.2: Rule 170 of the Highway Code: Give way to pedestrians who have started to cross

Source: The Highway Code, http://www.highwaycodeuk.co.uk/road-junctions.html, accessed 15/02/18)

Report structure

1.5 This research has been commissioned by Transport for London (TfL) to provide a better understanding of driver behaviour with pedestrians and cyclists at continuous footways in London. The report is structured in the following sections:

- **Section 2** gives an overview of the research aims and objectives before describing our research approach.
- **Section 3** provides a profile of the seven case study junctions which were the subject of this research.
- **Section 4** presents findings from the analysis of road user interactions to address each research objective.
- **Section 5** summarises the findings under each research objective.
- **Section 6** offers suggestions for further research.

2 Research aims and approach

2.1 This section of the report sets out the research aim and objectives and outlines our research approach.

Research aim and objectives

2.2 Transport for London (TfL) commissioned Steer Davies Gleave to undertake a research study with the following main aim:

> To determine how continuous footways influence driver behaviour and the consequent level of risk for pedestrians and cyclists

2.3 Within this overall aim, the research has five specific objectives:

1. Analyse if drivers give way to pedestrians using the continuous footway (at each site and on average across all sites)
2. Analyse if drivers give way to cyclists using the major road (at each site and on average across all sites)
3. Evaluate the effect of different volumes of pedestrians or cyclists on driver behaviour
4. Understand if the direction of traffic flow affects driver behaviour (i.e. one-way in or out of the priority junction, or two-way flow)
5. Evaluate whether certain design elements and the junction's geometry influences driver behaviour and compliance with that geometry

2.4 The following are out of scope of this piece of research:

- Comparing driver behaviour before and after the installation of a continuous footway
- Comparing continuous footway sites to others without this treatment
- Analysing the effect of continuous footways on pedestrian behaviour
- Analysing the effect of continuous footways on people who rely on tactile information

2.5 The reader must bear these limits to the scope in mind when reading this report, as the research focuses on understanding observed driver behaviour at continuous footways without comparing it to other scenarios.

Research approach

2.6 To answer the research aim and objectives, we assessed seven case study junctions located in inner south London, at which continuous footway treatments were already in place. Details of these seven junctions are provided in Section 3. Our research approach at each junction is described below.

Initial site visits

2.7 The project team conducted site visits at each of the seven sites to make observations about the land use and place context, the layout of the junction, and the specific design details of the continuous footway, as well as initial observations of vehicle and pedestrian movements.

Vehicle and pedestrian flows

2.8 Video cameras were installed at all seven sites for three 12-hour periods across one week in April 2017, totalling 36 hours of footage per location. This week was the first that schools returned after the Easter holidays. The time periods were:

- Tuesday 18th April 0700 – 1900
- Wednesday 19th April 1400 – 0200 (Thursday 20th April)
- Saturday 22nd April 1000 – 2200

2.9 This footage was analysed to provide classified vehicle and pedestrian counts through each day, broken down by direction of movement and by vehicle / pedestrian type.

Interactions analysis

2.10 We then analysed the video footage to identify interactions occurring between drivers and pedestrians crossing the continuous footway, and between drivers and cyclists crossing the junction mouth on the major road.

2.11 For the purposes of the research, we defined an interaction as:

> Any instance where two road users’ paths cross in a way that causes one or both to change their behaviour from what it would have otherwise been without the presence of the other.

2.12 Observed interactions were coded into two matrices: one for pedestrian / driver and one for cyclist / driver interactions (Figure 2.1 and Figure 2.2). We also noted the number of drivers proceeding through the junction without having to interact with a pedestrian or cyclist, and how the driver behaved (Figure 2.3). For both matrices, there are three options for observed driver behaviour and three options for cyclist or pedestrian location. The three options for driver behaviour are:

- **Driver proceeds through junction:** Driver continues through the junction without slowing or stopping for other vehicles, pedestrians or cyclists.
- **Driver stops but not in a way that would invite a pedestrian to cross or cyclist to proceed:** Driver does slow or stop while making their turn through the junction, however this is not because they are giving way to a pedestrian or cyclist; they may stop with their vehicle across the footway or stop part-way through making turn because of other vehicles.
- **Driver slows or stops to make turn:** Driver slows or stops to give way to pedestrian or cyclist (or in a way that would give way to them if no pedestrian or cyclist is present).

2.13 The three options for pedestrian location are described below, while cyclist locations are self-explanatory and conveyed by the descriptions in the matrix:

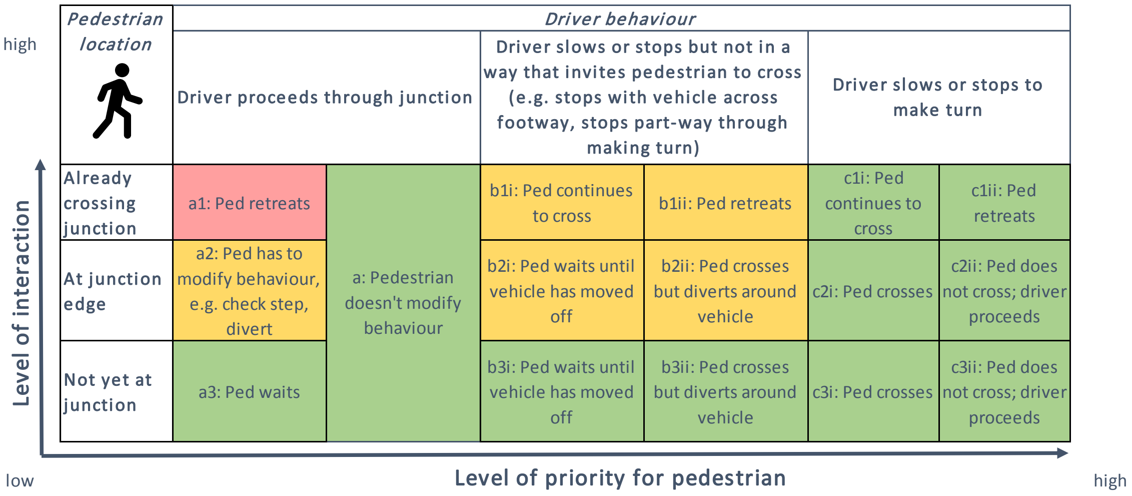
- **Already crossing junction:** The pedestrian is already walking across the continuous footway – where the carriageway would be in a normal junction layout – when the driver arrives at the junction. It is worth drawing attention to the Highway Code at this point, which states that pedestrians have priority if they have started crossing a side road before a driver is turning into or out of it (regardless of it being a continuous footway).

- **At junction edge:** The pedestrian is about to cross the continuous footway and is where the kerb line would be if there were no continuous footway.
- **Not yet at junction:** The pedestrian is several metres / strides from the junction edge, as described above.

2.14 The consequence in terms of the pedestrian's or cyclist's behaviour is then noted in the matrix. The matrices are coloured according to the level of interaction or change in behaviour required of the pedestrian or cyclist, and broadly whether drivers have obeyed the Highway Code:

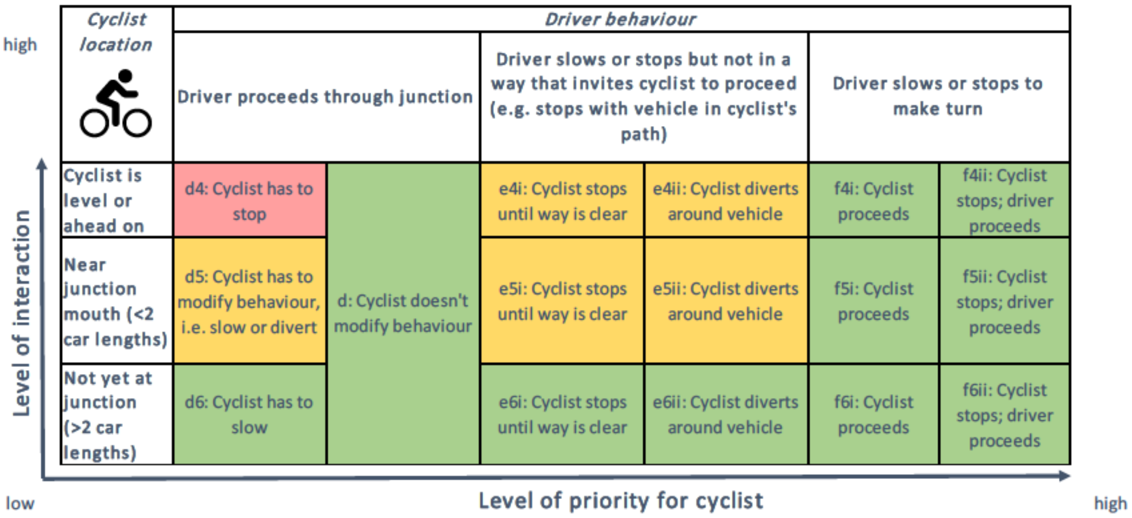
- **Green:** pedestrian, cyclist or driver gives priority to the other with little change of behaviour required. Drivers obey the Highway Code.
- **Yellow:** pedestrian or cyclist slightly alters their behaviour, or their behaviour is interrupted to accommodate the driver. Drivers' adherence to the Highway Code is more ambiguous.
- **Red:** pedestrian or cyclist makes a sudden change in behaviour to accommodate the driver. Any collisions would have been recorded under this interaction type, however none were recorded during our observations at the seven case study locations. Drivers have not obeyed the Highway Code.

Figure 2.1: Pedestrian response to driver behaviour



Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross (e.g. stops with vehicle across footway, stops part-way through making turn)		Driver slows or stops to make turn	
Already crossing junction	🟥 a1: Ped retreats	🟩 a: Pedestrian doesn't modify behaviour	🟨 b1i: Ped continues to cross	🟨 b1ii: Ped retreats	🟩 c1i: Ped continues to cross	🟩 c1ii: Ped retreats
At junction edge	🟨 a2: Ped has to modify behaviour, e.g. check step, divert		🟨 b2i: Ped waits until vehicle has moved off	🟨 b2ii: Ped crosses but diverts around vehicle	🟩 c2i: Ped crosses	🟩 c2ii: Ped does not cross; driver proceeds
Not yet at junction	🟩 a3: Ped waits		🟩 b3i: Ped waits until vehicle has moved off	🟩 b3ii: Ped crosses but diverts around vehicle	🟩 c3i: Ped crosses	🟩 c3ii: Ped does not cross; driver proceeds

Figure 2.2: Cyclist response to driver behaviour



Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed (e.g. stops with vehicle in cyclist's path)		Driver slows or stops to make turn	
Cyclist is level or ahead on	🟥 d4: Cyclist has to stop	🟩 d: Cyclist doesn't modify behaviour	🟨 e4i: Cyclist stops until way is clear	🟨 e4ii: Cyclist diverts around vehicle	🟩 f4i: Cyclist proceeds	🟩 f4ii: Cyclist stops; driver proceeds
Near junction mouth (<2 car lengths)	🟨 d5: Cyclist has to modify behaviour, i.e. slow or divert		🟨 e5i: Cyclist stops until way is clear	🟨 e5ii: Cyclist diverts around vehicle	🟩 f5i: Cyclist proceeds	🟩 f5ii: Cyclist stops; driver proceeds
Not yet at junction (>2 car lengths)	🟩 d6: Cyclist has to slow		🟩 e6i: Cyclist stops until way is clear	🟩 e6ii: Cyclist diverts around vehicle	🟩 f6i: Cyclist proceeds	🟩 f6ii: Cyclist stops; driver proceeds

Figure 2.3: No pedestrian or cyclist present

	Driver behaviour		
No pedestrian or cyclist present	g: Driver proceeds through junction and does not stop in making turn	h: Driver stops but not in a way that would invite a pedestrian to cross or cyclist to proceed (e.g. stops with vehicle across the footway, stops part-way through making turn because of other vehicles)	i: Driver stops or substantially slows

Examples of interaction types

2.15 Over the next few pages, we provide screenshots to illustrate different interaction types. We present a range of interactions from across the matrices, however, we have not illustrated every interaction type due to the number of them. Moreover, many interactions types are quite similar, but differ in the location of the pedestrian or cyclist. For example, c2i: Pedestrian crosses involves a driver slowing or stopping when a pedestrian is at the junction edge, and the pedestrian continues to cross. c3i: Pedestrian crosses involves the same driver behaviour but the pedestrian is a few strides back from the junction edge, but continues to cross all the same, as the driver has given way.

2.16 The following example interaction types are presented:

- Pedestrians:
  - a2: Pedestrian has to modify behaviour, e.g. check step, divert (Figure 2.4)
  - a: Pedestrian doesn't modify behaviour (Figure 2.5)
  - b2ii: Pedestrian crosses but diverts around vehicle (Figure 2.6)
  - b3ii: Pedestrian crosses but diverts around vehicle (Figure 2.7)
  - c1i: Pedestrian continues to cross (Figure 2.8)
  - c3i: Pedestrian crosses (Figure 2.9)
- Cyclists:
  - d: Cyclist doesn’t modify behaviour (Figure 2.10)
  - f4i: Cyclist proceeds (Figure 2.11)
  - e5ii: Cyclist diverts around vehicle (Figure 2.12)

Figure 2.4: Screenshot of a2: Pedestrian has to modify behaviour, e.g. check step, divert

Two pedestrians are approaching the junction mouth from the right of the screenshot.

As they reach the junction edge (where the kerb line would be if a standard junction treatment had been applied), they check their step as they see the black vehicle about to turn left in to the junction.

As the vehicle proceeds through the junction, they continue across the junction mouth.

Figure 2.5: Screenshot of a: Pedestrian doesn't modify behaviour

A black vehicle is stopped on the main road, waiting to turn right into the side road. A pedestrian is approaching the continuous footway.

The pedestrian continues walking as the vehicle turns into the side road. The pedestrian does not have to modify their behaviour as the vehicle will clear the footway before they arrive.

The pedestrian continues walking across the footway after the vehicle has passed.

Figure 2.6: Screenshot of b2ii: Pedestrian crosses but diverts around vehicle

A vehicle approaches the junction, while a pedestrian with an orange carrier bag walks towards the junction mouth.

The vehicle proceeds to stop on the continuous footway, the pedestrian is at the junction edge and diverts to walk behind the stopped vehicle.

As the vehicle waits to pull out the pedestrian continues behind the vehicle.

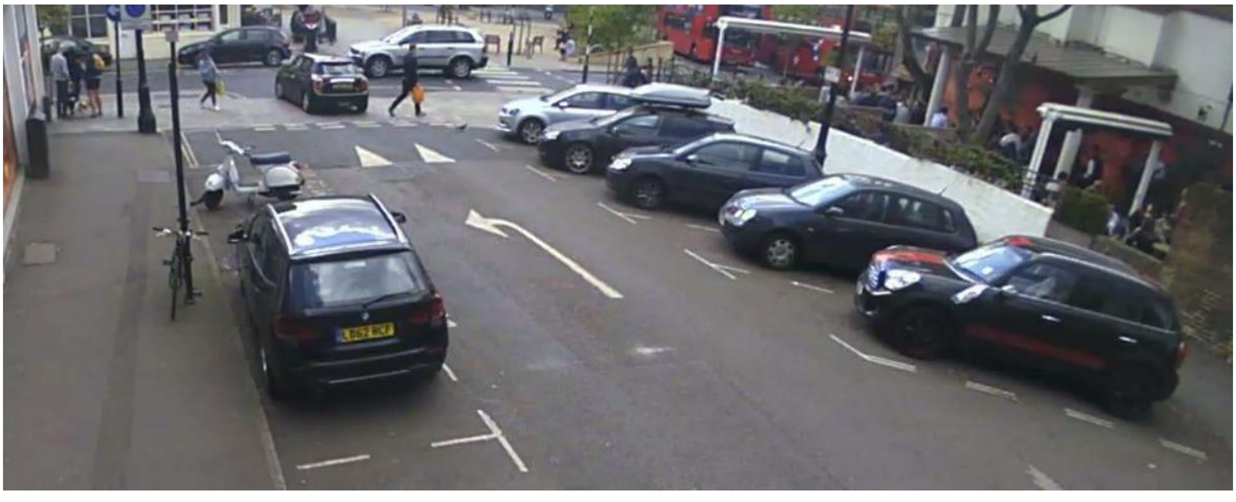


Figure 2.7: Screenshot of b3ii: Pedestrian crosses but diverts around vehicle

The driver proceeds on to the continuous footway. The pedestrian is still some distance from the continuous footway, i.e. not at the junction edge.

The driver stops on the continuous footway to wait for traffic to clear on the main road before joining it. The pedestrian continues crossing but diverts around the rear of the vehicle.

The pedestrian continues across the continuous footway as the vehicle joins the main road.

Figure 2.8: Screenshot of c1i: Pedestrian continues to cross

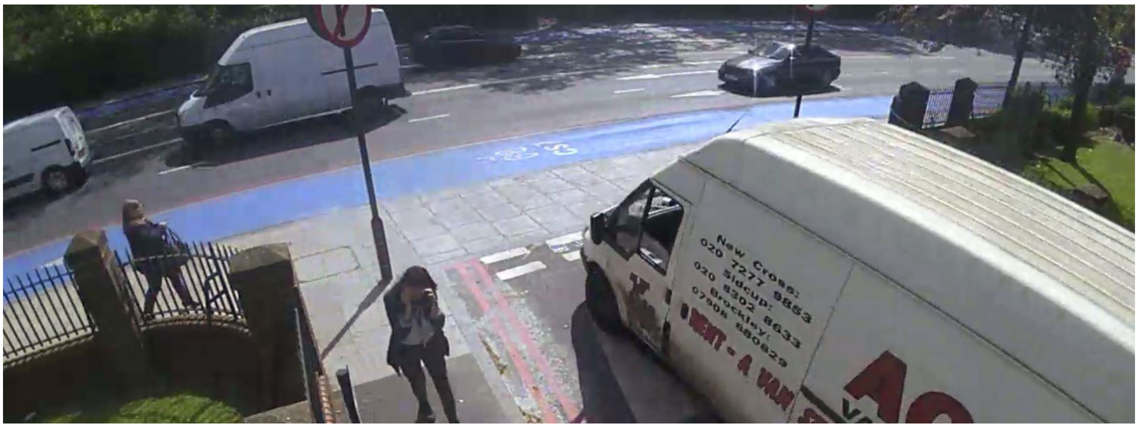
In this case, two pedestrians are crossing the continuous footway as the driver approaches it.

The vehicle slows to a halt at the give way line behind the continuous footway to allow the pedestrians to continue across the footway.

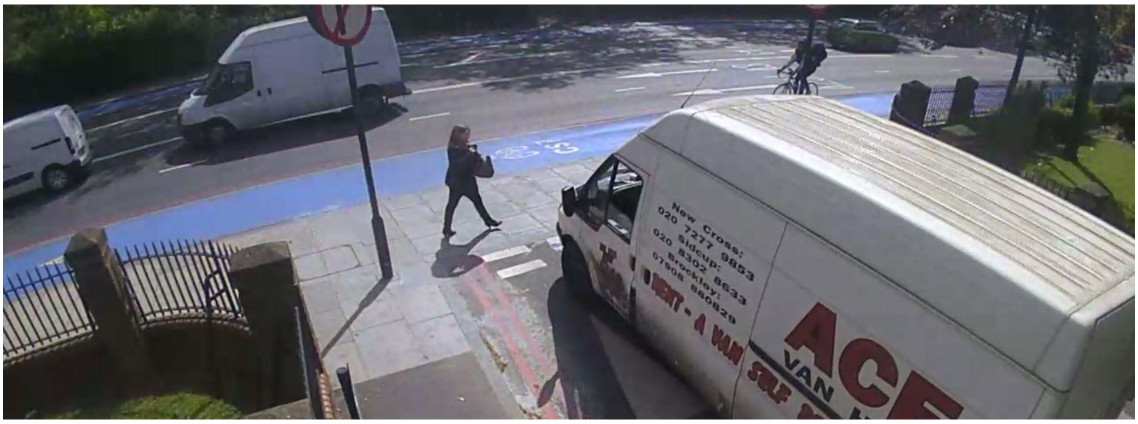
After waiting for the pedestrians to clear the continuous footway, the driver proceeds onto the footway and onto the main road.

Figure 2.9: Screenshot of c3i: Pedestrian crosses

Pedestrian approaches the left of the image but is yet to reach the continuous footway. Van pulls up to and stops at the give way line behind the continuous footway.



Van waits at the give way line, pedestrian proceeds across the continuous footway.



Van proceeds across the continuous footway after the pedestrian has cleared the junction mouth.

Figure 2.10: Screenshot of d: Cyclist doesn’t modify behaviour

Cyclist travels along main road from the left of the image, approaching the junction mouth.

Cyclist continues across junction mouth without slowing or diverting as vehicle approaches to turn right into the junction.

Vehicle proceeds into junction after cyclist clears the junction mouth – neither road user has to modify their behaviour to accommodate the other.

Figure 2.11: Screenshot of f4i: Cyclist proceeds

The cyclist approaches the junction mouth using the main road as the driver comes to the continuous footway. The driver proceeds on to the continuous footway as no pedestrians are crossing.

The cyclist passes the junction mouth as the driver comes to the edge of the continuous footway nearest the main road. The driver slows here to allow the cyclist to proceed.

The cyclist continues along the main road, and the driver proceeds to make the turn.

Figure 2.12: Screenshot of e5ii: Cyclist diverts around vehicle

The driver proceeds on to the continuous footway as there are no pedestrians crossing. They then proceed to sit on the stepped cycle track, waiting for vehicles to clear on the main road.

A cyclist approaches using the cycle track. The vehicle has to reverse slightly (see reverse light illuminated) to accommodate the cyclist, while the cyclist moves to the edge of the cycle track.

The driver then proceeds on to the main road, once the way is clear

3 Case study junction profiles

3.1 In this section of the report, we introduce each case study location. Site factsheets are provided, which detail the place context, surrounding land use and design of the junction. We then present a summary of flow data[1] including daily totals, totals for each possible vehicle movement, daily flow profiles and the breakdown of vehicles using each junction. We then present the pattern of interactions at each junction and provide some commentary on the most common interaction types.

Case study locations

3.2 The seven south London case study locations (shown in Figure 3.1) were:

1. Kennington Park Road / Magee Street
2. Clapham Old Town / Lydon Road
3. Clapham Old Town / Grafton Square (north of Scout Lane)
4. Clapham Old Town / Grafton Square (south of Polygon)
5. Coldharbour Lane / Cambria Road
6. The Pavement / Bromell's Road
7. Upper Tooting Road / Stapleton Road

General description of case study locations

3.3 All case study locations are priority junctions with a minor road joining a major road. There is a mix of one-way in, one-way out and two-way junctions. Land use around the junctions tends to be residential or local retail (i.e. small supermarket, café). All junctions are relatively quiet in terms of traffic, with much higher volumes of pedestrians than vehicles (20-80 vehicles per hour during the day time (of which 1-6 bicycles per hour) and 200 – 1,000 pedestrians per hour). The flow of bicycles crossing the junction mouth ranges from 20 – 400 cycles per hour[2].

3.4 Junction 6 was the busiest junction, recording the highest volume of pedestrians (26,098 across all three days) and vehicles (1,995). Junction 5 had the fewest pedestrians – 3,666 – and junction 2 the lowest number of vehicles – 581. Junctions 3, 4 and 6 in Clapham Old Town and near Clapham Common recorded substantially higher pedestrians flows on Saturday than during the week.

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[1] The flow data in tables and flow profile charts shows all vehicles (including bicycles) entering and exiting the junction (dependent on possible vehicle movement at each junction) and pedestrian and cyclist flows across the junction mouth. The flows on the diagrams show the total (sum of Tuesday, Wednesday and Saturday) flows for each movement.

[2] Site 1 has a very high peak hour flow of 2,000 cyclists because of its location on Cycle Superhighway 7.

3.5 At all junctions, very low numbers of bicycles were recorded turning in to or out of the junction. Junction 5 had the highest number: 227 across the three survey days; while junction 2 had the lowest – 41 bicycles. Much higher flows of bicycles were observed crossing the junction mouths. Junction 1 had the highest flow of 6,653 bicycles across the three survey days, compared to 825 at junction 4.

3.6 The flow profile through the three survey days followed a broadly similar pattern at each location. Vehicle flows remained relatively constant at low levels throughout each day, while pedestrian flows typically had the following pattern:

- Weekday morning peak (between 0730-0930)
- Weekday evening peak (between 1700-1930)
- Most of the junctions also had smaller peaks in the middle of the day around 1300
- Flatter profile on Saturdays, with a small peak in the middle of the day

3.7 The volume of bicycles was typically highest in the morning and evening peaks.

3.8 Classified counts of pedestrians showed little variation between junctions. The vast majority (92%) of pedestrians were adults aged between 17-65. Typically, 3-4% of pedestrians were children, with another 3-4% being encumbered adults, i.e. with a suitcase, pram etc. Between 0.2-0.5% of pedestrians were disabled or visually impaired. The breakdown of vehicle types is provided in each junction description as these vary junction to junction.

Figure 3.1: Overview map of case study locations

1: Kennington Park Road / Magee Street

Site factsheet: 1. Kennington Park Road / Magee Street	
Place context and nearby land uses	• The junction of Magee Street (side road, 20 mph limit) / Kennington Park Road (main road, 30 mph limit) is in Kennington, SE11 • Land use surrounding the road is mainly residential • There are some small retail units 15m north of the junction mouth
Possible vehicle movements	• Magee Street is one way exit only onto Kennington Park Road, and vehicles are only allowed to turn left • One possible vehicle movement: left turn out of Magee Street • The northbound cycle track of Cycle Superhighway 7 (CS7) runs along Kennington Park Road across the junction mouth, and is particularly busy during the morning peak
	Design context
General design of facility	• There is a ramp on the approach to the continuous footway facility • The facility is flush with the footway either side, and surfaced in the same materials • The facility is immediately adjacent to and parallel with CS7 • There is a flush kerb between the facility and the CS7 track • The facility is the same width as the pavement either side, approximately 2m wide • There are no corner radii or any other features to denote vehicular space
Materials used and road markings	• Concrete pavers are used on the facility which offers good colour contrast with black asphalt of the road • Footway material continues from footway across the junction • The CS7 cycle facility also offers good contrast due to use of blue paint • There is a give way marking and turning arrow on the Magee Street side of the facility
Lighting	• Street lighting is located on Magee Street approximately 6m from the crossing, and also approximately 10m to the south of the junction mouth on Kennington Park Road
Sightlines and obstructions	• Wall and railings flank the approach to the junction on Magee Street restricting drive visibility of approaching pedestrians and cyclists slightly • The restricted visibility means that vehicles need to proceed onto the footway facility to see cyclists and vehicles approaching on the main road
Other design elements in the immediate vicinity	• Illuminated no right turn signs on both sides of Magee Street • No entry signs on reverse side of no right turn signs, facing the main road

Figure 3.2: Possible movements and total flows - 1: Kennington Park Road / Magee Street

Table 3.1: Summary flow data (all movements) – 1: Kennington Park Road / Magee Street

Flows	Pedestrians (crossing junction mouth)	Bicycles crossing junction mouth	Vehicles inc bicycles (out of Magee Street)
Total Tuesday 0700-1900	2227	4862	483
Total Wednesday 1400-0200	1776	794	407
Total Saturday 1000-2200	2021	997	572
Average hourly flow	169	185	42
Peak hour flow	312	2049	65
When peak hour occurs	Tuesday 18:00-19:00	Tuesday 08:00-09:00	Wednesday 15:00-16:00
Number of pedestrians / cyclists per vehicle	4.1	4.6	n/a

3.9 On average across all three days, 69% of vehicles crossing the continuous footway were cars, 17% were vans (LGV) and 9% bicycles. The proportion of cars increased to 77% on Saturday, while there were more vans on Tuesday, when they accounted for 26% of traffic (Figure 3.3).

Figure 3.3: Vehicle breakdown – 1: Kennington Park Road / Magee Street

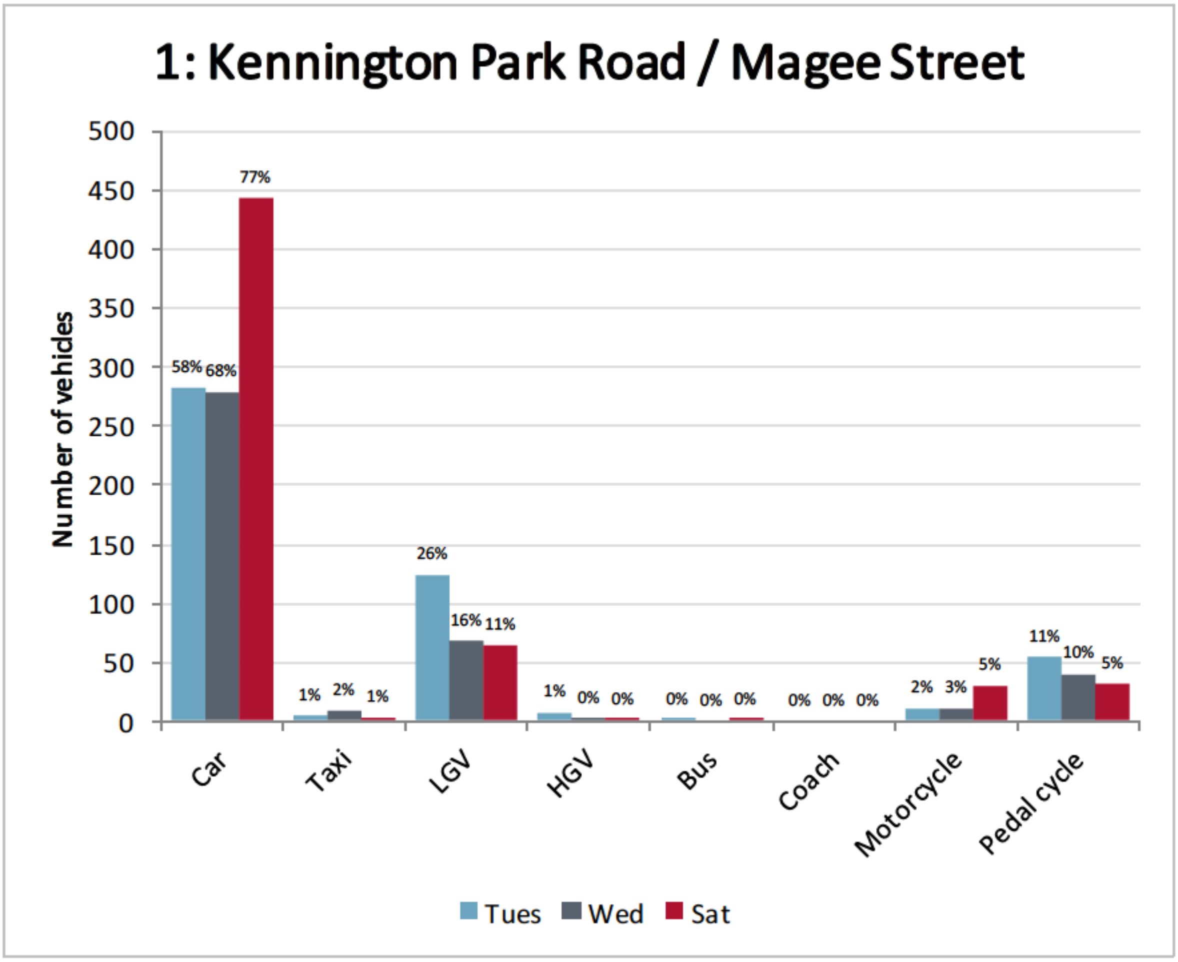
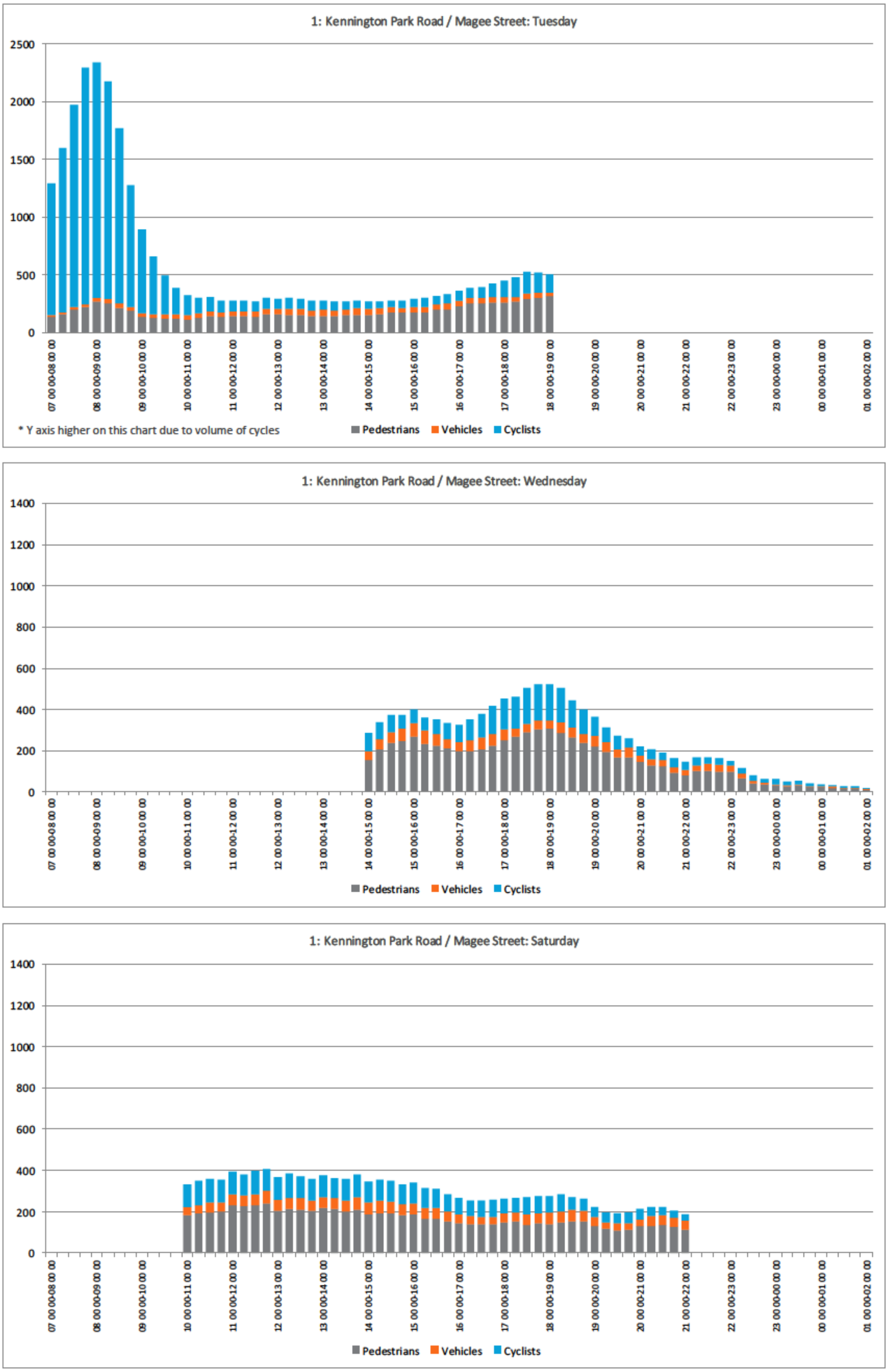


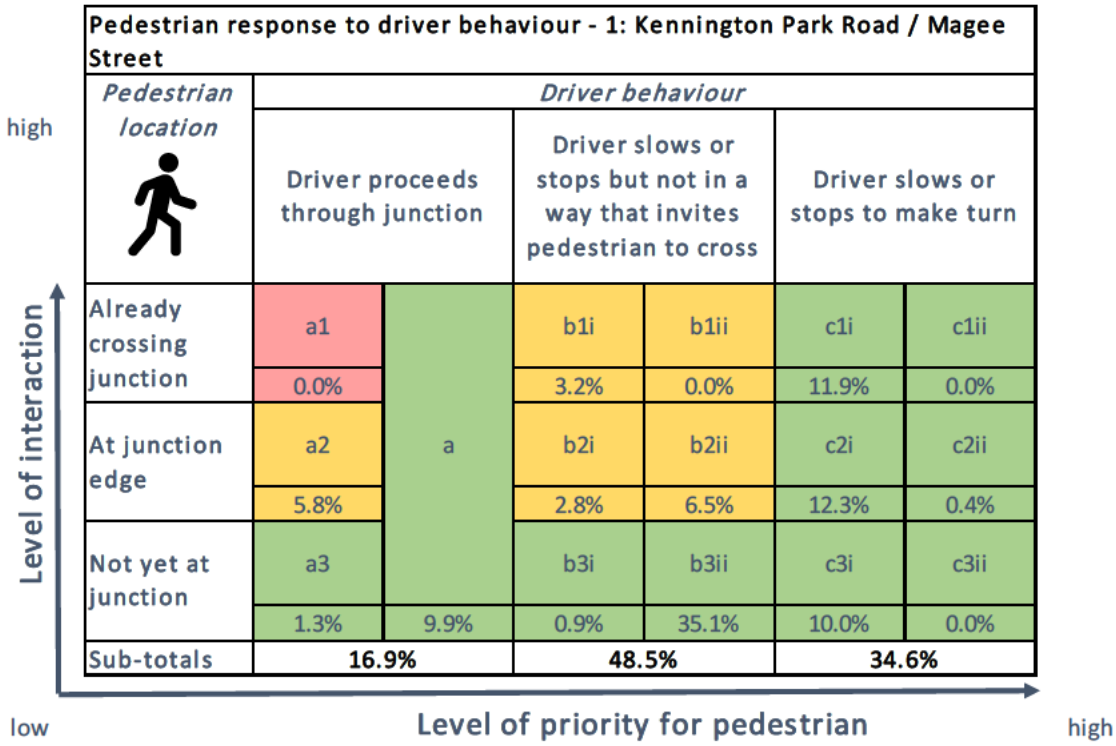
Figure 3.4: Daily flow profile – 1: Kennington Park Road / Magee Street



Pedestrian / driver interactions at Site 1: Kennington Park Road / Magee Street

3.10 At Site 1, over a third of drivers slowed or stopped when making their turn (34.6%), nearly half of drivers slowed or stopped, but not in a way that would invite pedestrians to cross (48.5%) while 16.9% of drivers proceeded through the junction. The most common recorded interaction at Site 1 is b3ii (35.1%) where the vehicle slows or stops to wait on the footway and pedestrians divert around it. The next most common interactions are 'c' column interactions, i.e. the drivers slow or stop for pedestrians before the continuous footway: c1i, c2i and c3i interactions. The top five interactions account for nearly 80% of all interactions and they all are 'green' low levels of interaction.

Figure 3.5: Pedestrian / driver interactions at Site1: Kennington Park Road / Magee Street



Pedestrian response to driver behaviour - 1: Kennington Park Road / Magee Street

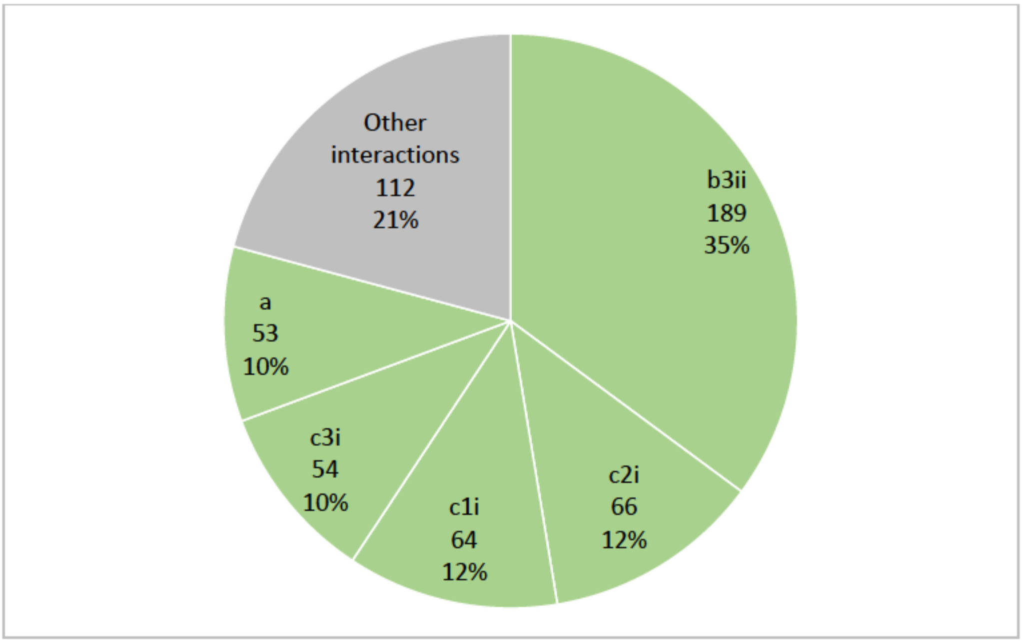
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.0%	a 9.9%	b1i 3.2%	b1ii 0.0%	c1i 11.9%	c1ii 0.0%
At junction edge	a2 5.8%		b2i 2.8%	b2ii 6.5%	c2i 12.3%	c2ii 0.4%
Not yet at junction	a3 1.3%		b3i 0.9%	b3ii 35.1%	c3i 10.0%	c3ii 0.0%
Sub-totals	**16.9%**		**48.5%**		**34.6%**	

n = 538

Table 3.2: Five most common pedestrian / driver interactions at Site1: Kennington Park Road / Magee Street

Rank	Interaction	Count	%
1	b3ii: Ped crosses but diverts around vehicle	189	35.1%
2	c2i: Ped crosses	66	12.3%
3	c1i: Ped continues to cross	64	11.9%
4	c3i: Ped crosses	54	10.0%
5	a: Pedestrian doesn't modify behaviour	53	9.9%
	Sum of top 5 interactions	**426**	**79.2%**

Figure 3.6: Five most common pedestrian / driver interactions at Site1: Kennington Park Road / Magee Street



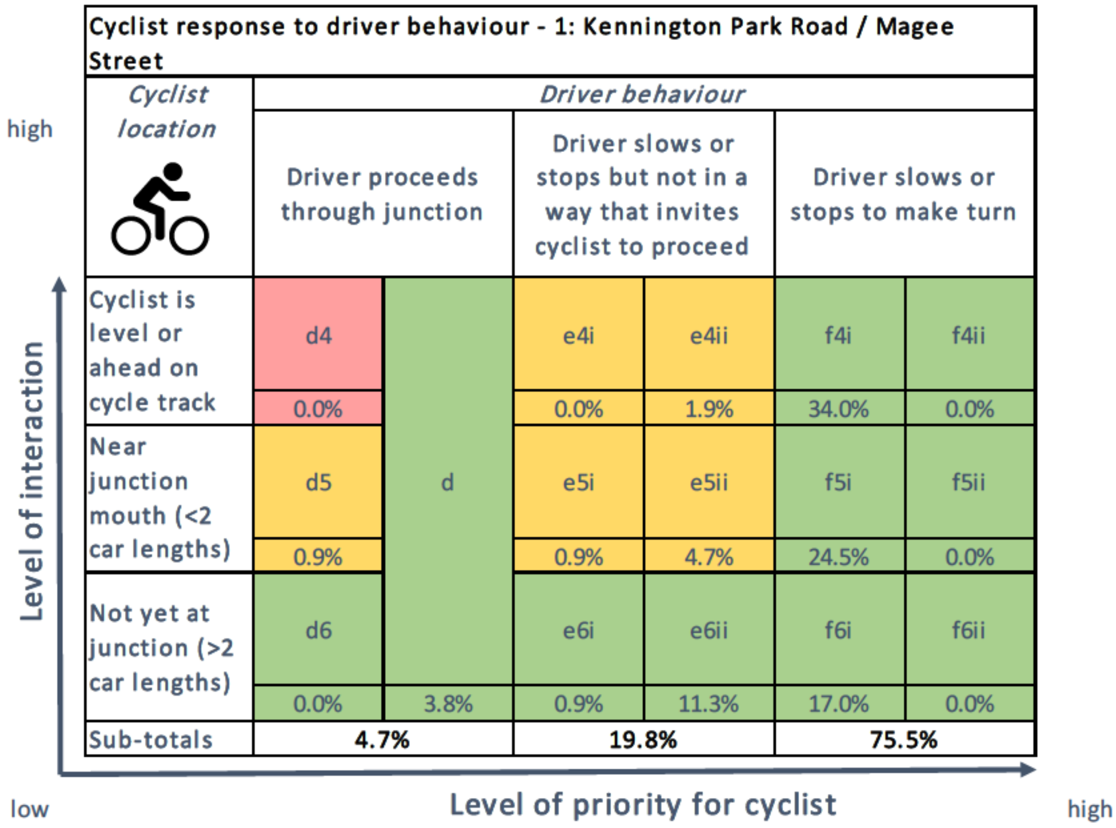
Key:

- b3ii: Ped crosses but diverts around vehicle
- c2i: Ped crosses
- c1i: Ped continues to cross
- c3i: Ped crosses
- a: Pedestrian doesn't modify behaviour

Cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street

3.11 At Site 1, when interacting with cyclists, three quarters of drivers slow or stop to give way to cyclists (75.5). A further 19.8% slow or stop but not in a way that invite cyclists to proceed and only 4.7% of drivers proceed. The three most common interaction types are f4i, f5i, f6i, all of which involve the driver giving way to the cyclist who is in different positions. Interactions e5ii and e6ii are the fourth and fifth most common, where the driver slows or stops at the junction but in a way that means cyclists need to divert or change their behaviour.

Figure 3.7: Cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street



Cyclist response to driver behaviour - 1: Kennington Park Road / Magee Street

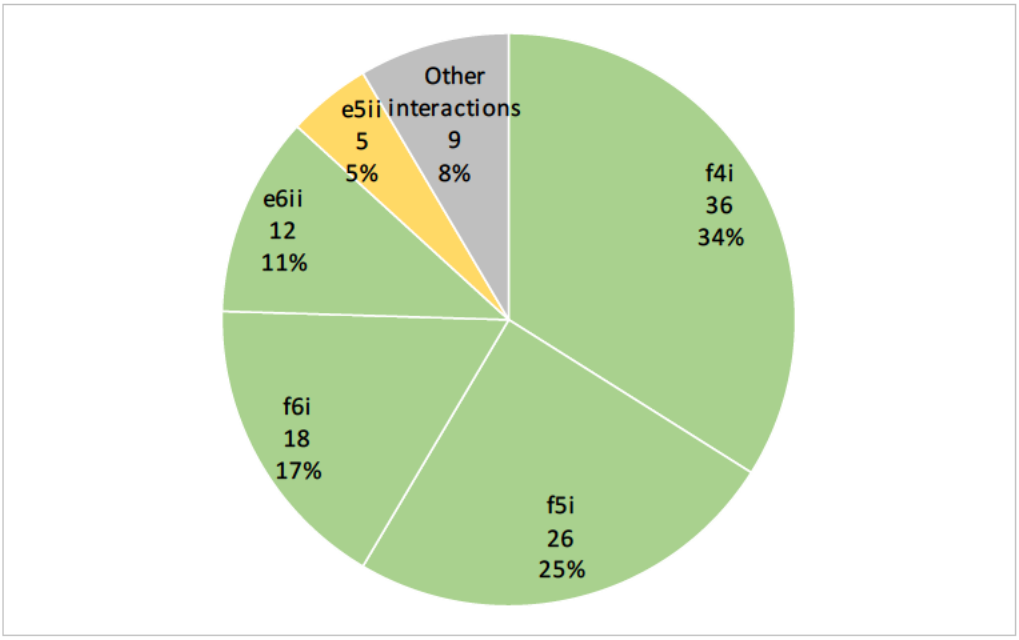
Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed		Driver slows or stops to make turn	
Cyclist is level or ahead on cycle track	d4 0.0%	d	e4i 0.0%	e4ii 1.9%	f4i 34.0%	f4ii 0.0%
Near junction mouth (<2 car lengths)	d5 0.9%		e5i 0.9%	e5ii 4.7%	f5i 24.5%	f5ii 0.0%
Not yet at junction (>2 car lengths)	d6 0.0%	3.8%	e6i 0.9%	e6ii 11.3%	f6i 17.0%	f6ii 0.0%
Sub-totals	**4.7%**		**19.8%**		**75.5%**	

n = 106

Table 3.3: Five most common cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street

Rank	Interaction	Count	%
1	f4i: Cyclist proceeds	36	34.0%
2	f5i: Cyclist proceeds	26	24.5%
3	f6i: Cyclist proceeds	18	17.0%
4	e6ii: Cyclist diverts around vehicle	12	11.3%
5	e5ii: Cyclist diverts around vehicle	5	4.7%
	Sum of top 5 interactions	**97**	**91.5%**

Figure 3.8: Five most common cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street



Key:

- f4i: Cyclist proceeds
- f5i: Cyclist proceeds
- f6i: Cyclist proceeds
- e6ii: Cyclist diverts around vehicle
- e5ii: Cyclist diverts around vehicle

2. Clapham Old Town / Lydon Road

Site factsheet: 2. Clapham Old Town / Lydon Road	
Place context and nearby land uses	• The junction of Lydon Road (side road, 20 mph) / Clapham Old Town (main road, 20 mph limit) is in Clapham, SW4. • Land use is mostly residential in the vicinity of the junction, with some retail and commercial uses opposite on Clapham Old Town, including estate agents, a photography studio and two pubs • One pub has a small amount of seating on pavement • Zebra crossings of Clapham Old Town on either side of the junction • Pubs likely to generate some evening and night time activity, albeit on the opposite side of the road from the junction
Possible vehicle movements	• Both Clapham Old Town and Lydon Road two way • Four vehicle movements possible: left and right, in and out of Lydon Road
	Design context
General design of facility	• The continuous footway is adjacent to an area of public realm created by a substantial footway build out at the junction of Lydon Road and North Street, planted with 7 trees • Small trees in build-outs are placed on either side of Lydon Road where the continuous footway facility joins the side road, creating a pinch point 'gateway' effect. This is where the give way marking is located • Continuous footway across the junction mouth is very wide, much wider than footway to south and north • Corner radii visually imply the vehicle space at the junction mouth, but there are no features (e.g. bollards or planting) to prevent vehicles from cutting the corner, and tyre marks on the stone indicate that this occurs • There is a camber along the footway running north-south • Exit ramp on the approach to pedestrian treatment helps slow vehicles exiting the side road • But no vertical deflection to slow drivers turning in to Lydon Road
Materials used and road markings	• York stone paving is used on the continuous footway across the junction mouth • The footway either side of junction mouth is artificial stone pavers • The surface across the continuous footway is only slightly different from adjacent footway, but contrasts significantly with the asphalt road surface • Give way line set back from continuous footway behind the planter pinch point • Double yellow lines on main road extending around corner radii
Lighting	• Facility appears to have adequate lighting from lighting on footway opposite junction mouth on Clapham Old Town, and lamp on the side road
Sightlines and obstructions	• The 'gateway' feature of two trees in build-outs may obstruct intervisibility between pedestrians and vehicles exiting, particularly in summer when in full leaf • The walls and hedges of adjacent properties mean vehicles have to advance into the continuous footway facility before being able to see traffic passing on the main road
Other design elements in the immediate vicinity	• Trees on north footway of Clapham Old Town • Advisory cycle lane across Lydon Road junction mouth • Bell bollard on build-out to north of facility

Figure 3.9: Possible movements and total flows - 2. Clapham Old Town / Lydon Road

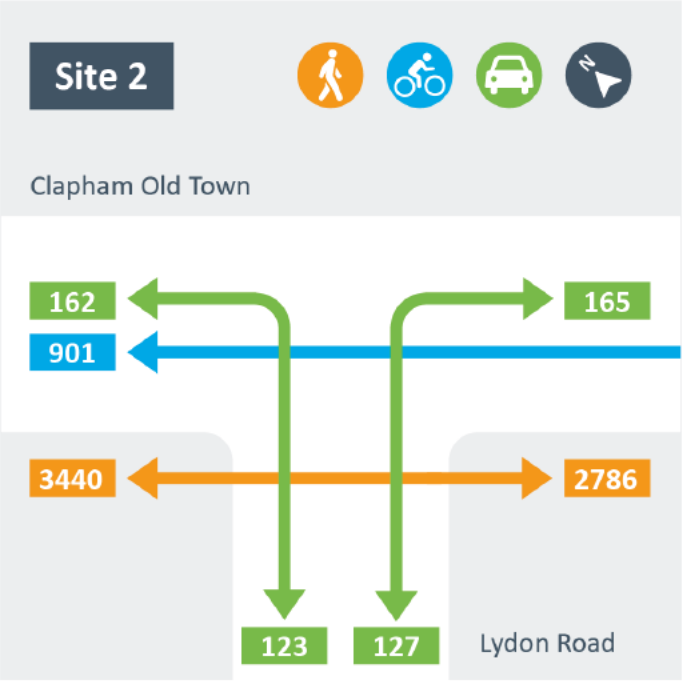


Table 3.4: Summary flow data (all movements) – 2. Clapham Old Town / Lydon Road

Flows	Pedestrians (crossing junction mouth)	Bicycles crossing junction mouth	Vehicles (in and out of Lydon Road)
Total Tuesday 0700-1900	2009	521	223
Total Wednesday 1400-0200	1631	161	148
Total Saturday 1000-2200	2586	219	210
Average hourly flow	173	25	16
Peak hour flow	333	199	32
When peak hour occurs	Tuesday 18:00-19:00	Tuesday 07:30-08:30	Saturday 14:30-15.30
Number of pedestrians / cyclists per vehicle	10.7	1.6	n/a

3.12 Across all three days, 73% of vehicles crossing the continuous footway were cars, 13% were vans and 7% bicycles. The proportion of cars increased to 78% on Saturday, while there were more vans on Tuesday, when they accounted for 18% of traffic (Figure 3.10).

Figure 3.10: Vehicle breakdown – 2. Clapham Old Town / Lydon Road

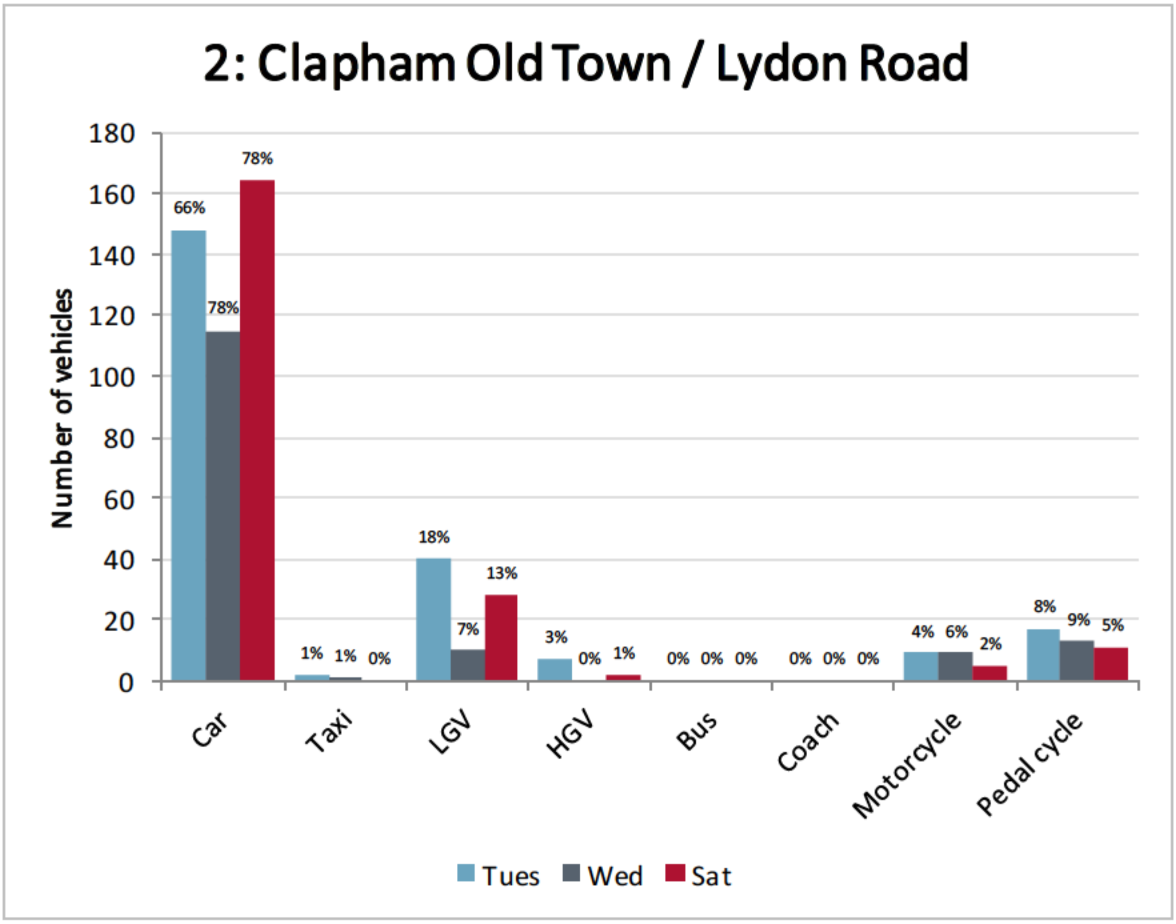
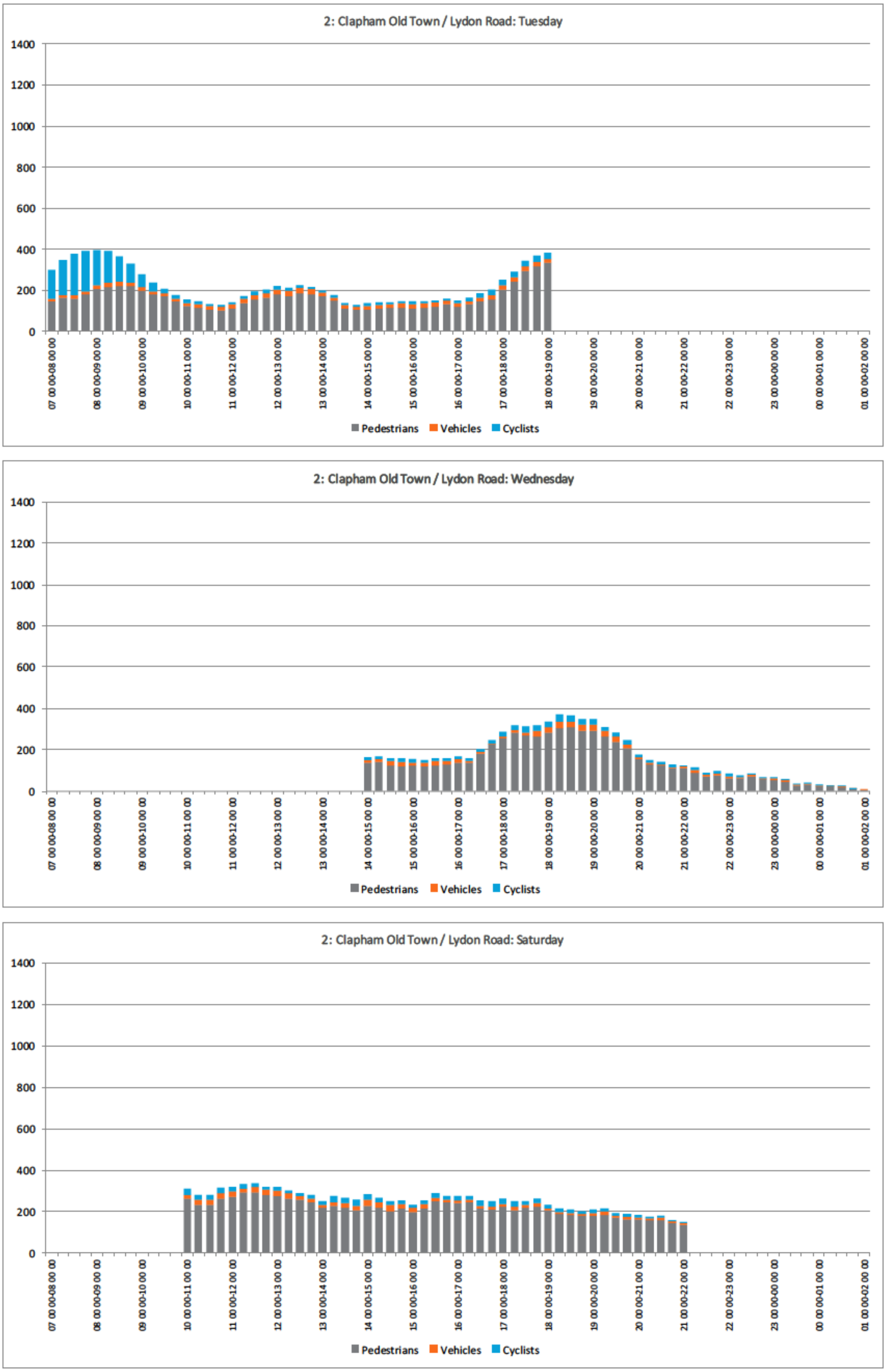


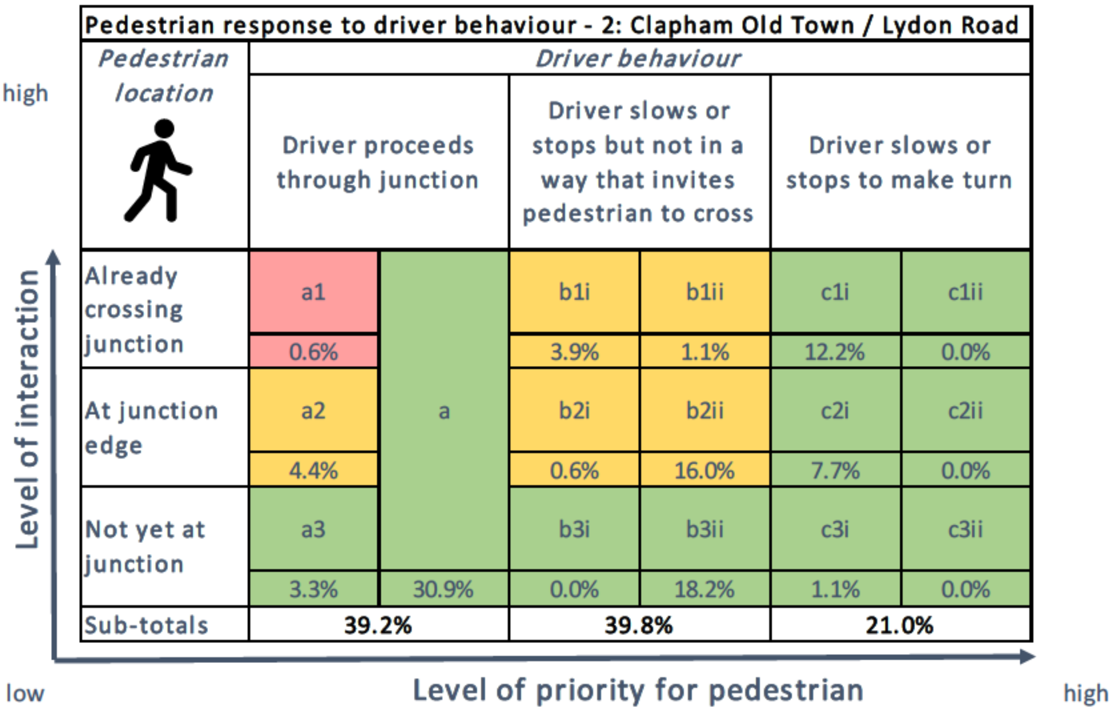
Figure 3.11: Daily flow profile – 2: Clapham Old Town / Lydon Road



Pedestrian / driver interactions at Site 2: Clapham Old Town / Lydon Road

3.13 At Site 2, 21% of drivers slow or stop when making their turn, 39.8% slow or stop but not in a way that invites pedestrians to cross and 39.2% proceed through the junction. interaction type a is the most common (30.9%), where the pedestrian and driver negotiate without either having to change their behaviour. b2ii and b3ii interactions are the second and third most common at Site 2; drivers proceed on to and stop on the continuous footway when pedestrians are at the junction edge (b2ii) or have yet to reach the junction (b3ii). This junction is quiet and so relatively few interactions were noted in total – 181. There is little variety of interactions as the top five types make up 85.1% of all interactions.

Figure 3.12: Pedestrian / driver interactions at Site 2: Clapham Old Town / Lydon Road



Pedestrian response to driver behaviour - 2: Clapham Old Town / Lydon Road

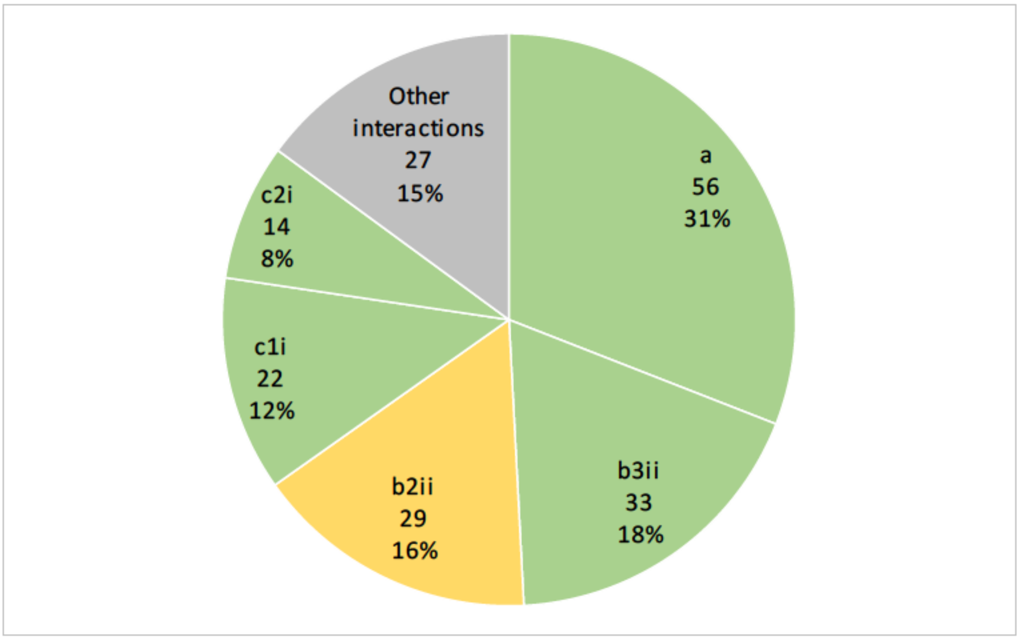
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.6%	a 30.9%	b1i 3.9%	b1ii 1.1%	c1i 12.2%	c1ii 0.0%
At junction edge	a2 4.4%		b2i 0.6%	b2ii 16.0%	c2i 7.7%	c2ii 0.0%
Not yet at junction	a3 3.3%		b3i 0.0%	b3ii 18.2%	c3i 1.1%	c3ii 0.0%
Sub-totals	**39.2%**		**39.8%**		**21.0%**	

n = 181

Table 3.5: Most common pedestrian / driver interactions at Site 2: Clapham Old Town / Lydon Road

Rank	Interaction	Count	%
1	a: Pedestrian doesn't modify behaviour	56	30.9%
2	b3ii: Ped crosses but diverts around vehicle	33	18.2%
3	b2ii: Ped crosses but diverts around vehicle	29	16.0%
4	c1i: Ped continues to cross	22	12.2%
5	c2i: Ped crosses	14	7.7%
	Sum of top 5 interactions	**154**	**85.1%**

Figure 3.13: Most common pedestrian / driver interactions at Site 2: Clapham Old Town / Lydon Road



Key

- a: Pedestrian doesn't modify behaviour
- b3ii: Ped crosses but diverts around vehicle
- b2ii: Ped crosses but diverts around vehicle
- c1i: Ped continues to cross
- c2i: Ped crosses

Cyclist / driver interactions at Site 2: Clapham Old Town / Lydon Road

3.14 Only three cyclist / driver interactions were recorded at Site 2, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

3. Clapham Old Town / Grafton Square (north of Scout Lane)

Site factsheet: 3. Clapham Old Town / Grafton Square (north of Scout Lane)	
Place context and nearby land uses	• The junction of Grafton Square (side road, 20 mph limit) / Clapham Old Town (main road, 20 mph limit) north of Scout Lane is located in Clapham Old Town, SW4. • The surrounding area is predominantly residential but there are a number of local retail and office uses in the immediate vicinity of the junction. • Opposite the junction on Clapham Old Town, there is a bakery, café, private hire booking office and language school. • There is a fire station immediately north of the junction and a firm of solicitors and job centre to the south, with residential units above. • There is a language school 15m south of the junction. • The lack of evening / night time use means the junction is likely to be busier during the day.
Possible vehicle movements	• Both Grafton Square and Clapham Old Town are two-way • Four vehicle movements possible: left and right, in and out of Grafton Square
	Design context
General design of facility	• The facility looks like a continuation of the footway, due to the continuity of surface material across the junction mouth. • The continuous footway is very wide, increasing from ~2.5m on approach, to ~7m across junction mouth. • The give way line on Grafton Square corresponds to the building line of the fire station, which is set back far from the main road. • Corner radii visually imply the vehicle space at the junction mouth. They are spaced quite widely and the turning radii for vehicles entering Grafton Square is quite large, meaning that vehicles may make this turn at speed. • The facility is flush with the footway and has ramp markings for exiting traffic, but due to gradient of the road it does not offer any real deflection.
Materials used and road markings	• The continuous footway is made of natural York stone paving, making it visually consistent with the adjacent footways, however in a smaller unit size. • The facility is edged with a flush granite kerb where it meets adjacent carriageway, but not where it meets the footway. • Strong material colour contrast between the asphalt road surface and footway. • Give way markings present.
Lighting	• Facility appears to have adequate lighting from lighting on footway opposite junction mouth on Clapham Old Town • There is an additional lamp on Grafton Square corresponding to the give way line, which would also provide some illumination to the crossing.
Sightlines and obstructions	• The give way line on Grafton Square is set far back from the main road which means that vehicles may not be easily see traffic on Clapham Old Town; drivers need to advance onto the continuous footway facility in order to observe traffic before exiting onto Clapham Old Town.
Other design elements in the immediate vicinity	• There is a small tree planted on either side of the crossing facility, at the back of the kerb along Clapham Old Town • A car club bay is located at end of line of parking bays leading to Grafton Square exit • Community-maintained planters of herbs and vegetables on the north footway outside the fire station

Figure 3.14: Possible movements and total flows – 3: Clapham Old Town / Grafton Square (north of Scout Lane)

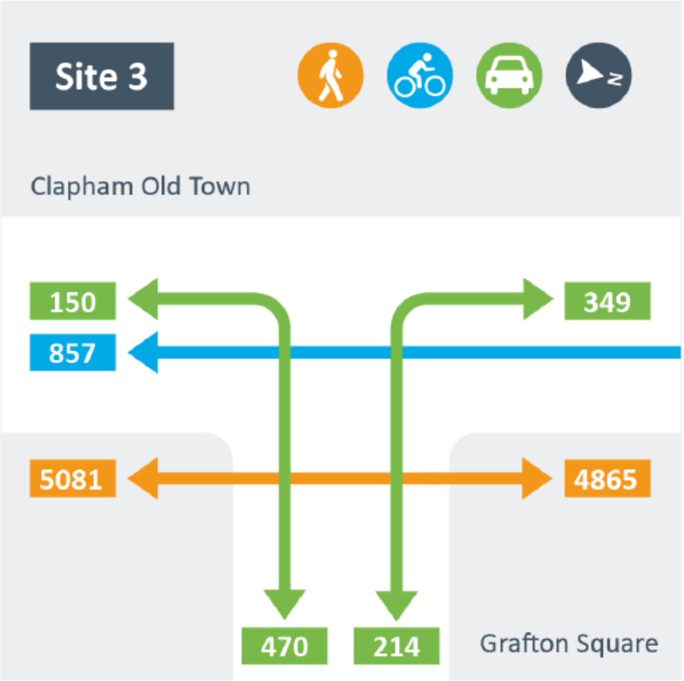


Table 3.6: Summary flow data (all movements) – 3: Clapham Old Town / Grafton Square (north of Scout Lane)

Flows	Pedestrians (crossing junction mouth)	Bicycles crossing junction mouth	Vehicles (in and out of Graton Square)
Total Tuesday 0700-1900	2683	502	623
Total Wednesday 1400-0200	2430	157	419
Total Saturday 1000-2200	4833	198	643
Average hourly flow	279	24	47
Peak hour flow	535	193	80
When peak hour occurs	Saturday 14:45-15:45	Tuesday 07:30-08:30	Tuesday 07:45-08:45
Number of pedestrians / cyclists per vehicle	5.9	0.5	n/a

3.15 On average across all three days, 77% of vehicles crossing the continuous footway were cars, 11% were vans and 6% bicycles. The proportion of cars increased to 82% on Saturday, while there were more vans on Tuesday, when they accounted for 16% of traffic (Figure 3.15).

Figure 3.15: Vehicle breakdown – 3: Clapham Old Town / Grafton Square (north of Scout Lane)

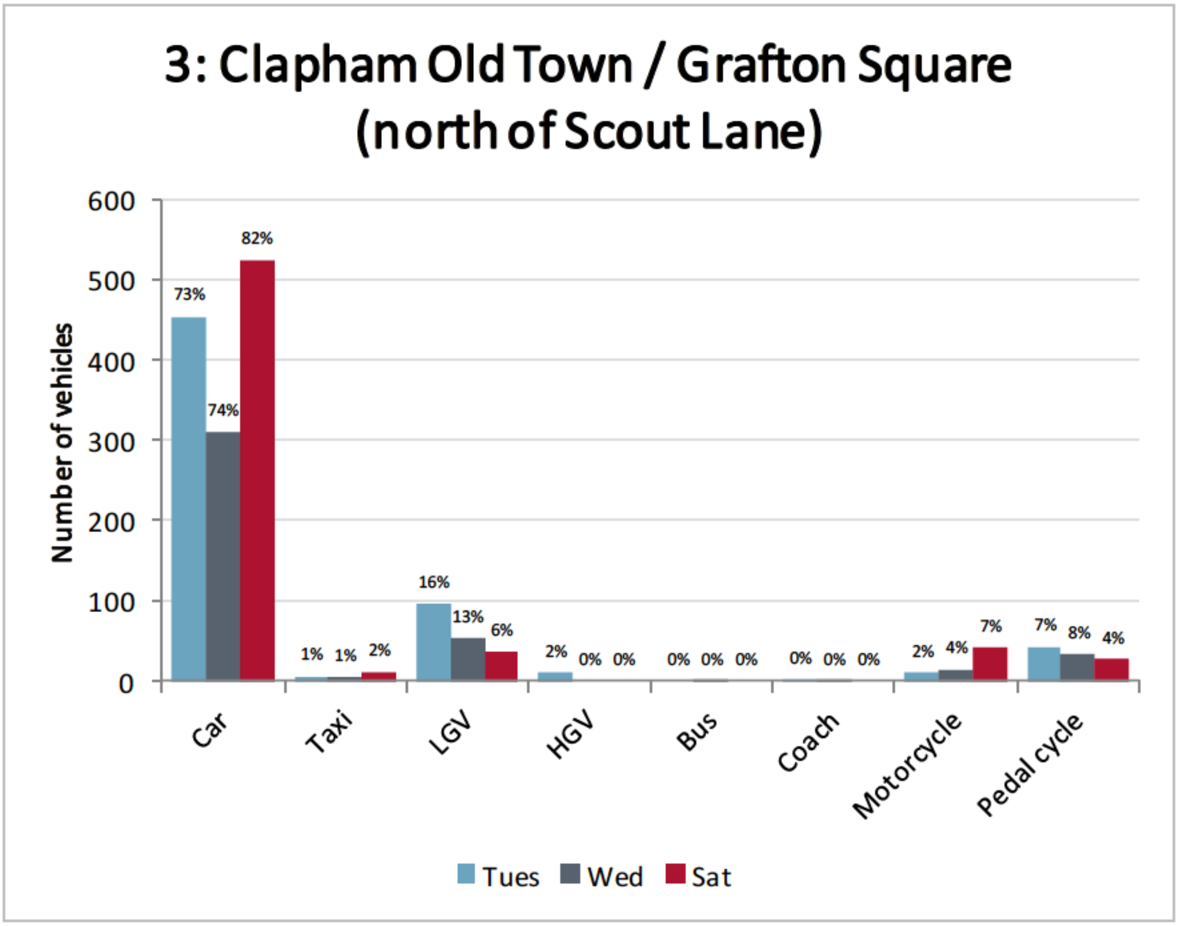
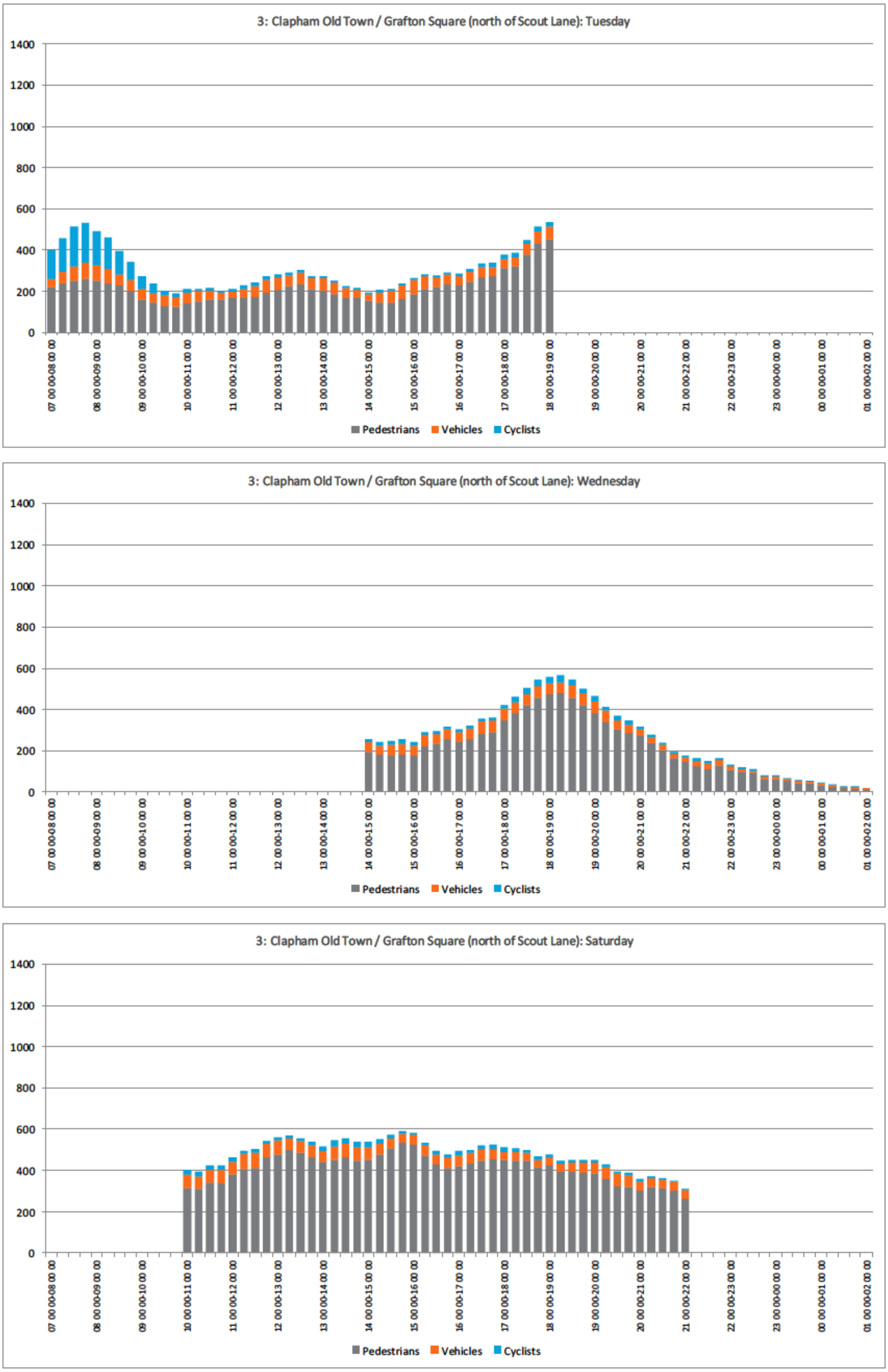


Figure 3.16: Daily flow profile – 3: Clapham Old Town / Grafton Square (north of Scout Lane)

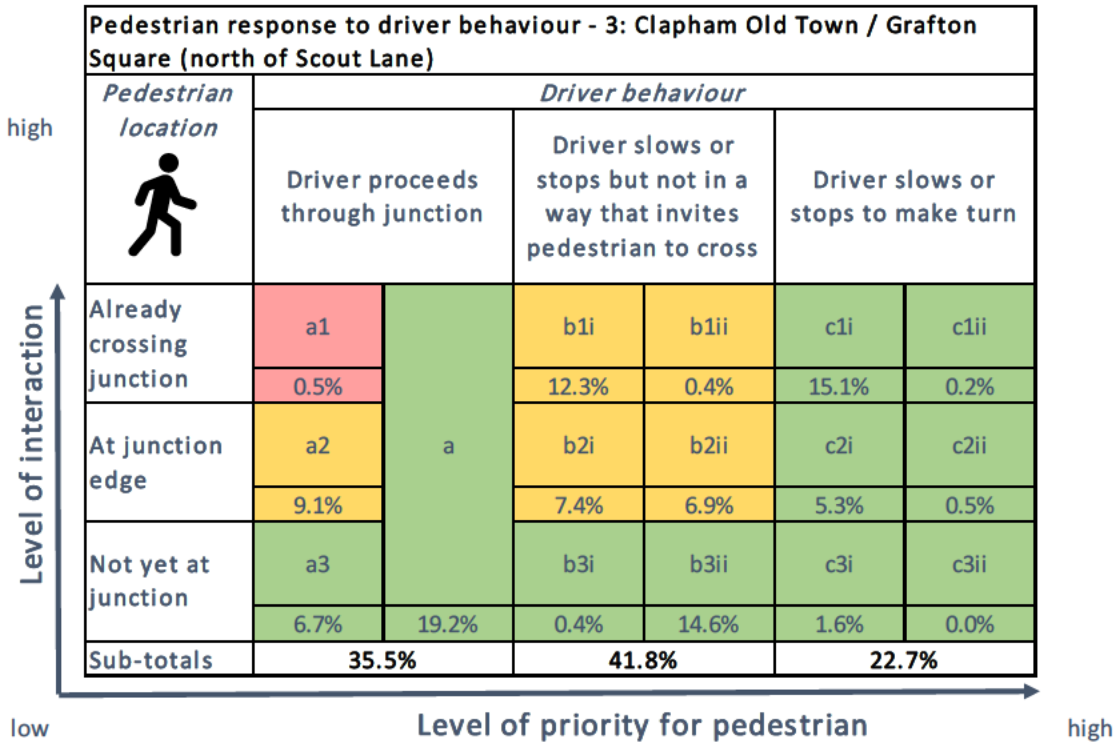


Pedestrian / driver interactions at Site 3: Clapham Old Town / Grafton Square (north of Scout Lane)

3.16 At Site 3, 22.7% of drivers slow or stop when making their turn, 41.8% do so but not in a way that invites pedestrians to cross and 35.5% of drivers proceed. There is quite a wide variety of interaction types among the top five at this junction. Interaction types a, c1i and b3ii make up the top three interactions at Site 3. 'a' involves neither road user having to modify their behaviour, c1i involves the driver giving way as the pedestrian is already crossing the junction, and b3ii has the driver slowing or stopping on the footway before the pedestrian arrives.

3.17 The fourth (b1i) and fifth (a2) most common interactions involve a higher level of interaction. For b1i, pedestrians are already crossing the junction and the vehicle does slow or stop but not in a way that invites pedestrians to cross (Figure 3.19 shows an example). For a2, pedestrians at the junction edge have to check their step or divert to avoid the vehicle proceeding through the junction (already shown in Figure 2.4). At Site 3, the top five account for 70.3% of all interactions which indicates that there is a wide variety of interactions occurring here.

Figure 3.17: Pedestrian / driver interactions at Site 3. Clapham Old Town / Grafton Square (north of Scout Lane)



Pedestrian response to driver behaviour - 3: Clapham Old Town / Grafton Square (north of Scout Lane)

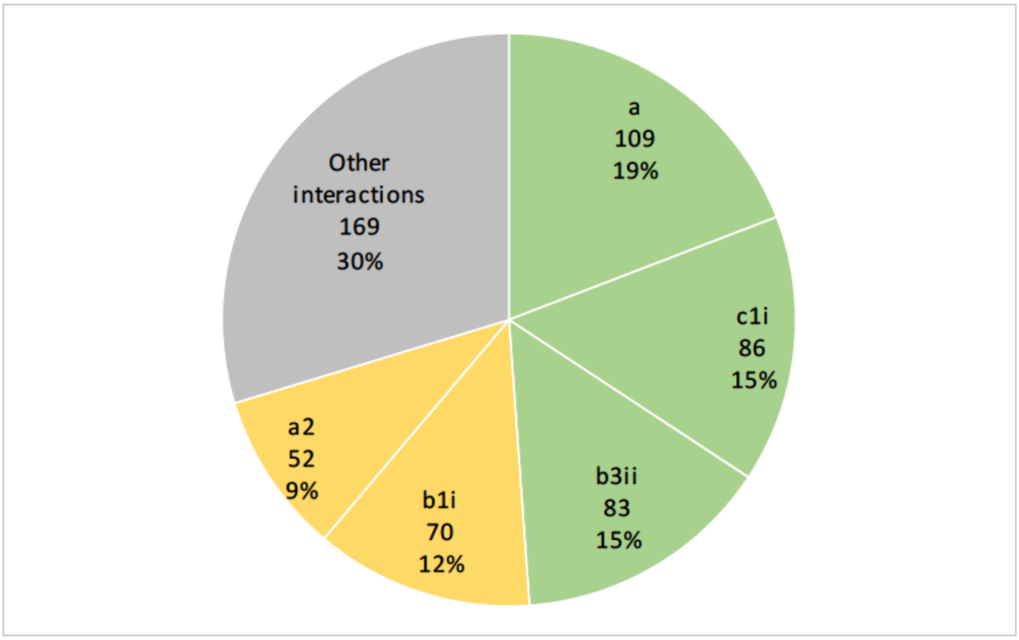
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.5%	a 19.2%	b1i 12.3%	b1ii 0.4%	c1i 15.1%	c1ii 0.2%
At junction edge	a2 9.1%		b2i 7.4%	b2ii 6.9%	c2i 5.3%	c2ii 0.5%
Not yet at junction	a3 6.7%		b3i 0.4%	b3ii 14.6%	c3i 1.6%	c3ii 0.0%
Sub-totals	**35.5%**		**41.8%**		**22.7%**	

n = 569

Table 3.7: Most common pedestrian / driver interactions at Site 3. Clapham Old Town / Grafton Square (north of Scout Lane)

Rank	Interaction	Count	%
1	a: Pedestrian doesn't modify behaviour	109	19.2%
2	c1i: Ped continues to cross	86	15.1%
3	b3ii: Ped crosses but diverts around vehicle	83	14.6%
4	b1i: Ped continues to cross	70	12.3%
5	a2: Ped has to modify behaviour, e.g. check step, divert	52	9.1%
	Sum of top 5 interactions	**400**	**70.3%**

Figure 3.18: Most common pedestrian / driver interactions at Site 3. Clapham Old Town / Grafton Square (north of Scout Lane)



Key

- a: Pedestrian doesn't modify behaviour
- c1i: Ped continues to cross
- b3ii: Ped crosses but diverts around vehicle
- b1i: Ped continues to cross
- a2: Ped has to modify behaviour, e.g. check step, divert

Cyclist / driver interactions at Site 3: Clapham Old Town / Grafton Square (north of Scout Lane)

3.18 Only 15 cyclist / driver interactions were recorded at Site 3, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

Figure 3.19: Screenshot of B1i: pedestrian continues to cross at Site 3

The vehicle approaches the continuous footway, as one pedestrian is already crossing the footway. The vehicle slows but does not stop at the give way line, so continues onto the continuous footway.

The pedestrian continues to cross as the vehicle creeps forward slowly and is quite close to the pedestrians. The second pedestrian quickens his step to clear the junction ahead of the vehicle.

The pedestrians continue along the footway and the vehicle proceeds out on to the main road.

4. Clapham Old Town / Grafton Square (south of Polygon)

Site factsheet: 4. Clapham Old Town / Grafton Square (south of Polygon)	
Place context and nearby land uses	• The junction of Grafton Square (side road, 20 mph limit) / Clapham Old Town (main road, 20 mph limit) is located in Clapham Old Town, SW4. • Land use on Clapham Old Town is retail on the ground floor and residential above, while Grafton Square is residential • There is a pub with outside seating on the north corner of the junction and another opposite Grafton Square • There is a Sainsbury's supermarket on the south corner of the junction • There are small independent shops and estate agents along Clapham Old Town • A zebra crossing is located 5m to the north of the junction across the main road • On street parking (pay and display) is found on both sides of Grafton Square • The pubs are likely to generate evening and night-time activity • Access to a nursery is on the north side of Grafton Square, 20m back from the junction
Possible vehicle movements	• Grafton Square is one way exit only onto Clapham Old Town which is one way eastbound • Only one vehicle movement possible: left turn out of Grafton Square
Design context	
General design of facility	• The continuous footway is the same surface material and level as the adjacent footways, however, a build-out on the north side and corner radii are used to narrow the crossing width • Tight geometry implied through corner radii which may encourage vehicles to slow when making turning movements • The facility is flush with the footway and has ramp markings for exiting traffic, but due to gradient of the road it does not offer any substantial vertical deflection. • The paving material on the Grafton Square side is aligned with the corner of the Sainsbury's building and doesn't correspond directly with the footway • There is angled parking on northern side of Grafton Square and parallel parking on the southern side
Materials used and road markings	• The continuous footway is made of natural York stone paving, making it visually consistent with the adjacent footways, however in a smaller unit size. • The facility is edged with a flush granite kerb where it meets adjacent carriageway, but not where it meets the footway. • Strong material colour contrast between the asphalt road surface and footway. • Give way markings present.
Lighting	• Facility appears to have adequate lighting from Grafton Square footway street lamp and lighting along Clapham Old Town
Sightlines and obstructions	• Angled parking on northern side of Grafton Square may partially obstruct intervisibility of pedestrians and drivers on approaches • Building line of Sainsbury's building is close to junction mouth which may also limit sightlines for pedestrians heading north along footway
Other design elements in the immediate vicinity	• Zebra crossing on main road (5m to north of junction) • No entry sign facing onto Clapham Old Town • Restricted parking sign and left turn only sign facing Grafton Square • A public square (The Polygon) with seating, planting and cycle facilities is opposite • Advisory contra-flow cycle lane westbound on Clapham Old Town

Figure 3.20: Possible movements and total flows – 4: Clapham Old Town / Grafton Square (south of Polygon)

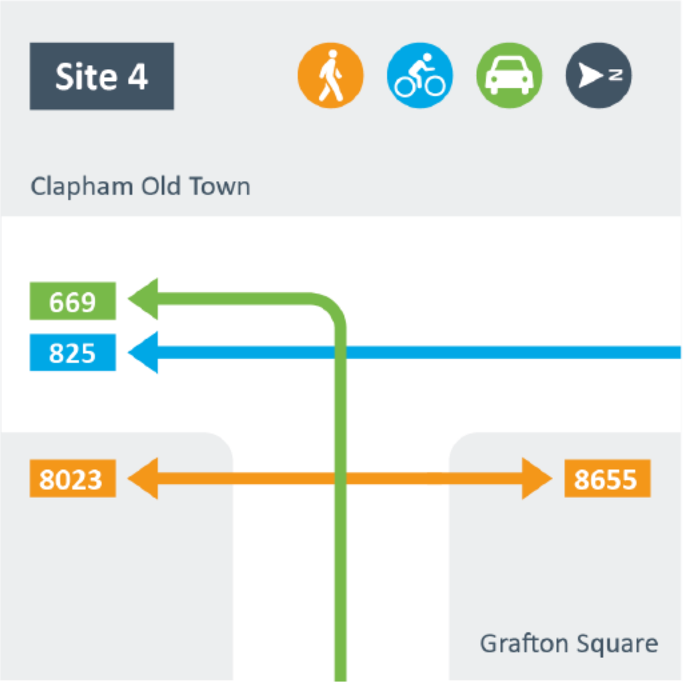


Table 3.8: Summary flow data (all movements) – 4: Clapham Old Town / Grafton Square (south of Polygon)

Flows	Pedestrians	Bicycles crossing junction mouth	Vehicles (out of Grafton Square)
Total Tuesday 0700-1900	4703	265	254
Total Wednesday 1400-0200	3957	377	193
Total Saturday 1000-2200	8018	183	282
Average hourly flow	469	23	20
Peak hour flow	837	107	37
When peak hour occurs	Saturday 16:30-17:30	Wednesday 18:00-19:00	Saturday 12:15-13:15
Number of pedestrians / cyclists per vehicle	22.9	1.1	n/a

3.19 On average across all three days, 77% of vehicles crossing the continuous footway were cars, 9% were vans, 8% bicycles and 5% motorcycles. The proportion of cars increased to 82% on Saturday, while there were more vans on Tuesday, when they accounted for 15% of traffic (Figure 3.21).

Figure 3.21: Vehicle breakdown – 4: Clapham Old Town / Grafton Square (south of Polygon)

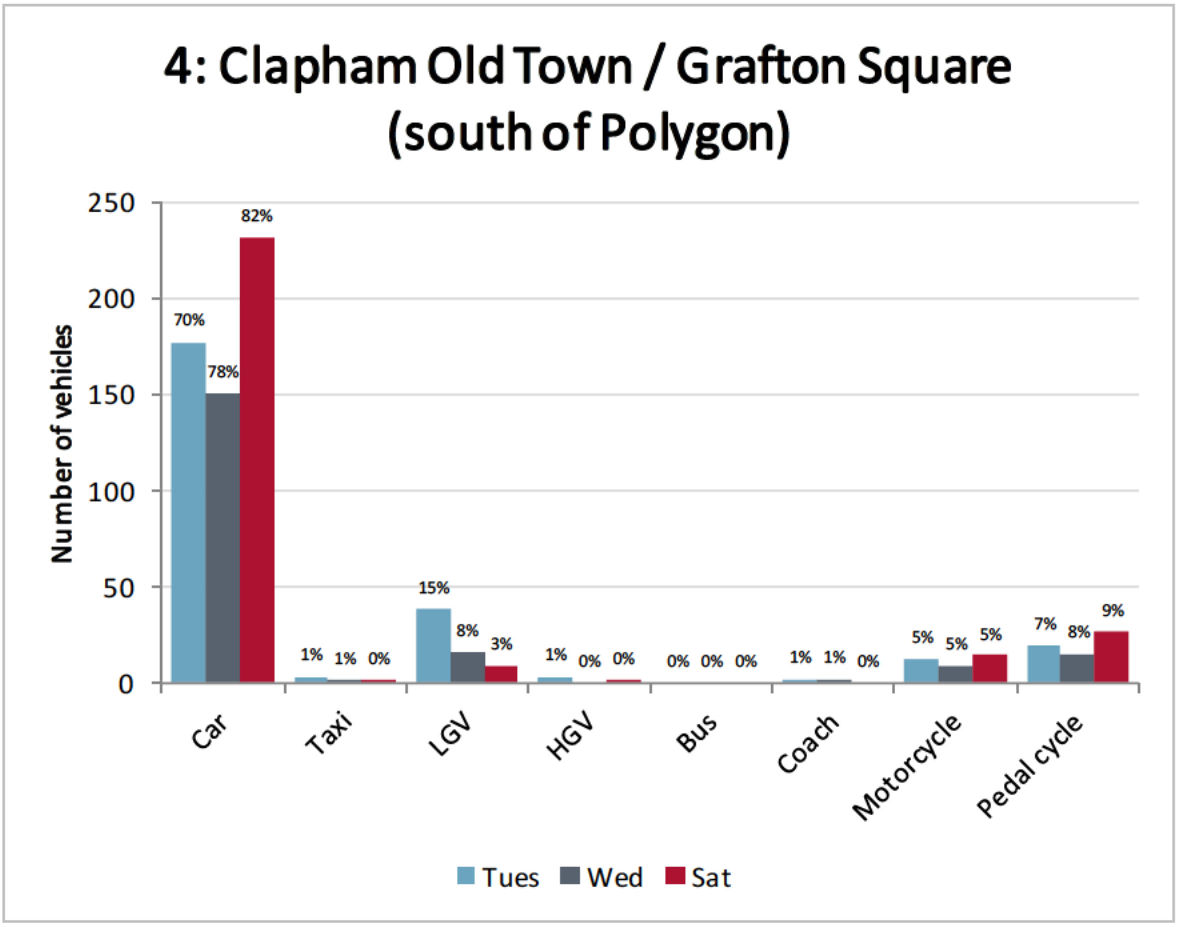
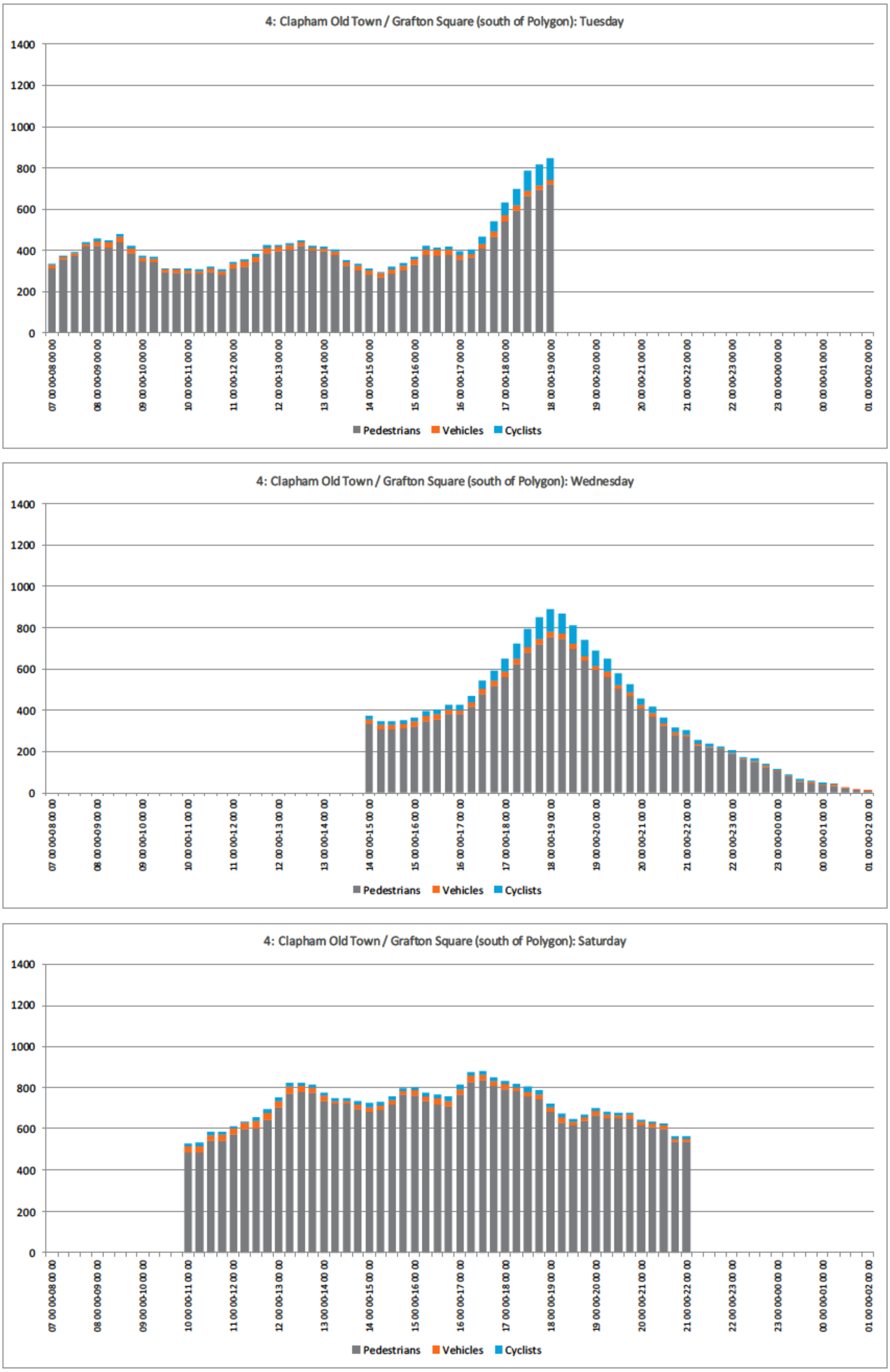


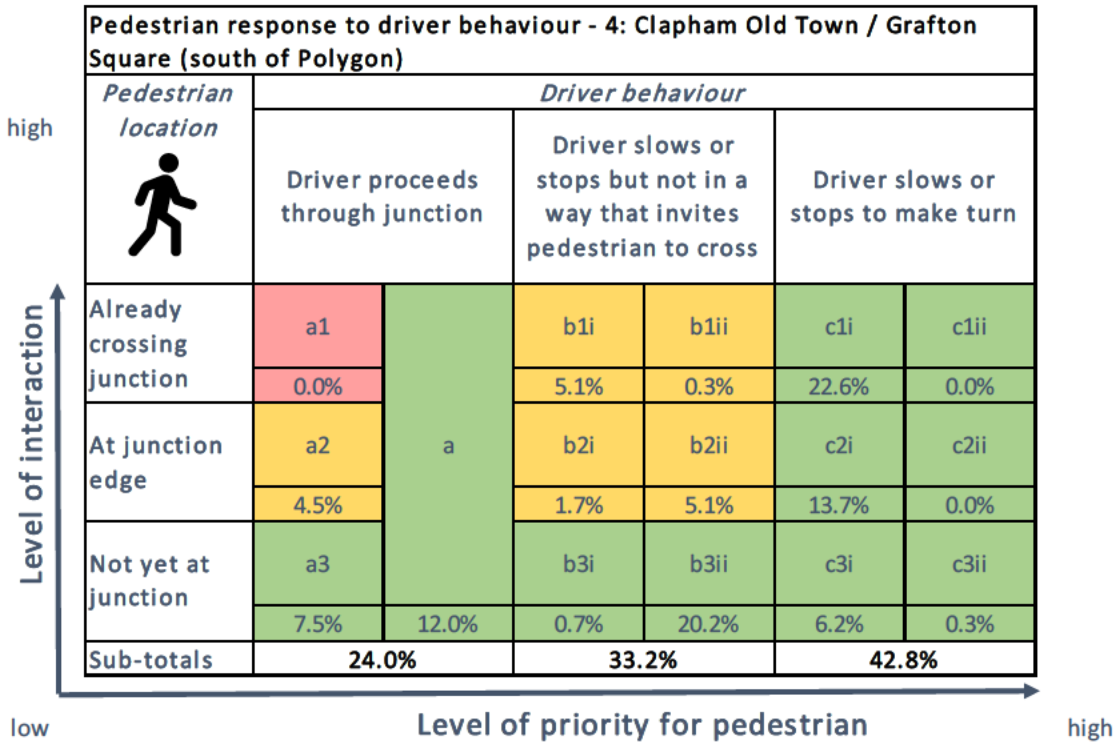
Figure 3.22: Daily flow profile – 4: Clapham Old Town / Grafton Square (south of Polygon)



Pedestrian / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)

3.20 At Site 4, 42.8% of drivers slow or stop to make their turn, around a third slow or stop but not in a way that invites pedestrians to cross (33.2%), and 24% of drivers proceed through the junction. All of the top 5 interactions at Site 4 fall within the 'green' low level of interactions. The most common interaction involves a driver giving way to a pedestrian who is already crossing (c1i), while the third most common involves the same driver behaviour but the pedestrian is at the junction edge (c2i). The second most common interaction is when the pedestrian is not yet at the junction edge and the driver has proceeded on to and stopped on the continuous footway. The fourth and fifth most common interactions involve the driver proceeding through the junction without the pedestrian having to modify their behaviour (a) or because the pedestrian is yet to reach the junction (a3). The top five account for about 76% of all interactions.

Figure 3.23: Pedestrian / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)



Pedestrian response to driver behaviour - 4: Clapham Old Town / Grafton Square (south of Polygon)

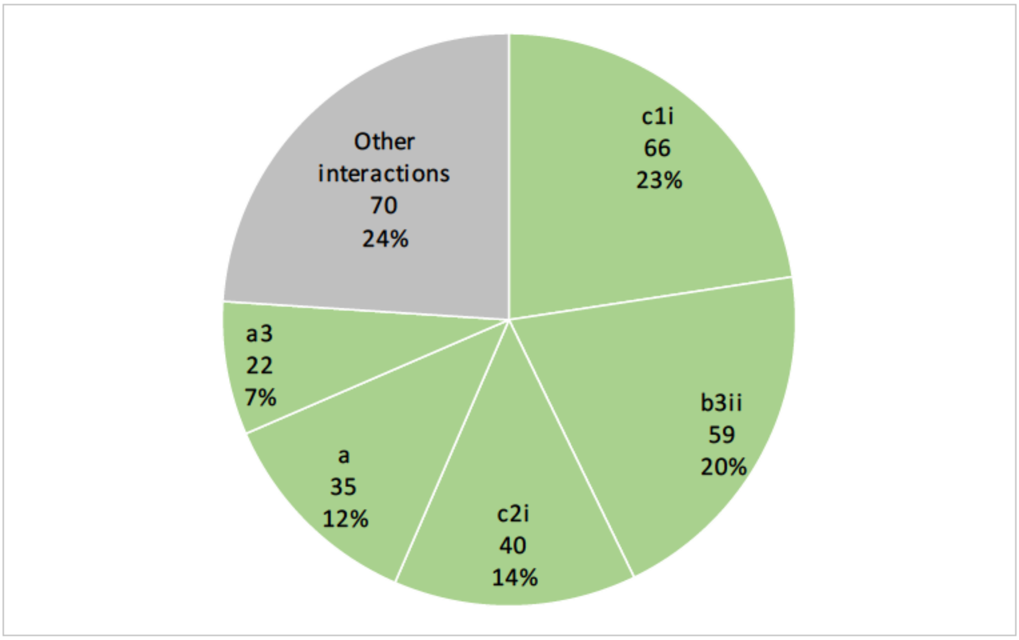
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.0%	a	b1i 5.1%	b1ii 0.3%	c1i 22.6%	c1ii 0.0%
At junction edge	a2 4.5%		b2i 1.7%	b2ii 5.1%	c2i 13.7%	c2ii 0.0%
Not yet at junction	a3 7.5%	12.0%	b3i 0.7%	b3ii 20.2%	c3i 6.2%	c3ii 0.3%
Sub-totals	**24.0%**		**33.2%**		**42.8%**	

n = 292

Table 3.9: Most common pedestrian / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)

Rank	Interaction	Count	%
1	c1i: Ped continues to cross	66	22.6%
2	b3ii: Ped crosses but diverts around vehicle	59	20.2%
3	c2i: Ped crosses	40	13.7%
4	a: Pedestrian doesn't modify behaviour	35	12.0%
5	a3: Ped waits	22	7.5%
	Sum of top 5 interactions	**222**	**76.0%**

Figure 3.24: Most common pedestrian / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)



Key

- c1i: Ped continues to cross
- b3ii: Ped crosses but diverts around vehicle
- c2i: Ped crosses
- a: Pedestrian doesn't modify behaviour
- a3: Ped waits

Cyclist / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)

3.21 Only four cyclist / driver interactions were recorded at Site 4, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

5. Coldharbour Lane / Cambria Road

Site factsheet: 5. Coldharbour Lane / Cambria Road	
Place context and nearby land uses	• The junction of Cambria Road (side road, 20 mph limit) / Coldharbour Lane (main road, 20 mph limit) is located in Camberwell, SE5 • Land use either side of Cambria Road and directly opposite the junction is residential • There is a parade of local shops diagonally opposite on Coldharbour Lane - this includes a barber shop, pharmacy, off licence • The nearby land uses are unlikely to lead to different activity patterns after dark • Buses 35, 45 and 245 run along Coldharbour Lane and there are bus stops west of the junction on either side of the road
Possible vehicle movements	• Cambria Road is one way entry only • Two vehicle movements possible: left and right turn into Cambria Road from Coldharbour Lane • Contraflow cycle movement signed on Cambria Road, allowing cyclists to exit from Cambria Road too
Design context	
General design of facility	• Footway treatment appears to be a hybrid of continuous footway and standard raised side road entry treatment; the materials are different to the adjacent footways and tactile paving is provided on all approaches, however there are no flush kerbs to demarcate the curve of the footway return into Cambria Road • Typical 1:15-1:10 gradient ramps provided either side of side road treatment • The footway is approximately 2.5m wide to the northeast and 1.5m to the southwest of the junction
Materials used and road markings	• Dark grey concrete block pavers used in continuous footway facility across junction mouth and extending approximately 3m either side of junction • Corduroy tactile paving provided across footway on approaches to junction on both side road and main road, located where footway material changes • Granite kerb edging, 150mm wide • 20mph marked on road surface of Cambria Road • Double yellow lines on southwest, single on northeast of Cambria Road • Zig zag markings on Coldharbour Lane
Lighting	• Facility appears to have adequate lighting from street lamps: two street lamps on the Coldharbour Lane (one either side of Cambria Road junction mouth, 2m to the southwest and 6m to the northeast)
Sightlines and obstructions	• There are low garden walls either side of the road, but vehicles can only turn into the road so this does not affect sightlines for vehicle movements or pedestrians approaching the junction mouth
Other design elements in the immediate vicinity	• Pedestrian-activated signal crossing approximately 10m to northeast of junction • Two one-way road signs on Cambria Road, either side of the junction • A 20 mph zone sign • A Legible London wayfinding totem on a build-out at entry to Cambria Road • Parking on east side of Cambria Road, protected by the build-out

Figure 3.25: Possible movements and total flows –5. Coldharbour Lane / Cambria Road

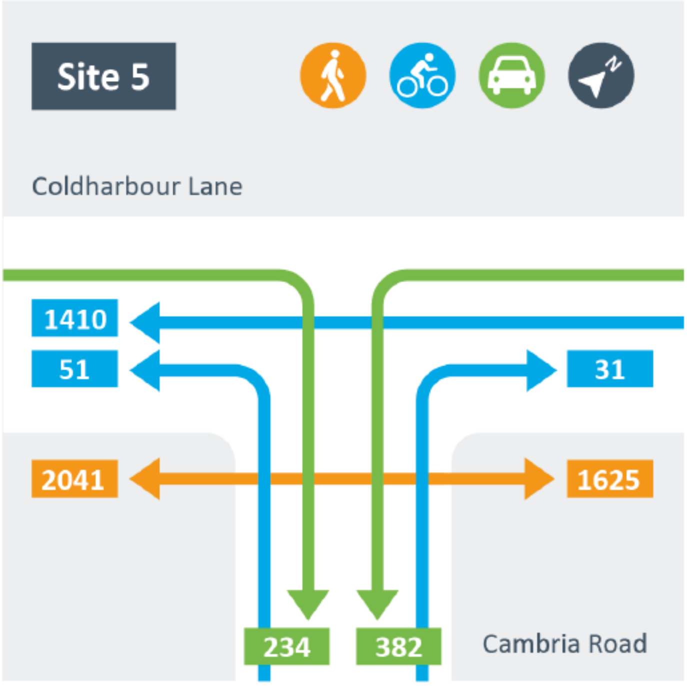


Table 3.10: Summary flow data (all movements) – 5. Coldharbour Lane / Cambria Road

Flows	Pedestrians	Bicycles crossing junction mouth	Vehicles (in (and cyclists out of) Cambria Road)
Total Tuesday 0700-1900	1261	505	299
Total Wednesday 1400-0200	1062	520	208
Total Saturday 1000-2200	1343	385	195
Average hourly flow	103	39	20
Peak hour flow	171	127	40
When peak hour occurs	Wednesday 18:15-19:15	Weds 18:00-19:00	Weds 16:30:00-17:30
Number of pedestrians / cyclists per vehicle	5.2	2.0	n/a

3.22 On average across all three days, 44% of vehicles crossing the continuous footway were cars, 32% were bicycles and 17% vans. The proportion of cars was highest on Wednesday – 46% – van numbers were highest on Tuesday – 26% – and bicycles made up 44% of traffic on Saturday (Figure 3.26).

Figure 3.26: Vehicle breakdown – 5. Coldharbour Lane / Cambria Road

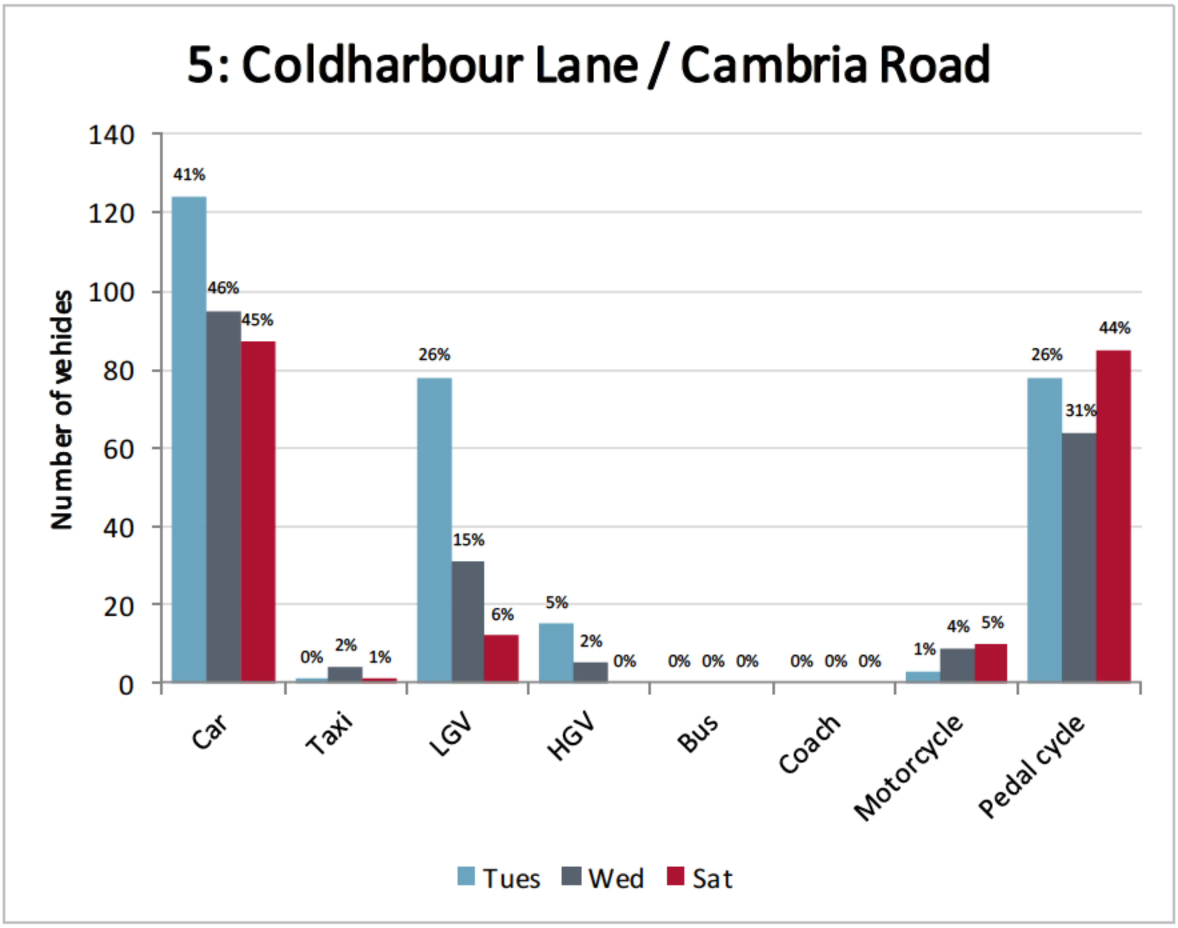
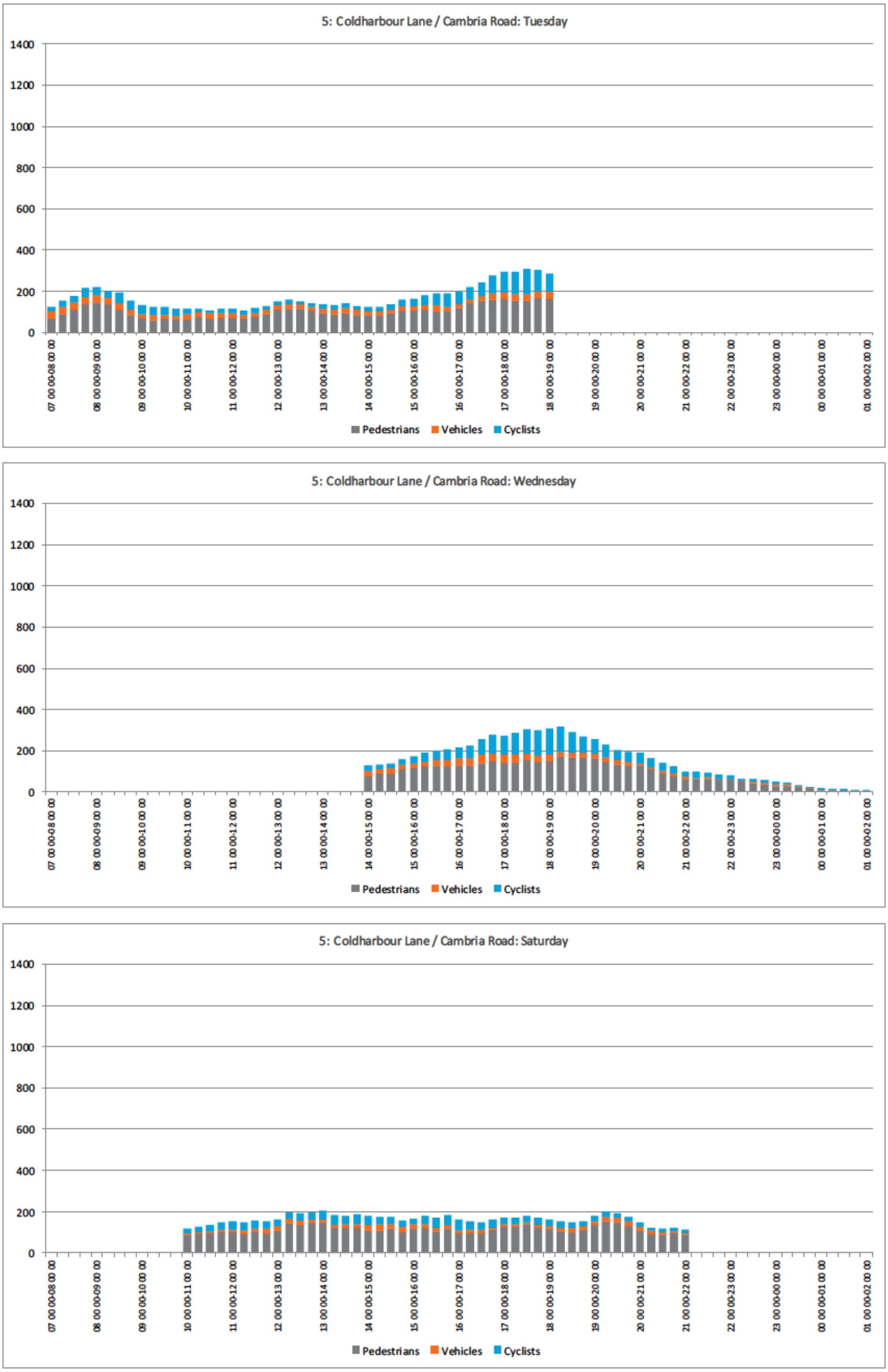


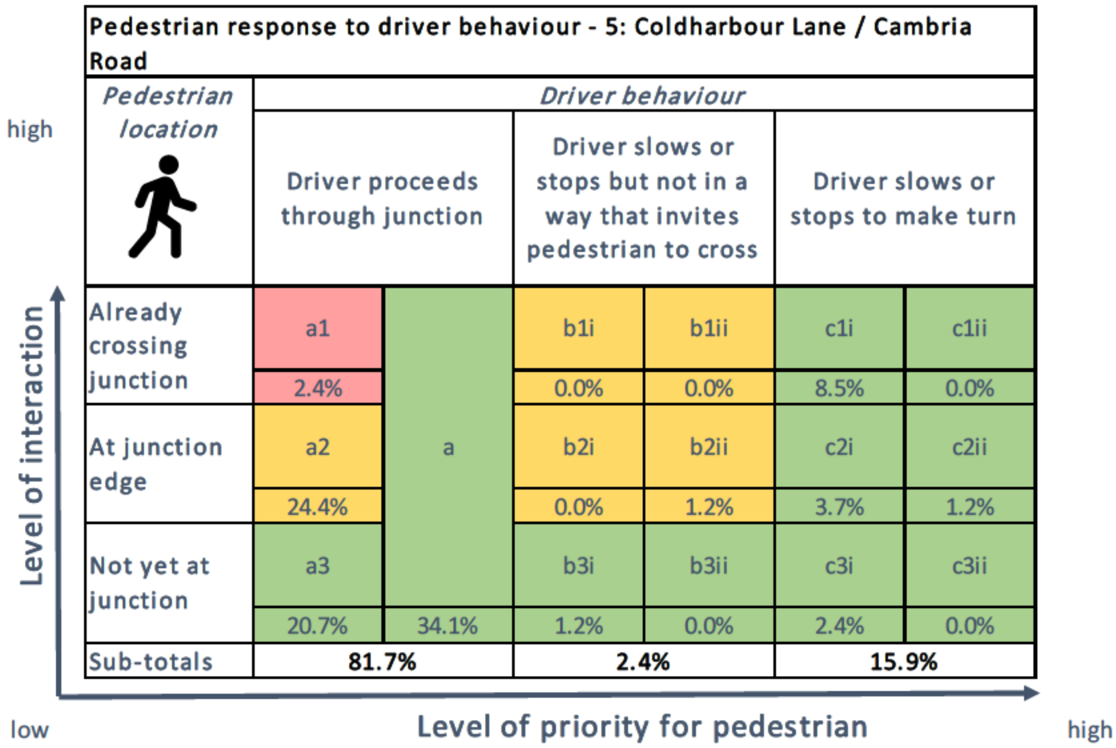
Figure 3.27: Daily flow profile – 5. Coldharbour Lane / Cambria Road



Pedestrian / driver interactions at Site 5. Coldharbour Lane / Cambria Road

3.23 The pattern of interactions at Site 5 is quite different from the other case study junctions. 15.9% of drivers slow or stop when turning and only 2.4% of drivers slow or stop in a way that doesn't invite pedestrians to cross. 81.7% of drivers proceed through the junction. The top three interactions all involve the driver proceeding through the junction; pedestrians either do not have to modify their behaviour (interaction 'a'), they have to check their step or divert (a2) or they wait for the vehicle to clear (a3). Site 5 also has a relatively high proportion of a1 interactions (2.4%) compared to other junctions, although it is still low in absolute terms. The fourth and fifth most common interactions involve the driver giving way to a pedestrian who is already crossing (c1i) or who is at the junction edge (c2i). The vast majority of interactions are made up from the top five: 91.5%. In considering the interactions that occur at this junction it is important to note the small sample size (82), due to the low flow pedestrians and drivers.

Figure 3.28: Pedestrian / driver interactions at Site 5: Coldharbour Lane / Cambria Road



Pedestrian response to driver behaviour - 5: Coldharbour Lane / Cambria Road

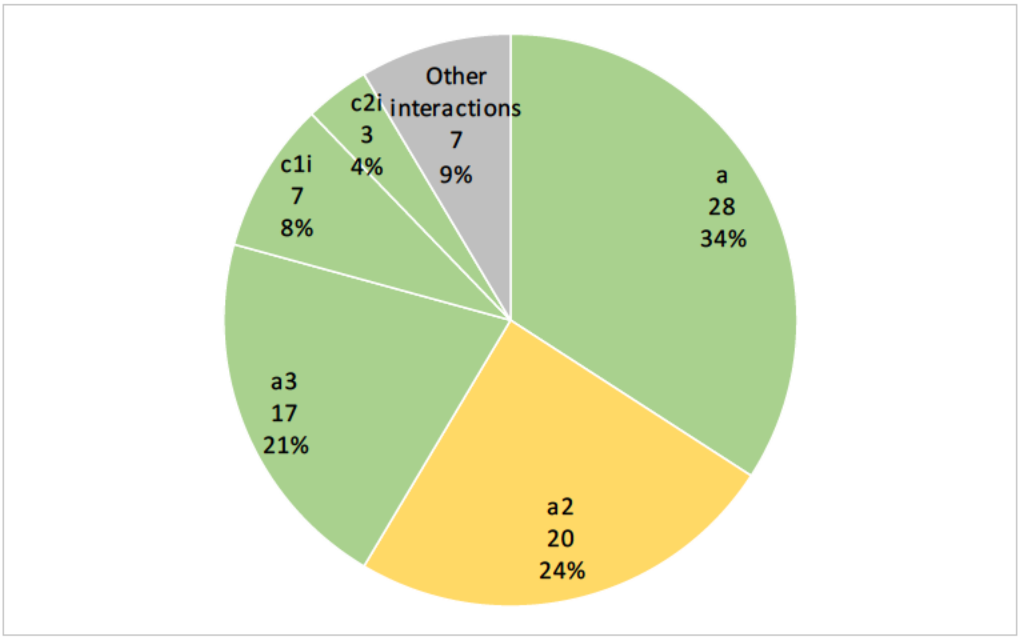
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 2.4%	a	b1i 0.0%	b1ii 0.0%	c1i 8.5%	c1ii 0.0%
At junction edge	a2 24.4%		b2i 0.0%	b2ii 1.2%	c2i 3.7%	c2ii 1.2%
Not yet at junction	a3 20.7%	34.1%	b3i 1.2%	b3ii 0.0%	c3i 2.4%	c3ii 0.0%
Sub-totals	**81.7%**		**2.4%**		**15.9%**	

n = 82

Table 3.11: Most common pedestrian / driver interactions at Site 5: Coldharbour Lane / Cambria Road

Rank	Interaction	Count	%
1	a: Pedestrian doesn't modify behaviour	28	34.1%
2	a2: Ped has to modify behaviour, e.g. check step, divert	20	24.4%
3	a3: Ped waits	17	20.7%
4	c1i: Ped continues to cross	7	8.5%
5	c2i: Ped crosses	3	3.7%
	Sum of top 5 interactions	**75**	**91.5%**

Figure 3.29: Most common pedestrian / driver interactions at Site 5: Coldharbour Lane / Cambria Road



Key

- a: Pedestrian doesn't modify behaviour
- a2: Ped has to modify behaviour, e.g. check step, divert
- a3: Ped waits
- c1i: Ped continues to cross
- c2i: Ped crosses

Cyclist / driver interactions at Site 5. Coldharbour Lane / Cambria Road

3.24 Only seven cyclist / driver interactions were recorded at Site 5, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

6. The Pavement / Bromell's Road

Site factsheet: 6. The Pavement / Bromell's Road	
Place context and nearby land uses	• The junction of Bromell's Road (side road, 20 mph limit) with The Pavement (main road, 20 mph limit) is located in Clapham Old Town, SW4 • The land use either side of the junction comprises retail at ground floor with residential above, including cafés (some with on-street seating), a butcher, a delicatessen, a clothes shop and a book shop • Clapham Common is on the other side of the road from the junction, with an entrance directly opposite - this is a key generator of activity (especially in the summer months) • Activity generated by these land uses is predominantly day time and early evening activity, with the adjacent café closing at 7pm and other businesses closing earlier • The Iceland supermarket on The Pavement (Clapham high street sides) has access for delivery and servicing from Bromell's Road
Possible vehicle movements	• Bromell's Road is one way exit only onto The Pavement and The Pavement is one way eastbound. • One vehicle movement possible: left turn out of Bromell's Road into The Pavement
	Design context
General design of facility	• The facility looks like a continuation of the footway, with the same material, pavement width and kerb height across the junction • There is no kerb or other delineation to define vehicular space in the facility • Width of the footway maintained; approximately 3m on approaches • The vehicle give way line is set behind the footway and has a ramp with a substantial vertical deflection leading up to the footway • There are no features to demarcate or guide the turning radii - i.e. no flush kerbs or bollards to mark corners
Materials used and road markings	• 300m granite kerb along The Pavement • Natural York stone paving on footway and facility • No colour contrast between footway and facility, but strong contrast between road and facility • Double yellow lines on Bromell's Road leading up to facility, and in front of the facility along The Pavement • Give way markings present
Lighting	• Facility appears to have adequate lighting from street lamps - one on approach along Bromell's Road, and one on footway opposite junction mouth on The Pavement
Sightlines and obstructions	• Bromell's Road is narrow and tightly enclosed by buildings which restrict sightlines, as a result, drivers have to drive on to the continuous footway facility in order to see traffic passing along The Pavement
Other design elements in the immediate vicinity	• Two cycle stands on the footway either side of a small tree, adjacent to the junction on the north side of Bromell's Road • Zebra crossing approx 5m to the north of the junction • Contraflow cycle lane on the far side of The Pavement opposite the junction mouth

Figure 3.30: Possible movements and total flows –6: The Pavement / Bromell's Road

Table 3.12: Summary flow data (all movements) – 6: The Pavement / Bromell's Road

Flows	Pedestrians	Bicycles crossing junction mouth	Vehicles (out of Bromell's Road)
Total Tuesday 0700-1900	7395	342	716
Total Wednesday 1400-0200	6275	424	521
Total Saturday 1000-2200	12428	415	758
Average hourly flow	735	33	56
Peak hour flow	1309	114	86
When peak hour occurs	Saturday 16:15-17:15	Tuesday 18:00-19:00	Saturday 11:15-12:15
Number of pedestrians / cyclists per vehicle	13.1	0.6	n/a

3.25 On average across all three days, 65% of vehicles crossing the continuous footway were cars, 12% were vans, 11% bicycles, 7% motorcycles and 5% taxis. The proportion of cars increased to 69% on Saturday, while there were more vans and bicycles using this junction on Tuesday; they made up 16% and 14% of traffic respectively (Figure 3.31).

Figure 3.31: Vehicle breakdown – 6: The Pavement / Bromell's Road

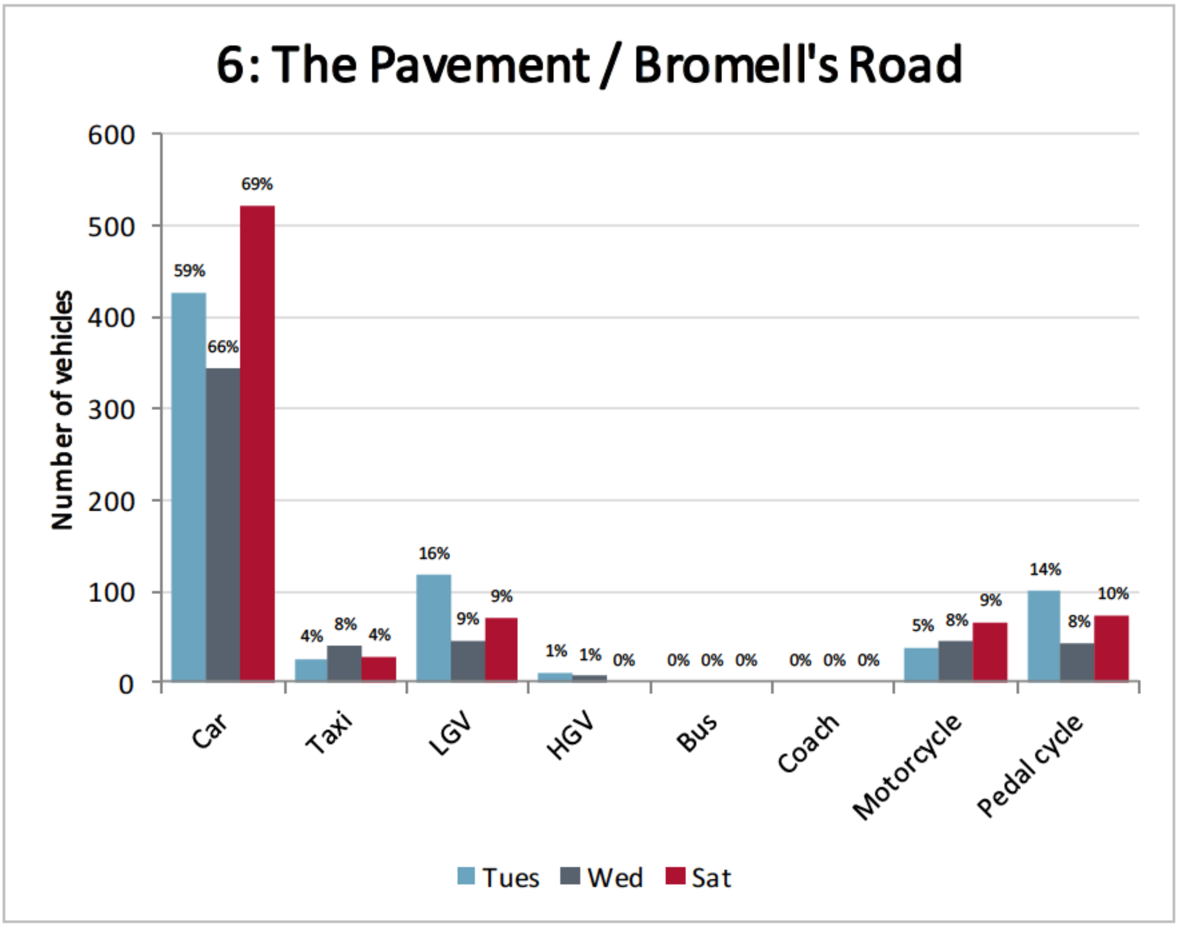
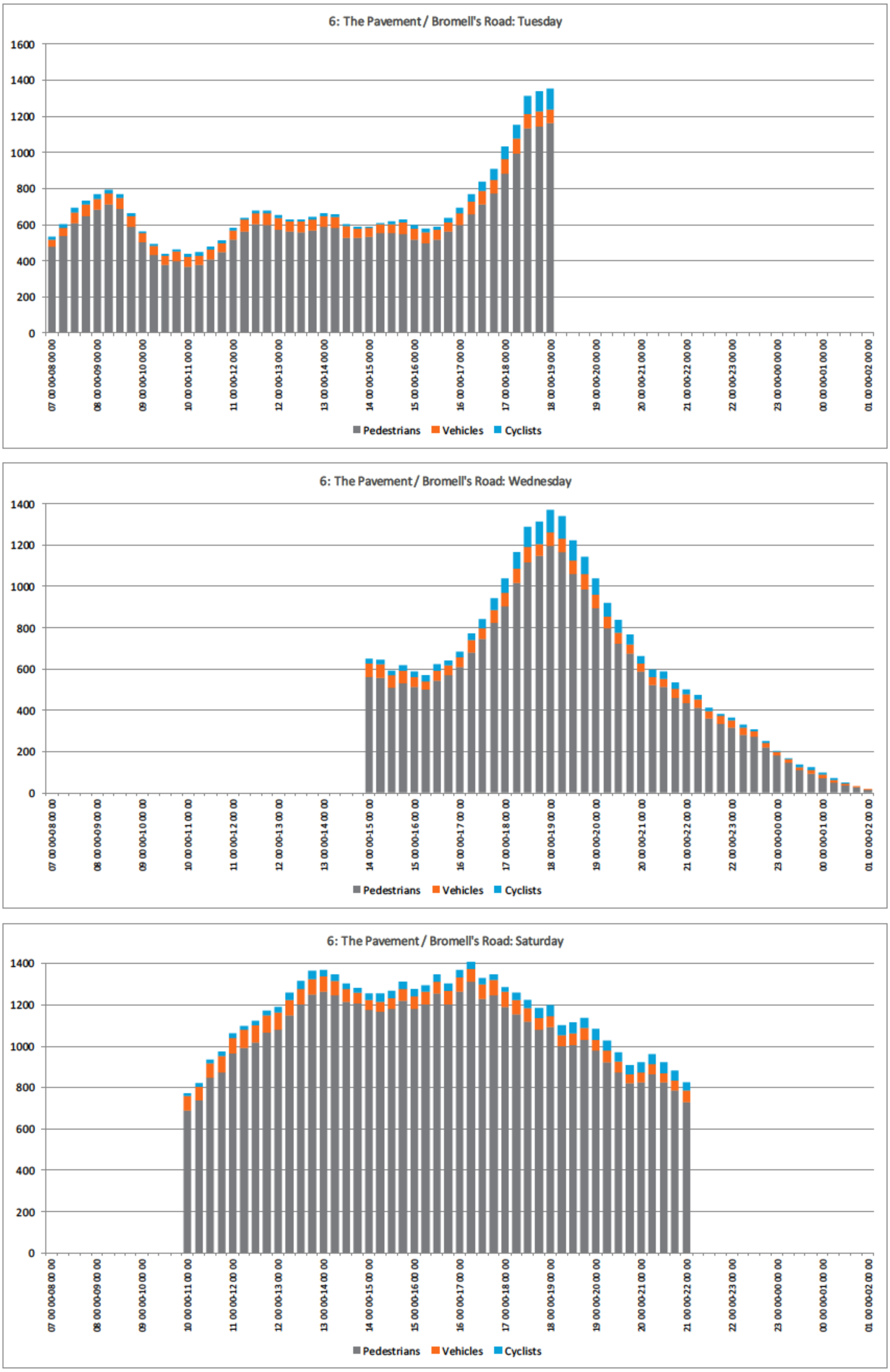


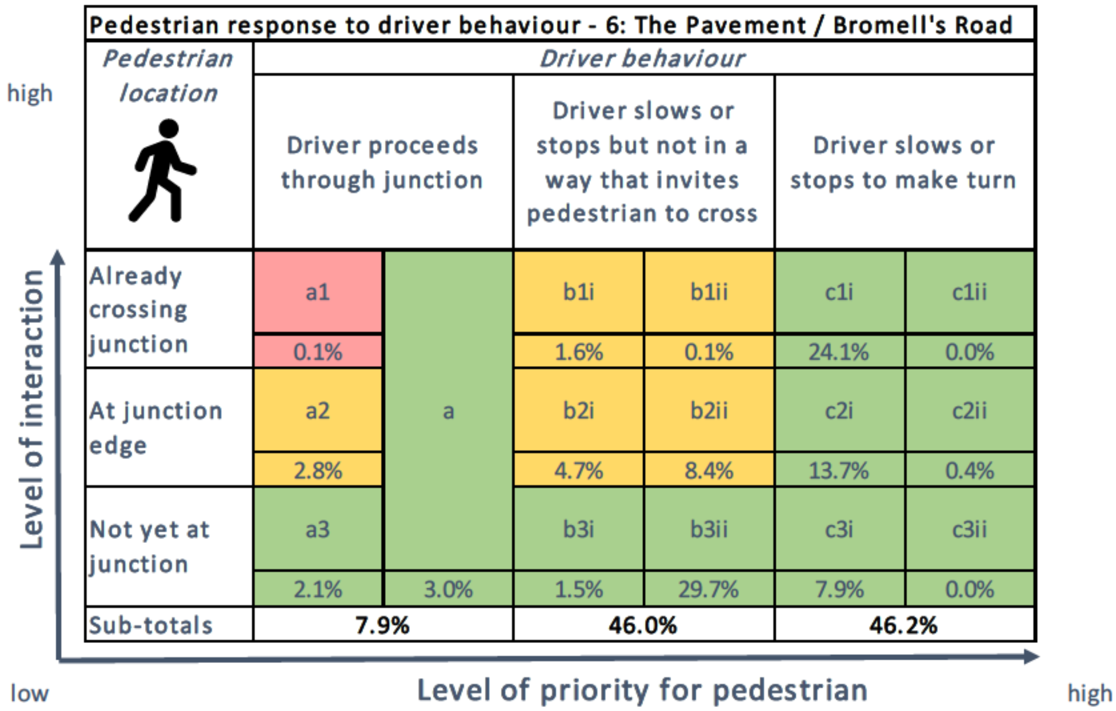
Figure 3.32: Daily flow profile – 6: The Pavement / Bromell's Road



Pedestrian / driver interactions at Site 6: The Pavement / Bromell's Road

3.26 Site 6 has the highest total pedestrian / driver interactions of any case study site (1,586); a result of it having the highest pedestrian flows and steady numbers of vehicles using the junction. 46.2% of drivers slow or stop when turning and a further 46% slow or stop but not in a way that invites pedestrians to cross. 7.9% proceed through the junction – the lowest number among the case study sites. The most common interaction involved the driver stopping on the continuous footway before the pedestrian arrives at it – the pedestrian then diverts around the vehicle (b3ii). The fourth most common interaction is very similar, but the pedestrian is at the junction edge (b2ii). Three of the top five interactions are made up of the driver slowing or stopping and the pedestrian continuing to cross (c1i, c2i and c3i). There is relatively little variety of interactions as the top five interaction types make up 83.9% of all interactions.

Figure 3.33: Pedestrian / driver interactions at Site 6: The Pavement / Bromell's Road



Pedestrian response to driver behaviour - 6: The Pavement / Bromell's Road

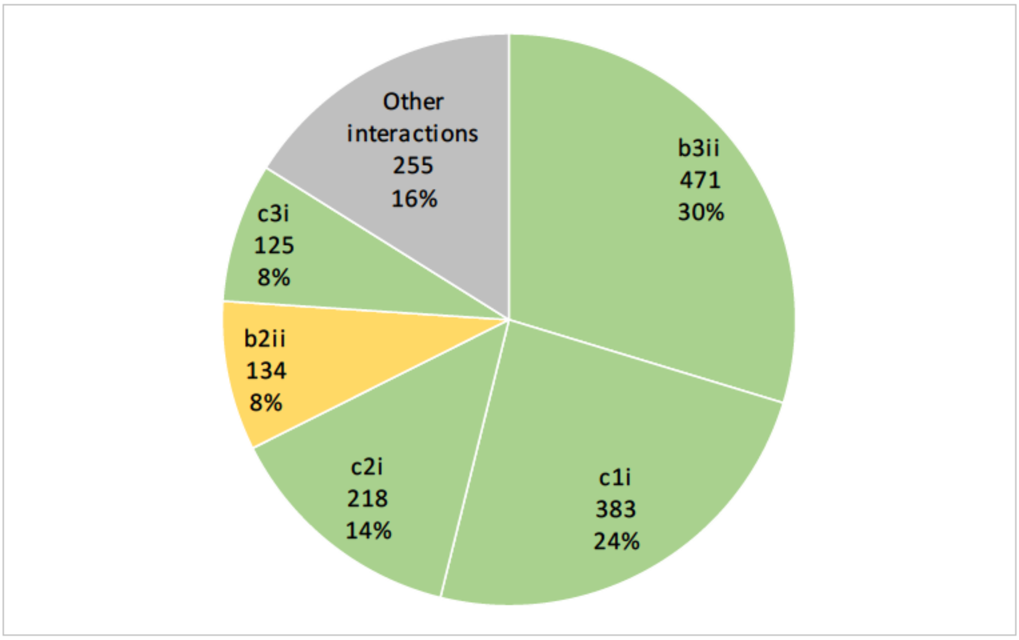
Pedestrian location	Driver behaviour					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.1%	a	b1i 1.6%	b1ii 0.1%	c1i 24.1%	c1ii 0.0%
At junction edge	a2 2.8%		b2i 4.7%	b2ii 8.4%	c2i 13.7%	c2ii 0.4%
Not yet at junction	a3 2.1%	3.0%	b3i 1.5%	b3ii 29.7%	c3i 7.9%	c3ii 0.0%
Sub-totals	7.9%		46.0%		46.2%	

n = 1586

Table 3.13: Most common pedestrian / driver interactions at Site 6: The Pavement / Bromell's Road

Rank	Interaction	Count	%
1	b3ii: Ped crosses but diverts around vehicle	471	29.7%
2	c1i: Ped continues to cross	383	24.1%
3	c2i: Ped crosses	218	13.7%
4	b2ii: Ped crosses but diverts around vehicle	134	8.4%
5	c3i: Ped crosses	125	7.9%
	Sum of top 5 interactions	**1331**	**83.9%**

Figure 3.34: Most common pedestrian / driver interactions at Site 6: The Pavement / Bromell's Road



Key

- b3ii: Ped crosses but diverts around vehicle
- c1i: Ped continues to cross
- c2i: Ped crosses
- b2ii: Ped crosses but diverts around vehicle
- c3i: Ped crosses

Cyclist / driver interactions at Site 6: The Pavement / Bromell's Road

3.27 Only 11 cyclist / driver interactions were recorded at Site 6, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

7. Upper Tooting Road / Stapleton Road

Site factsheet: 7. Upper Tooting Road / Stapleton Road	
Place context and nearby land uses	• Stapleton Road (side road, 20mph limit) / Upper Tooting Road (main road, 30 mph limit) is in Tooting, SW17 • Entrance of Tooting Bec tube station (Northern line) leads to Stapleton Road, as well as another entrance Tooting Bec Road • The tube entrance is busiest at peak commuter times and during the evening • Some vehicles use Stapleton Road to drop off or pick up people for the tube station • There is a cafe with outdoor seating on the south-west corner of the junction, and a pub opposite on Upper Tooting Road • The cafe on the corner opens during the daytime only, however the pub likely generates more night time activity • Stapleton Road entry is by the signalised junction of Tooting Bec Road/Upper Tooting Road
Possible vehicle movements	• Stapleton Road is one way entry only with the exception of cyclists • Two vehicle movements possible: left and right turn into Stapleton Road • > 7.5t vehicles and bus/coaches banned, except for access • Contraflow cycle movement on Stapleton Road means cyclists can exit Stapleton Road too
	Design context
General design of facility	• Facility looks like one continuous footway, with same grade, surface material, and unit size as adjacent footways • There is no kerb or other delineation to define vehicular space in the facility • Bell bollards on both corners physically restrict turning vehicles, and with the corner radii and ramp markings imply vehicles may be crossing • Ramp and difference in surface material between road and footway provides a visual signal to drivers that crossing is different to standard • Stapleton Road behind the continuous footway is paved with natural stone paving • The footway south of the junction is approx 2.5m, north of junction is approx 5m; the continuous footway extends into Stapleton Road the same depth as the north footway adjacent to the tube station
Materials used and road markings	• Facility is paved in Yorkstone with flush granite kerb edging where it meets the asphalt • Strong colour contrast to asphalt of main road • Less contrast with Stapleton Road where it runs behind the facility - here larger natural stone pavers are used in the carriageway, with different unit size and texture
Lighting	• Facility appears to have adequate lighting from street lamps - one by tube station facing onto Stapleton Road, and two on both sides of junction mouth on main road
Sightlines and obstructions	• For vehicles turning in there is clear visibility into junction (no obstructions by street furniture, planting etc.) • Southbound traffic can block sightlines when turning right in from Upper Tooting Road
Other design elements in the immediate vicinity	• Trees and cycle stands adjacent to the tube station entrance • > 7.5t vehicles / buses restricted sign • 20mph and contraflow cycle lane sign • Cycle symbol markings on Stapleton Road

Figure 3.35: Possible movements and total flows –7. Upper Tooting Road / Stapleton Road

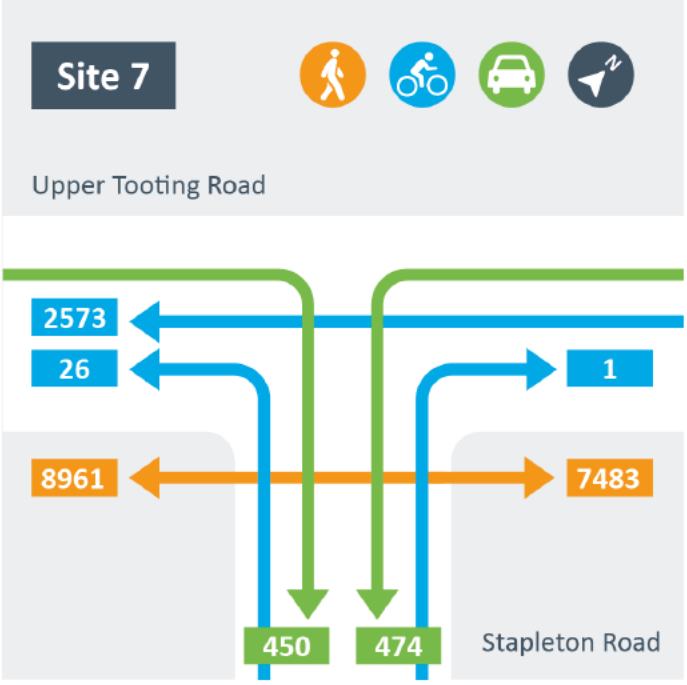


Table 3.14: Summary flow data – 7: Upper Tooting Road / Stapleton Road

Flows	Pedestrians	Bicycles crossing junction mouth	Vehicles (in (and cyclists out of) Stapleton Road)
Total Tuesday 0700-1900	5412	973	320
Total Wednesday 1400-0200	4534	1075	292
Total Saturday 1000-2200	6498	525	342
Average hourly flow	332	71	27
Peak hour flow	750	361	54
When peak hour occurs	Tuesday 07:30-08:30	Tuesday 18:00-19:00	Tuesday 18:00-19:00
Number of pedestrians / cyclists per vehicle	17.2	2.7	n/a

3.28 On average across all three days, 74% of vehicles crossing the continuous footway were cars, 13% were bicycles and 8% vans. The proportion of vans increased to 12% on Tuesday (Figure 3.36).

Figure 3.36: Vehicle breakdown – 7: Upper Tooting Road / Stapleton Road

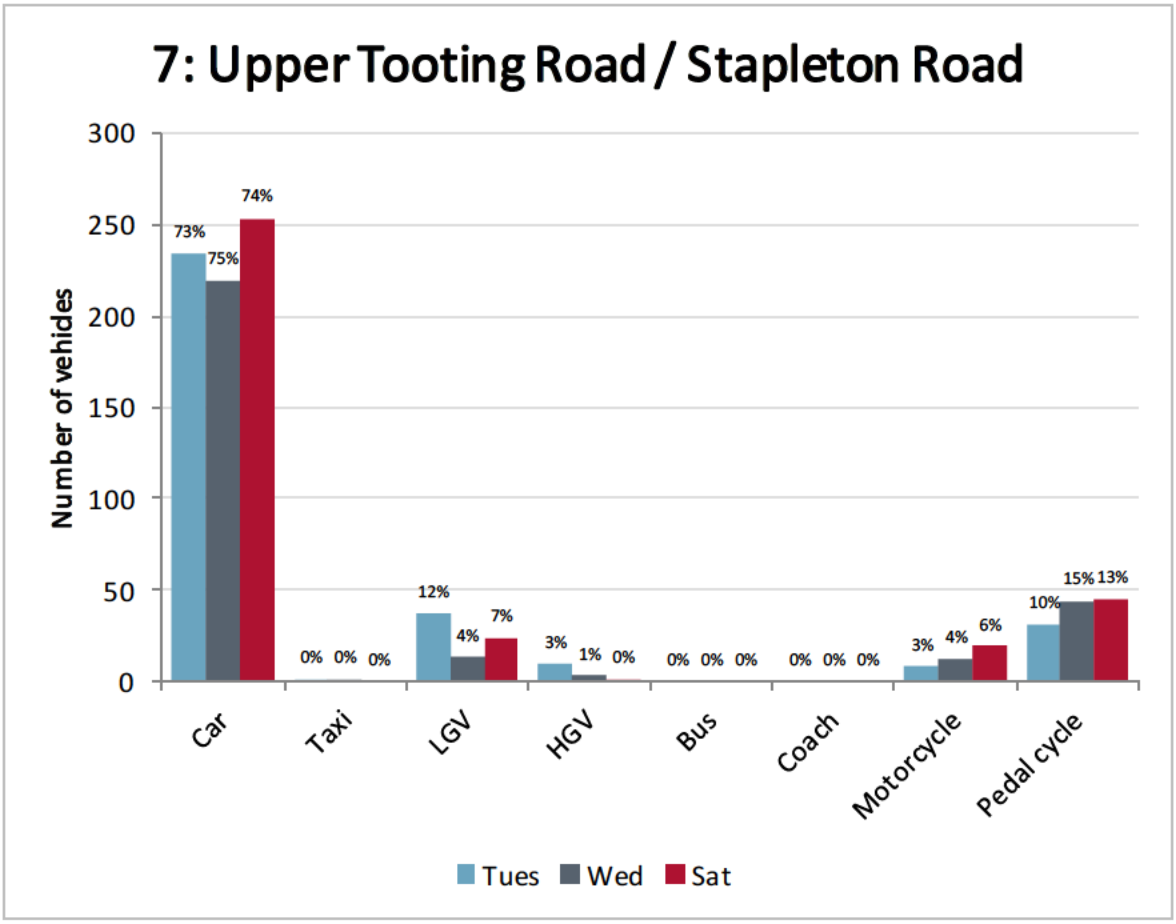
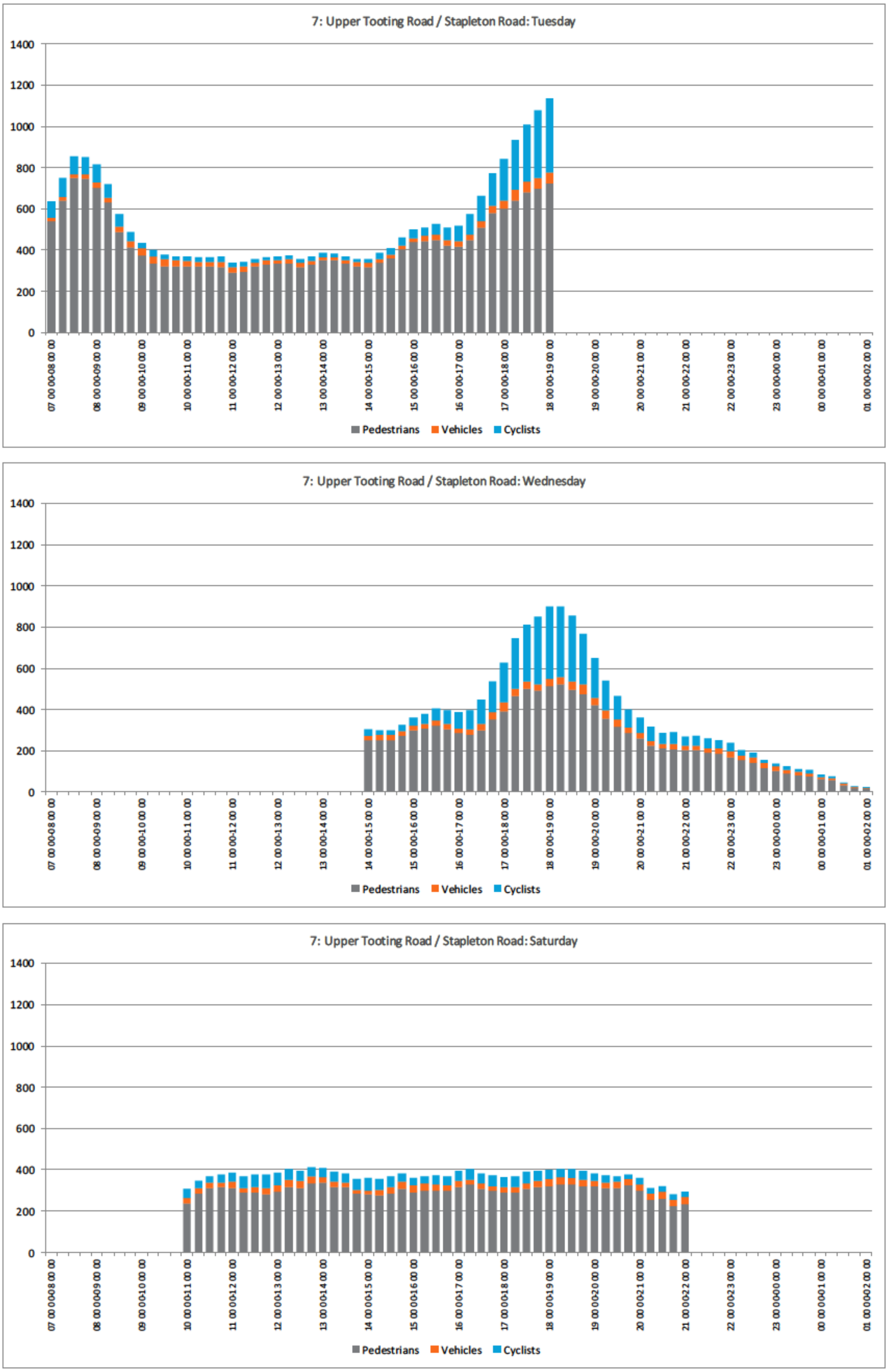


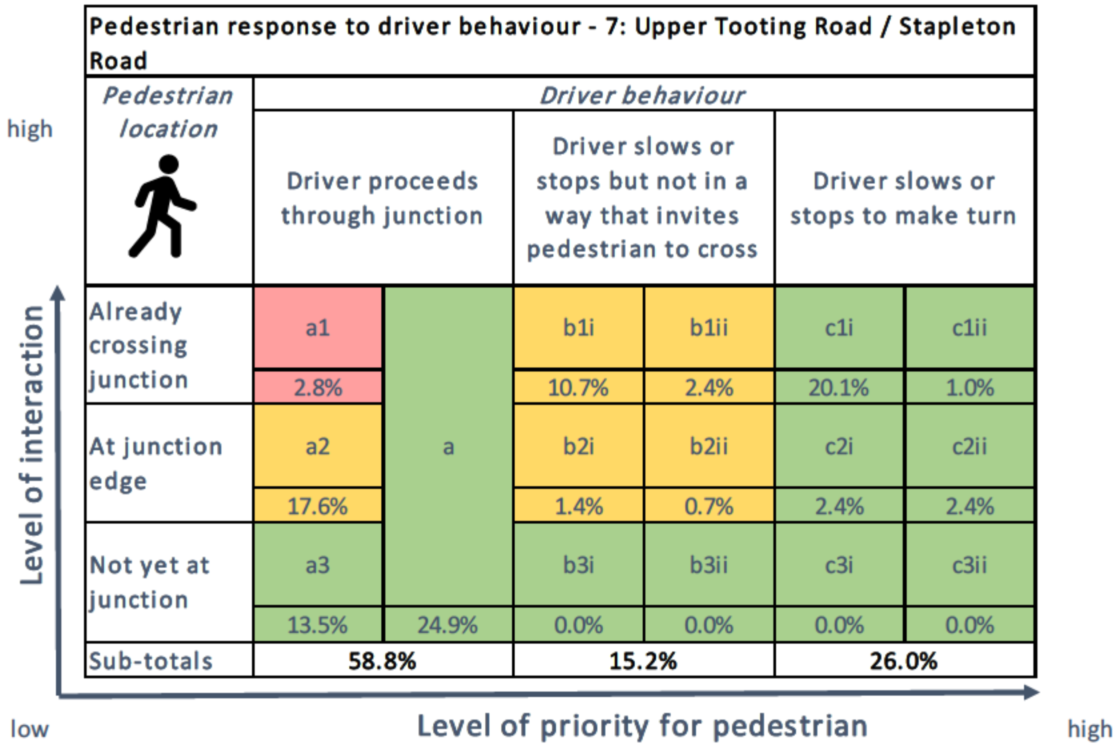
Figure 3.37: Daily flow profile – 7: Upper Tooting Road / Stapleton Road



Pedestrian / driver interactions at Site 7: Upper Tooting Road / Stapleton Road

3.29 Site 7's pattern of interactions differs from many of the other junctions, but shows a similar pattern to Site 5 with a high proportion of drivers proceeding through the junction. 26% of drivers slow or stop when making their turn, 15.2% slow or stop but not in a way that invites pedestrians to cross, while 58.8% proceed through the junction. Drivers proceed through the junction for three of the most common interaction types: a is the most common interaction type where the driver proceeds but a pedestrian doesn't have to modify their behaviour, a2 is the third where a pedestrian at the junction edge has to modify their behaviour as the driver proceeds, and a3 is fourth where the pedestrian has yet to reach the junction mouth as the driver proceeds. The second most common interaction was c1i where the pedestrian is already crossing, and the driver slows or stops when making their turn. The fifth most common interaction involved the pedestrian already crossing and the driver slowing or stopping but not in a way that invited the pedestrian to cross. The top five account for a high proportion of all interactions at this site: 86.9%.

Figure 3.38: Pedestrian / driver interactions at Site 7: Upper Tooting Road / Stapleton Road



Pedestrian response to driver behaviour - 7: Upper Tooting Road / Stapleton Road

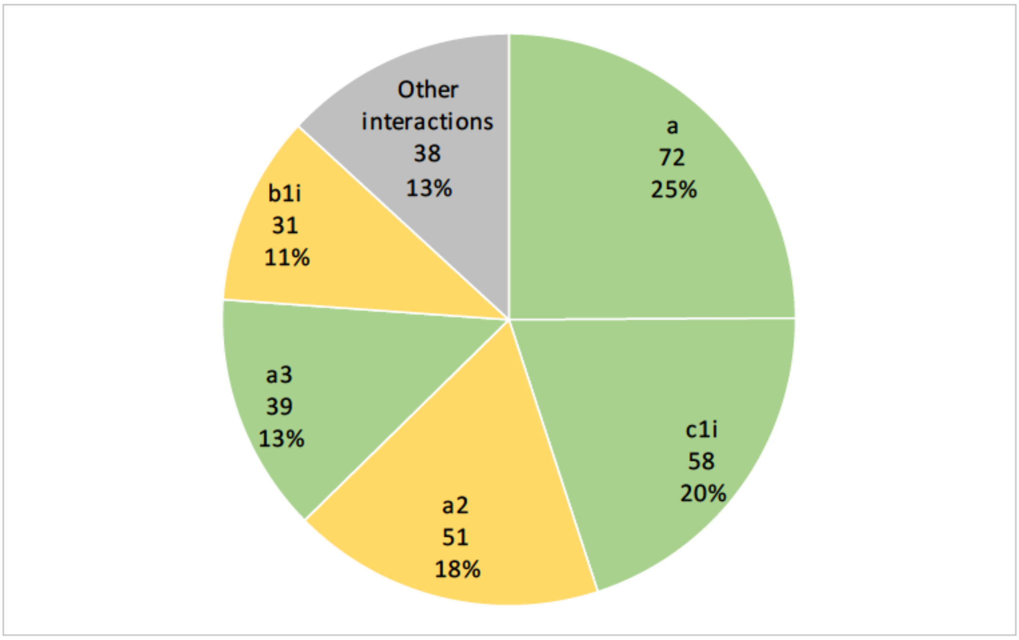
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 2.8%	a 24.9%	b1i 10.7%	b1ii 2.4%	c1i 20.1%	c1ii 1.0%
At junction edge	a2 17.6%		b2i 1.4%	b2ii 0.7%	c2i 2.4%	c2ii 2.4%
Not yet at junction	a3 13.5%		b3i 0.0%	b3ii 0.0%	c3i 0.0%	c3ii 0.0%
Sub-totals	**58.8%**		**15.2%**		**26.0%**	

n = 289

Table 3.15: Most common pedestrian / driver interactions at Site 7: Upper Tooting Road / Stapleton Road

Rank	Interaction	Count	%
1	a: Pedestrian doesn't modify behaviour	72	24.9%
2	c1i: Ped continues to cross	58	20.1%
3	a2: Ped has to modify behaviour, e.g. check step, divert	51	17.6%
4	a3: Ped waits	39	13.5%
5	b1i: Ped continues to cross	31	10.7%
	Sum of top 5 interactions	**251**	**86.9%**

Figure 3.39: Most common pedestrian / driver interactions at Site 7: Upper Tooting Road / Stapleton Road



Key

- a: Pedestrian doesn't modify behaviour
- c1i: Ped continues to cross
- a2: Ped has to modify behaviour, e.g. check step, divert
- a3: Ped waits
- b1i: Ped continues to cross

Cyclist / driver interactions at Site 7: Upper Tooting Road / Stapleton Road

3.30 Only eight cyclist / driver interactions were recorded at Site 7, so the sample is insufficient to analyse on its own. An aggregate analysis of cyclist / driver interactions is shown in Section 4 under Objective 2.

4 Aggregate interactions analysis

4.1 This section of the report addresses each of the five research objectives in turn by looking at the results of the interactions analysis in aggregate and comparing differences between junctions. To reiterate, the focus of this report is on how drivers behave at continuous footways and the consequent level of risk for pedestrians and cyclists. Analysis of different pedestrian behaviour, comparison to other junction layouts, or comparative analysis of the layout prior to, and after the installation of the continuous footway are all beyond the scope of this report.

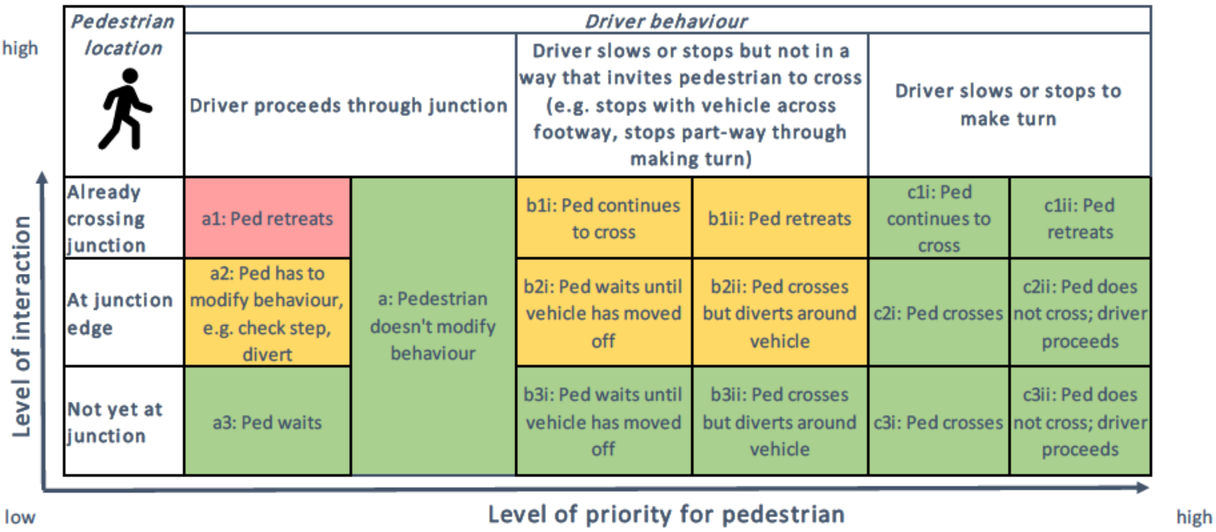
Objective 1: Analyse if drivers give way to pedestrians using the continuous footway (at each site and on average across all sites)

Drivers are more likely to give way to pedestrians who are on or very near the continuous footway

---

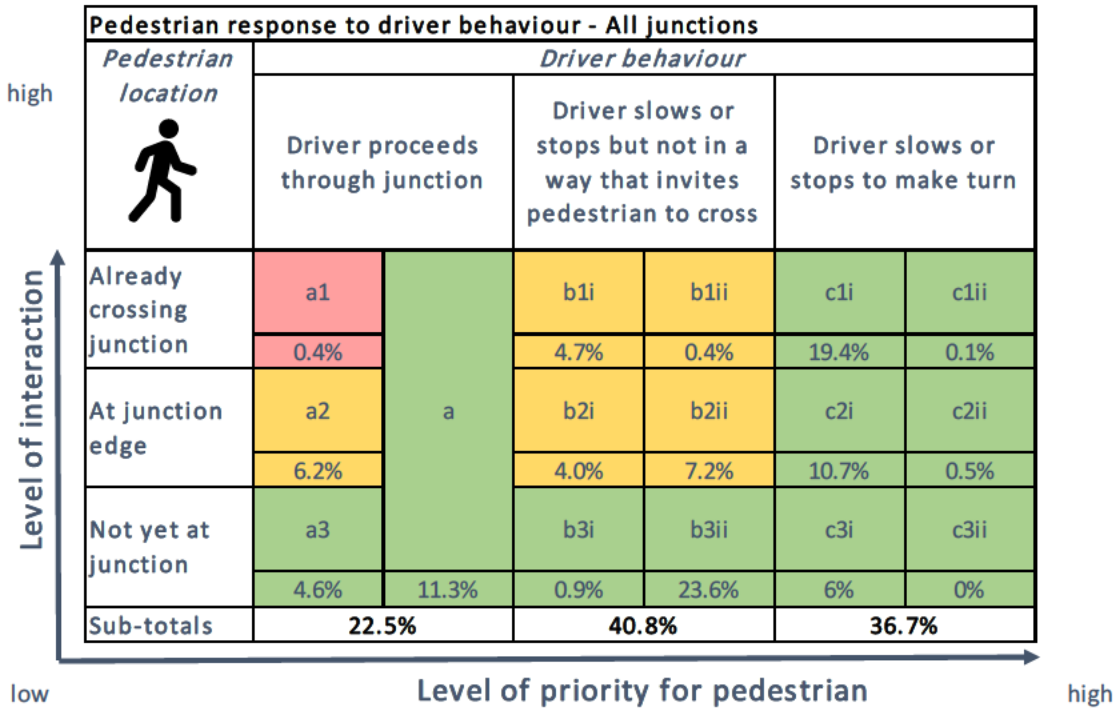
4.2 The matrix in Figure 4.2 shows the recorded interactions between pedestrians and drivers across all seven junctions. The percentage in each cell shows the proportion of each interaction type relative to the total number of recorded pedestrian / driver interactions. For descriptions of each interaction type, please refer to Figure 4.1 for the full pedestrian matrix.

Figure 4.1: Matrix of pedestrian responses to driver behaviour for reference



Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross (e.g. stops with vehicle across footway, stops part-way through making turn)		Driver slows or stops to make turn	
Already crossing junction	a1: Ped retreats	a: Pedestrian doesn't modify behaviour	b1i: Ped continues to cross	b1ii: Ped retreats	c1i: Ped continues to cross	c1ii: Ped retreats
At junction edge	a2: Ped has to modify behaviour, e.g. check step, divert		b2i: Ped waits until vehicle has moved off	b2ii: Ped crosses but diverts around vehicle	c2i: Ped crosses	c2ii: Ped does not cross; driver proceeds
Not yet at junction	a3: Ped waits		b3i: Ped waits until vehicle has moved off	b3ii: Ped crosses but diverts around vehicle	c3i: Ped crosses	c3ii: Ped does not cross; driver proceeds

Figure 4.2: Pedestrian / driver interactions at all case study junctions



Pedestrian response to driver behaviour - All junctions

Pedestrian location	*Driver behaviour* Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.4%	a 11.3%	b1i 4.7%	b1ii 0.4%	c1i 19.4%	c1ii 0.1%
At junction edge	a2 6.2%		b2i 4.0%	b2ii 7.2%	c2i 10.7%	c2ii 0.5%
Not yet at junction	a3 4.6%		b3i 0.9%	b3ii 23.6%	c3i 6%	c3ii 0%
Sub-totals	22.5%		40.8%		36.7%	

n = 3537

4.3 The most common type of interaction between pedestrians and drivers (b3ii, 23.6%) is that the driver arrives at the continuous footway before the pedestrian and slows or stops with their vehicle across the footway – generally because they are giving way to vehicles on the main road. The pedestrian then crosses by diverting behind or in front of the vehicle. In other words, the position of the vehicle means the pedestrian has to deviate from their desire line slightly. An example is shown in the screenshots in Figure 2.7.

4.4 Interactions c1i (19.4%) and c2i (10.7%) are the second and fourth most common. Both of these involve the driver slowing or stopping to give way to the pedestrian who is already crossing the continuous footway (c1i) or is about to cross it (c2i). An example of c1i is shown in Figure 2.8.

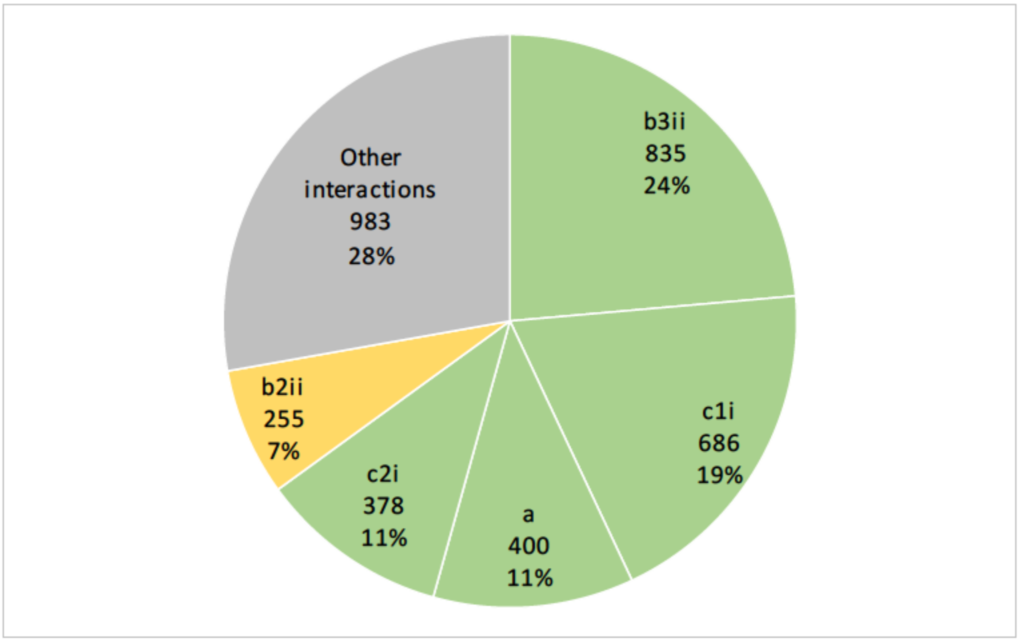
Table 4.1: Five most common pedestrian / driver interactions at all case study junctions

Rank	Interaction	Count	%
1	b3ii: Ped crosses but diverts around vehicle	835	23.6%
2	c1i: Ped continues to cross	686	19.4%
3	a: Pedestrian doesn't modify behaviour	400	11.3%
4	c2i: Ped crosses	378	10.7%
5	b2ii: Ped crosses but diverts around vehicle	255	7.2%
	Sum of top 5 interactions	**2554**	**72.2%**

4.5 The third most common interaction type is where the pedestrian does not have to modify their behaviour even though the driver proceeds through the junction (a, 11.3%). This means that the pedestrian and vehicle may pass quite close to each other, but neither needs to change their behaviour to accommodate the other, i.e. the pedestrian keeps walking at the same pace, having assessed that the car will pass before they arrive at the continuous footway, and the driver turns in or out of the junction having assessed that there is time to do so before the pedestrian reaches the continuous footway. Figure 2.5 shows an example.

4.6 The fifth most common interaction type (b2ii: pedestrian crosses but diverts around the vehicle, 7.2%) is similar to the most common in that the driver slows or stops but not in a way that invites a pedestrian to cross. The difference is in the pedestrian's location – they are at the junction edge – and this is why this falls into the yellow category of interactions because the pedestrian is having to change their behaviour more suddenly than if they were several strides back from the junction edge. These five interaction types account for nearly three quarters of observed interactions between pedestrians and vehicles – other interaction types make up the remaining 28% of interactions (Figure 4.3).

Figure 4.3: Five most common pedestrian / driver interactions at all case study junctions

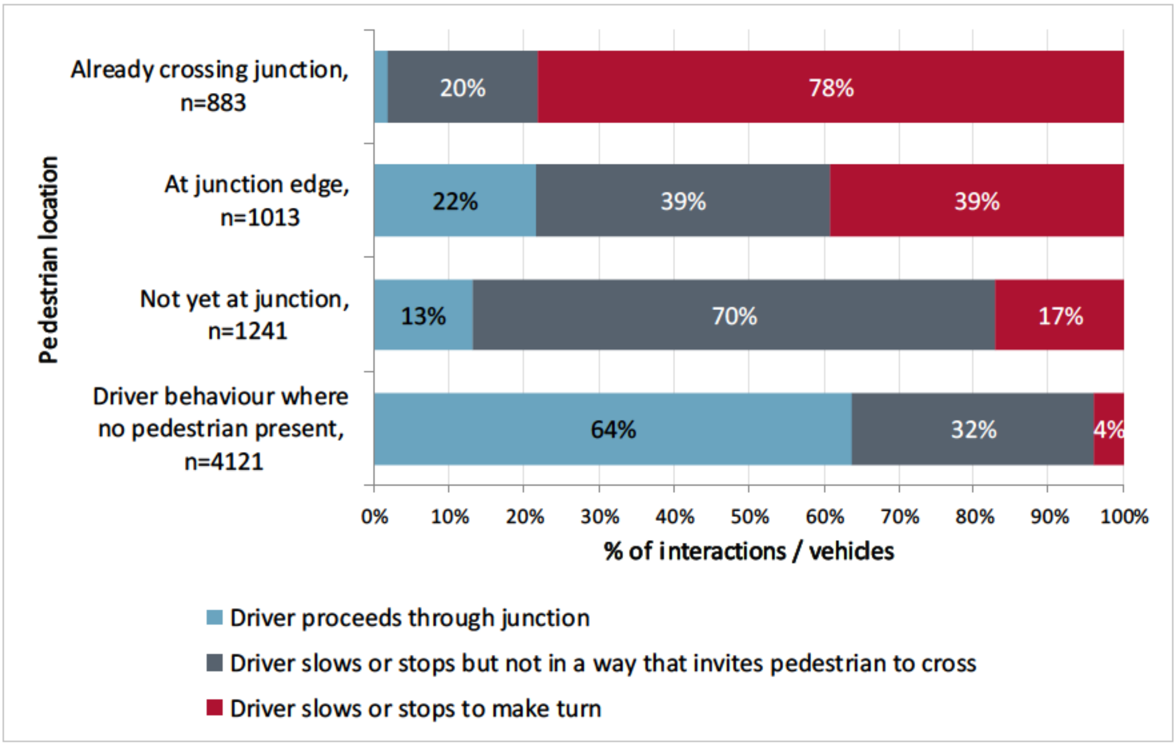


Key

- b3ii: Ped crosses but diverts around vehicle
- c1i: Ped continues to cross
- a: Pedestrian doesn't modify behaviour
- c2i: Ped crosses
- b2ii: Ped crosses but diverts around vehicle

4.7 When this data is aggregated, it is possible to see a more general perspective of how driver behaviour varies according to pedestrian location. Figure 4.4 shows that when pedestrians are already crossing the junction, 78% of drivers give way to them. When they are at the effective junction edge (i.e. where the kerb line would be if the footway were not continuous) this proportion falls to 39%. And when pedestrians are several strides back from the junction edge, 17% of drivers slow or stop to give way to pedestrians. By way of comparison, 4% of drivers slow or stop in such a way when there is no pedestrian present, and 64% proceed through the junction.

Figure 4.4: Driver behaviour according to pedestrian location



Objective 2: Analyse if drivers give way to cyclists using the major road (at each site and on average across all sites)

The vast majority of drivers give way to cyclists who are using the main road

4.8 As noted in the presentation of each case study junction, there were relatively few cyclist / driver interactions noted: only 154 in total across all seven case study junctions, compared to 3,537 pedestrian / driver interactions. This is because of the relatively small number of cyclists using the main roads and few vehicles using the side roads. In many cases, vehicles using the junction were interacting with pedestrians using the footway or vehicles using the main road rather than cyclists. This means that the data in this section should be treated with caution and any findings that can be drawn from this data are only indicative. Moreover, the majority of these interactions were observed at Site 1: Kennington Park Road / Magee Street where a stepped cycle track (part of Cycle Superhighway 7) runs adjacent to the continuous footway (Figure 4.5).

Figure 4.5: Cycle Superhighway 7 at Site 1: Kennington Park Road / Magee Street

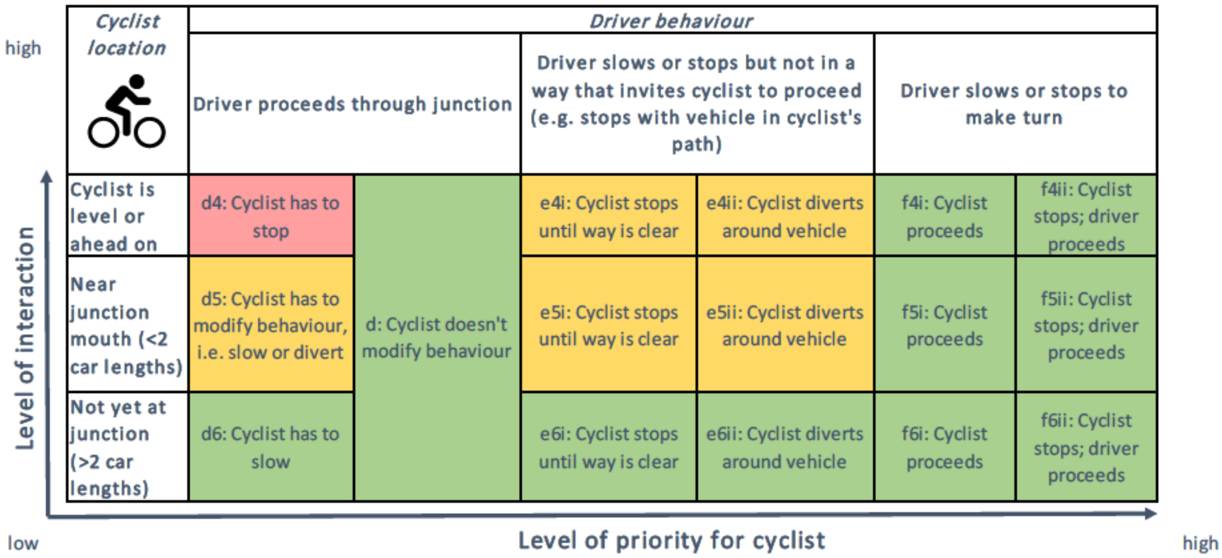
4.9 Table 4.2 shows the total number of cyclist / driver interactions observed at each case study location; it shows that 106 of the 154 observed interactions were at Site 1. It also shows that at the case study junctions, interactions between cyclists and drivers occurred for only 0.3% and 1.8% of all cyclists that passed the junction mouth. As a result of the high proportion of interactions made up by Site 1, the following presents an analysis of Site 1 separately, and aggregates the other sites where there is either an advisory cycle lane or no cycle lane on the main road. We then go on to present all seven case studies in aggregate.

Table 4.2: Total number of cyclist / driver interactions

Case study location	Number of cyclist / driver interactions	Total number of cyclists	Interactions as a % of total cyclists
1. Kennington Park Road / Magee Street	106	6653	1.59%
2. Clapham Old Town / Lydon Road	3	901	0.33%
3. Clapham Old Town / Grafton Square (north of Scout Lane)	15	857	1.75%
4. Clapham Old Town / Grafton Square (south of Polygon)	4	825	0.48%
5. Coldharbour Lane / Cambria Road	7	1410	0.50%
6. The Pavement / Bromell's Road	11	1181	0.93%
7. Upper Tooting Road / Stapleton Road	8	2573	0.31%
Totals	**154**	**14,400**	**1.07%**

4.10 For descriptions of each interaction type, please refer to for the full cyclist matrix shown in Figure 4.6 for reference.

Figure 4.6: Matrix of cyclist / driver interactions for reference



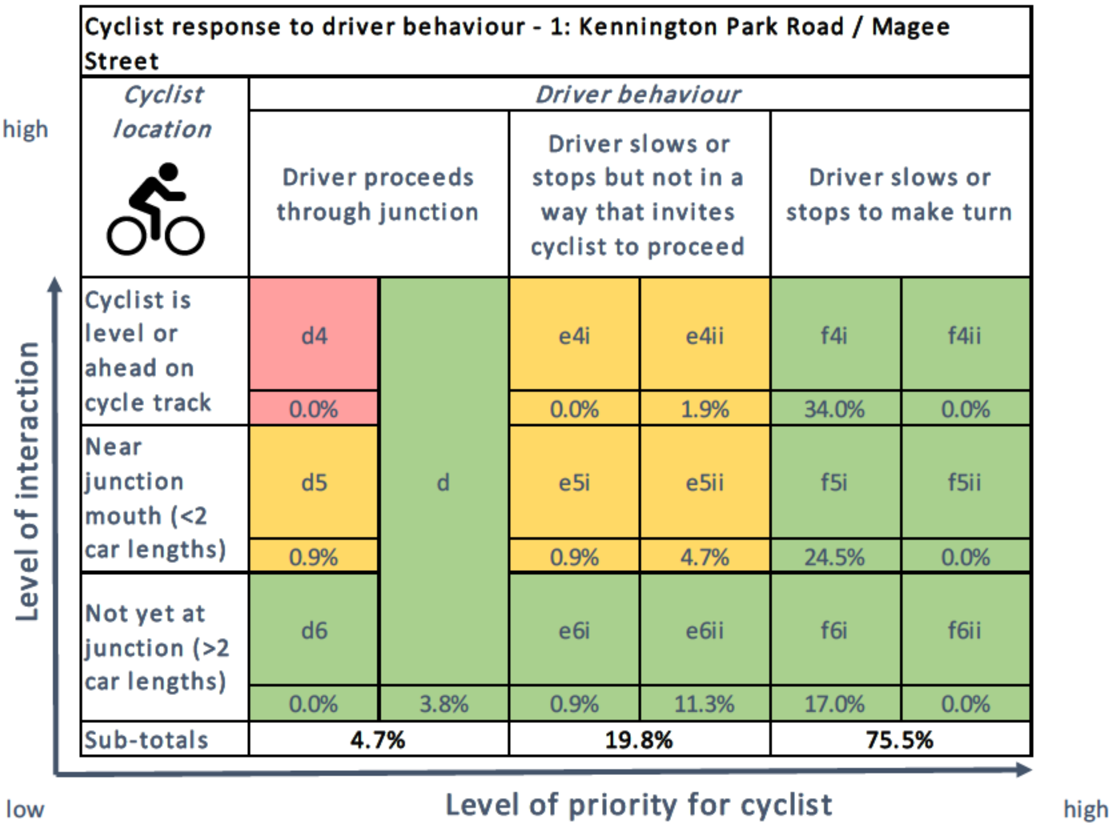
Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed (e.g. stops with vehicle in cyclist's path)		Driver slows or stops to make turn	
Cyclist is level or ahead on	d4: Cyclist has to stop	d: Cyclist doesn't modify behaviour	e4i: Cyclist stops until way is clear	e4ii: Cyclist diverts around vehicle	f4i: Cyclist proceeds	f4ii: Cyclist stops; driver proceeds
Near junction mouth (<2 car lengths)	d5: Cyclist has to modify behaviour, i.e. slow or divert		e5i: Cyclist stops until way is clear	e5ii: Cyclist diverts around vehicle	f5i: Cyclist proceeds	f5ii: Cyclist stops; driver proceeds
Not yet at junction (>2 car lengths)	d6: Cyclist has to slow		e6i: Cyclist stops until way is clear	e6ii: Cyclist diverts around vehicle	f6i: Cyclist proceeds	f6ii: Cyclist stops; driver proceeds

1. Kennington Park Road / Magee Street

4.11 *Please note this is the same data as presented in the case study profile of Site 1 in Section 3.*

4.12 At Site 1, most drivers slow or stop to give way to cyclists: interaction types f4i, f5i, f6i total 75.5% of interactions between them – all of which involve drivers slowing or stopping to make their turn as the cyclist proceeds. 19.8% of drivers stop at the junction but in a way that means cyclists need to divert or change their behaviour, and 4.7% of drivers proceed through the junction.

Figure 4.7: Cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street



Cyclist response to driver behaviour - 1: Kennington Park Road / Magee Street

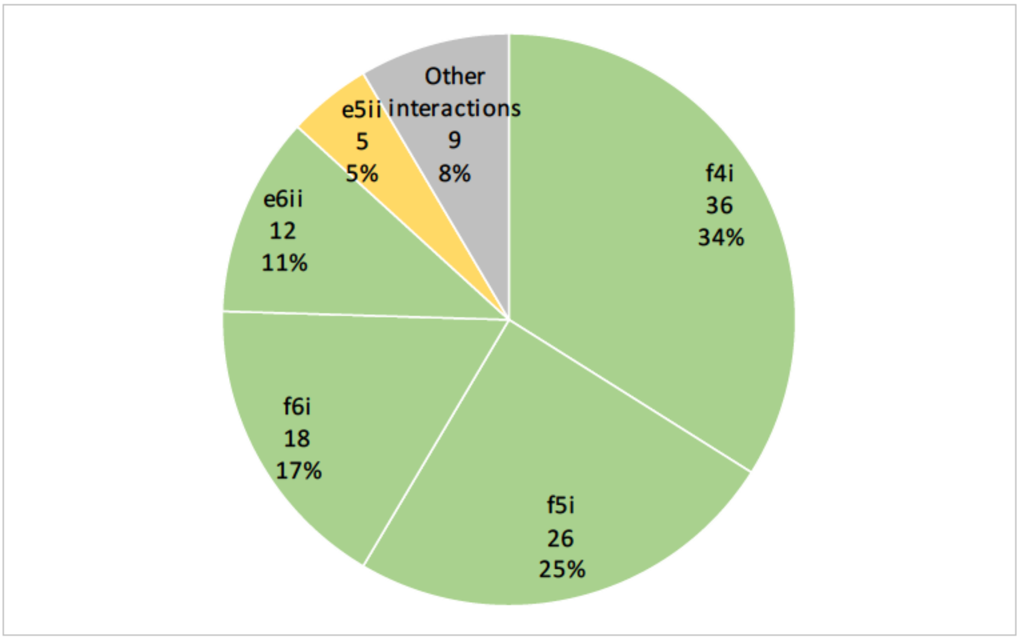
Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed		Driver slows or stops to make turn	
Cyclist is level or ahead on cycle track	d4 0.0%	d	e4i 0.0%	e4ii 1.9%	f4i 34.0%	f4ii 0.0%
Near junction mouth (<2 car lengths)	d5 0.9%		e5i 0.9%	e5ii 4.7%	f5i 24.5%	f5ii 0.0%
Not yet at junction (>2 car lengths)	d6 0.0%	3.8%	e6i 0.9%	e6ii 11.3%	f6i 17.0%	f6ii 0.0%
Sub-totals	**4.7%**		**19.8%**		**75.5%**	

n = 106

Table 4.3: Most common cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street

Rank	Interaction	Count	%
1	f4i: Cyclist proceeds	36	34.0%
2	f5i: Cyclist proceeds	26	24.5%
3	f6i: Cyclist proceeds	18	17.0%
4	e6ii: Cyclist diverts around vehicle	12	11.3%
5	e5ii: Cyclist diverts around vehicle	5	4.7%
	Sum of top 5 interactions	**97**	**91.5%**

Figure 4.8: Most common cyclist / driver interactions at Site 1: Kennington Park Road / Magee Street



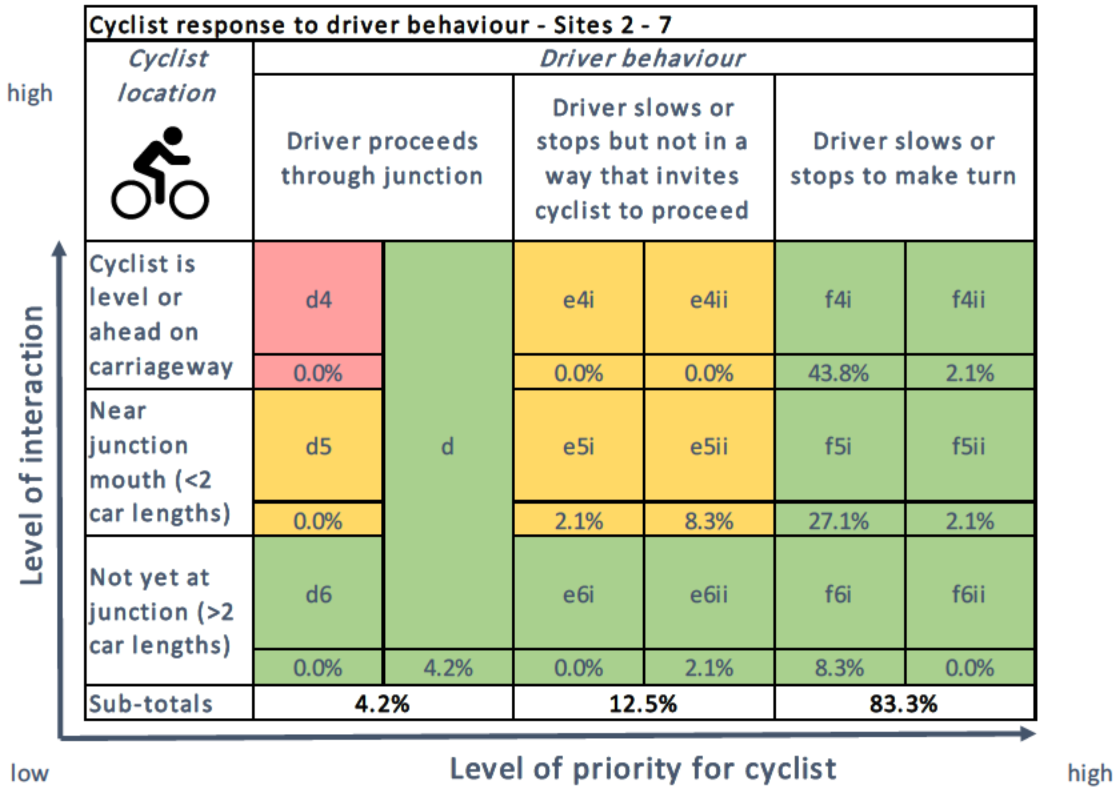
Key

- f4i: Cyclist proceeds
- f5i: Cyclist proceeds
- f6i: Cyclist proceeds
- e6ii: Cyclist diverts around vehicle
- e5ii: Cyclist diverts around vehicle

Case study locations 2 – 7

4.13 The pattern of cyclist / driver interactions at Sites 2 – 7 are broadly similar to Site 1. Most drivers give way to cyclists using the main road: 83.3% of interactions and f4i, f5i, f6i interactions make up 79.2% (compared to 75.5% at Site 1). 43.8% of interactions are drivers giving way to cyclists who are level with or ahead of the junction mouth (f4i), followed by 27.1% of drivers who give way to cyclists who are less than two car lengths away from the junction mouth (f5i) and 8.3% for cyclists who are more than two car lengths away from the junction mouth. The fourth most common interaction type is the driver slowing or stopping but not in a way that invites cyclists to proceed when cyclists are less than two car lengths away from the junction mouth (e5ii). And the fifth most common interaction type is the driver proceeds but the cyclist does not have to modify their behaviour (d). There is a small variety of interactions as the top five account for 91.7% of all interactions, and the sample is small for these junctions (48).

Figure 4.9: Cyclist / driver interactions at Sites 2-7



Cyclist response to driver behaviour - Sites 2 - 7

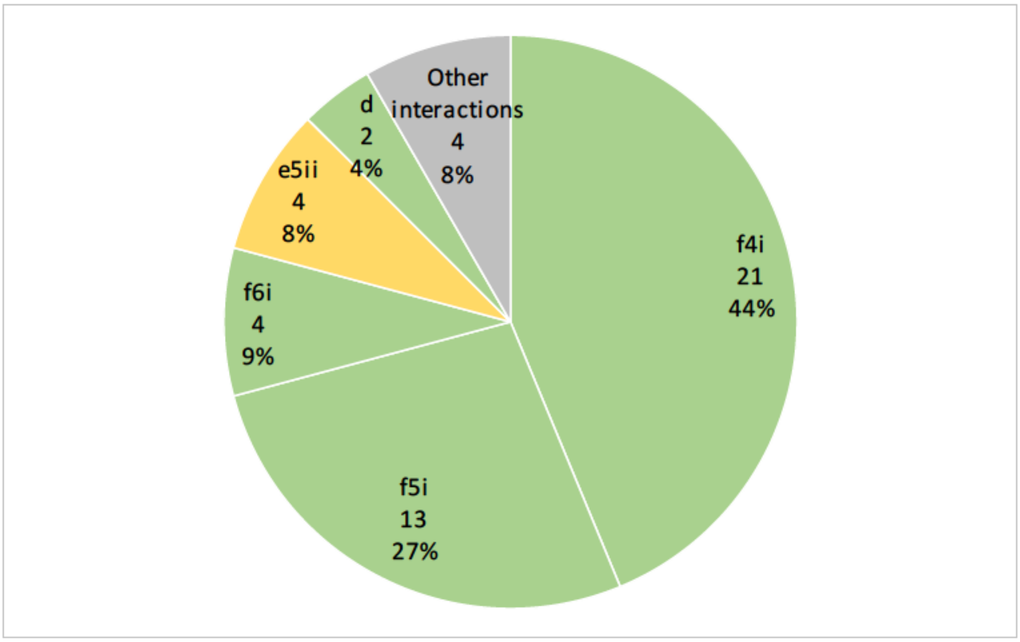
Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed		Driver slows or stops to make turn	
Cyclist is level or ahead on carriageway	d4 0.0%	d 4.2%	e4i 0.0%	e4ii 0.0%	f4i 43.8%	f4ii 2.1%
Near junction mouth (<2 car lengths)	d5 0.0%		e5i 2.1%	e5ii 8.3%	f5i 27.1%	f5ii 2.1%
Not yet at junction (>2 car lengths)	d6 0.0%		e6i 0.0%	e6ii 2.1%	f6i 8.3%	f6ii 0.0%
Sub-totals	4.2%		12.5%		83.3%	

n = 48

Table 4.4: Most common cyclist / driver interactions at Sites 2-7

Rank	Interaction	Count	%
1	f4i: Cyclist proceeds	21	43.8%
2	f5i: Cyclist proceeds	13	27.1%
3	f6i: Cyclist proceeds	4	8.3%
4	e5ii: Cyclist diverts around vehicle	4	8.3%
5	d: Cyclist doesn't modify behaviour	2	4.2%
	Sum of top 5 interactions	**44**	**91.7%**

Figure 4.10: Most common cyclist / driver interactions at Sites 2-7



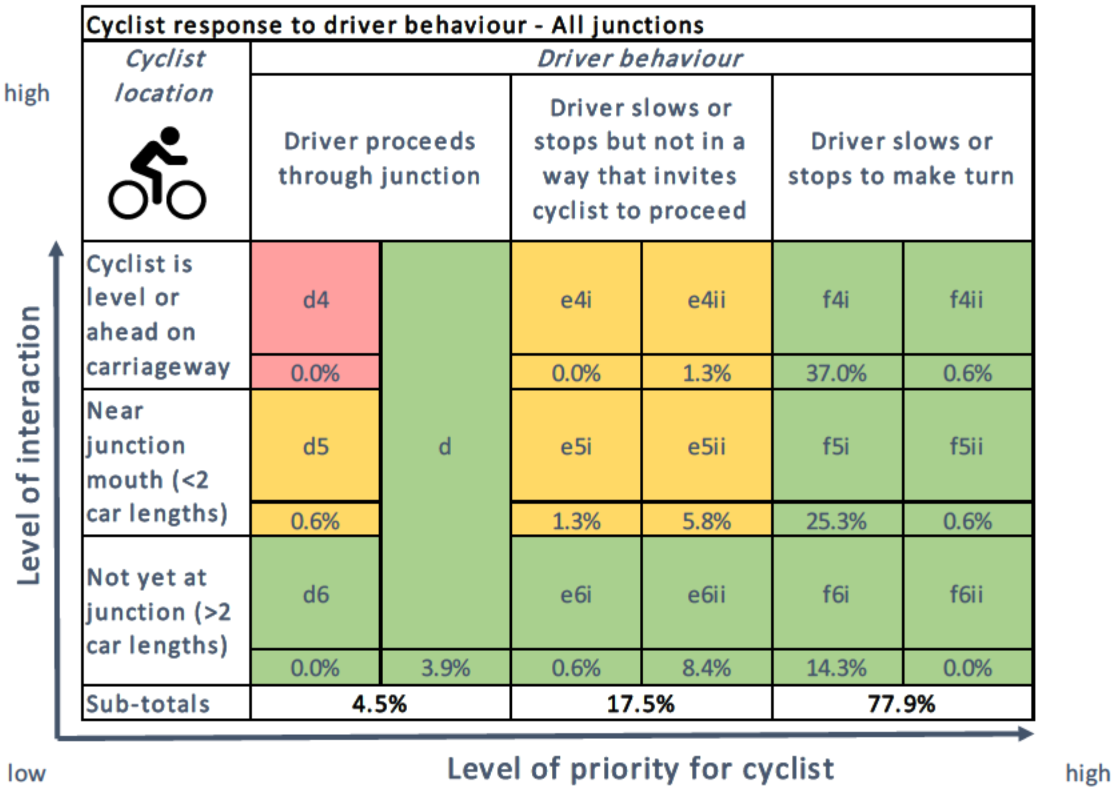
Key

- f4i: Cyclist proceeds
- f5i: Cyclist proceeds
- f6i: Cyclist proceeds
- e5ii: Cyclist diverts around vehicle
- d: Cyclist doesn't modify behaviour

Cyclist / driver interactions at all case study junctions

4.14 The interaction matrix in Figure 4.11 shows all cyclist / driver interactions at all case study junctions. It shows the percentage of each interaction type among all cyclist / driver interactions. When interpreting these results, the reader should consider the proportion of the results that come from Site 1, although the previous analysis showed that the pattern of interactions is similar at Sites 2-7 as at Site 1.

Figure 4.11: Cyclist / driver interactions at all case study junctions



Cyclist response to driver behaviour - All junctions						
Cyclist location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites cyclist to proceed		Driver slows or stops to make turn	
Cyclist is level or ahead on carriageway	d4 0.0%	d 3.9%	e4i 0.0%	e4ii 1.3%	f4i 37.0%	f4ii 0.6%
Near junction mouth (<2 car lengths)	d5 0.6%		e5i 1.3%	e5ii 5.8%	f5i 25.3%	f5ii 0.6%
Not yet at junction (>2 car lengths)	d6 0.0%		e6i 0.6%	e6ii 8.4%	f6i 14.3%	f6ii 0.0%
Sub-totals	**4.5%**		**17.5%**		**77.9%**	

n = 154

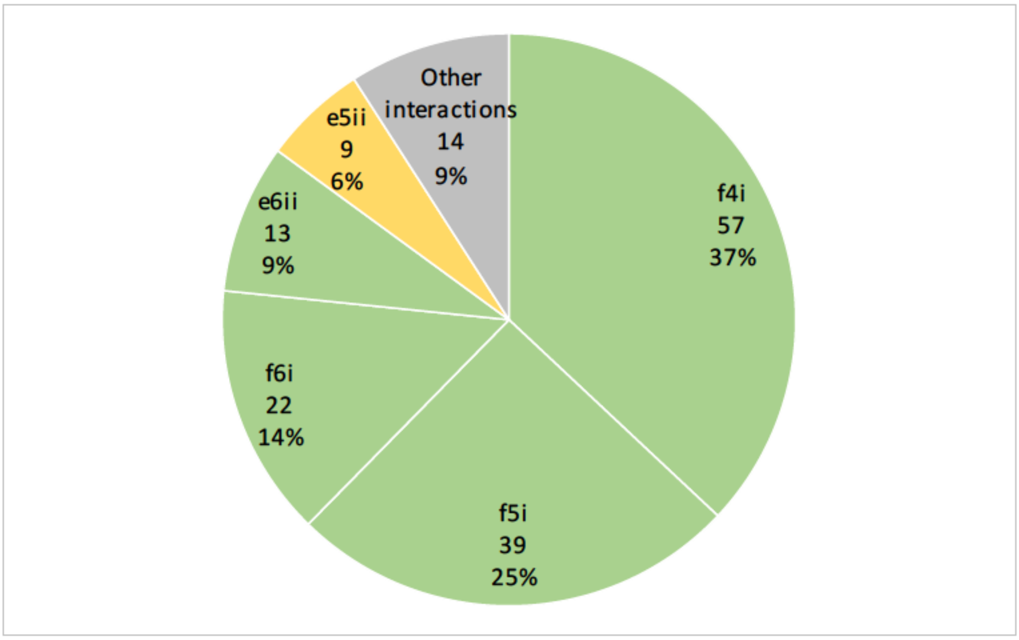
4.15 The three most common interactions all involve the driver slowing or stopping to give way to the cyclist who proceeds across the junction mouth. 37% of interactions were f4i where the cyclist is already passing the junction mouth and the driver gives way to them. An example is shown in the screenshots in Figure 2.11. 25.3% were f5i where the cyclist is near the junction mouth – less than two car lengths away – and 14.3% of interactions were f6i where the cyclist is more than two car lengths from the junction mouth.

Table 4.5: Most common cyclist / driver interactions at all case study junctions

Rank	Interaction	Count	%
1	f4i: Cyclist proceeds	57	37.0%
2	f5i: Cyclist proceeds	39	25.3%
3	f6i: Cyclist proceeds	22	14.3%
4	e6ii: Cyclist diverts around vehicle	13	8.4%
5	e5ii: Cyclist diverts around vehicle	9	5.8%
	Sum of top 5 interactions	**140**	**90.9%**

4.16 The fourth and fifth most common types of interaction with cyclists involve the cyclist having to divert because the driver has stopped but not in a way that gives priority to the cyclist. An example is shown in Section 2 in Figure 2.12. The top 5 interactions account for 90.9% of all interactions, so there is not a great deal of variety of interactions.

Figure 4.12: Most common cyclist / driver interactions at all case study junctions

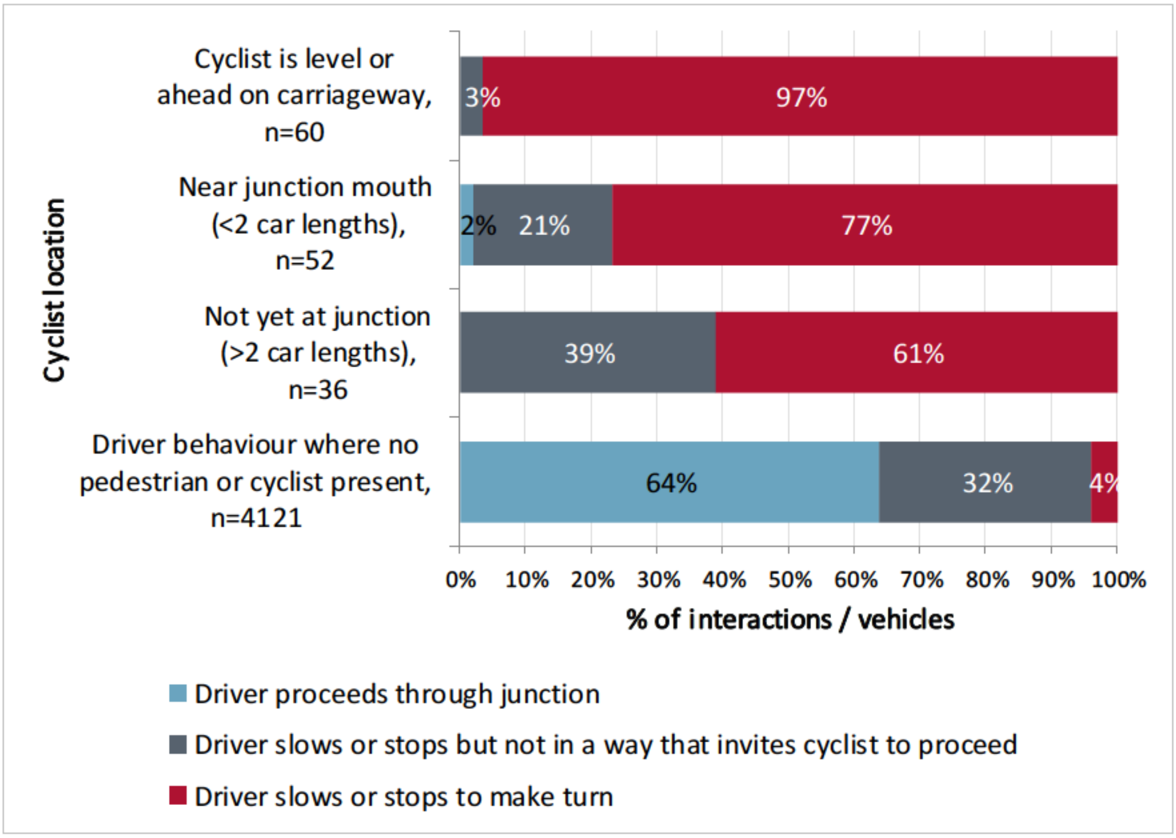


Key

- f4i: Cyclist proceeds
- f5i: Cyclist proceeds
- f6i: Cyclist proceeds
- e6ii: Cyclist diverts around vehicle
- e5ii: Cyclist diverts around vehicle

4.17 When this data is aggregated, it is possible to see that the majority of drivers give way to cyclists using the main road. 97% of drivers do so when the cyclist is level with the junction mouth, 77% when near the junction mouth and 61% when the cyclist is not yet at the junction mouth (Figure 4.13). Generally, drivers appear to give way to cyclists using the main road more than they give way to pedestrians using the continuous footway. It can be surmised that giving way to cyclists using the main road is essentially the same behaviour as giving way to any vehicles using the main road, which a driver would have to do at any normal priority junction, while a continuous footway presents drivers with a new junction layout when interacting with pedestrians.

Figure 4.13: Driver behaviour according to cyclist location



Objective 3: Evaluate the effect of different volumes of pedestrians or cyclists on driver behaviour

Drivers are more likely to give way to pedestrians when pedestrian volumes are higher, however this relationship varies by junction type

4.18 To address this objective, we will look at instances where volumes of pedestrians and drivers vary – between junctions and over time – to understand if there are significant differences in driver behaviour.

4.19 Given the small sample of cyclist / driver interactions, it is not possible to draw conclusions for this objective as we would need to analyse subsets of an already small sample.

Effect of the total number of pedestrians on driver behaviour

4.20 We assessed driver behaviour at each case study location against the total number of pedestrians counted across the three-day observation period. The busiest location was Site 6: The Pavement / Bromell's Road with 26,098 pedestrians counted, while the quietest location was Site 5: Coldharbour Lane / Cambria Road; only 3,666 pedestrians were counted.

Figure 4.14: The proportion of drivers who give way according to the total number of pedestrians

Junction type	
🟩	One-way out
●	One-way out cycle track
▲	One-way in
◆	Two-way

4.21 Figure 4.14 indicates that drivers are more likely to give way to pedestrians at junctions with a higher flow of pedestrians. 46% of drivers give way at Site 6 (the busiest) compared to 16%

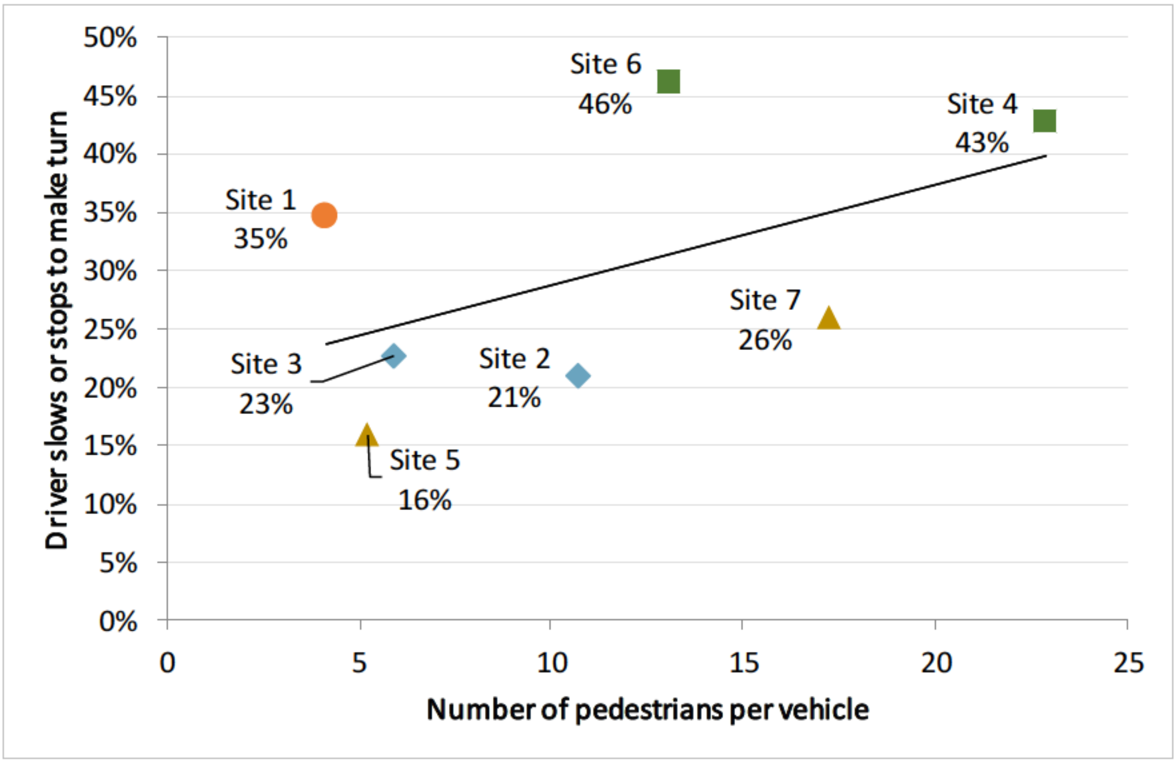
who give way at Site 5 (the quietest). However, when the role of junction type is considered, the correlation is weaker; junction type seems to have a marked effect on driver behaviour. Junctions where it is only possible to turn out of the side road (green squares and orange circle) have the highest proportion of drivers giving way; Site 1 is the second quietest with 6,024 pedestrians, however it has the third highest proportion of drivers giving way to pedestrians. By contrast, at one-way in junctions (yellow triangles) fewer drivers give way to pedestrians despite Site 7 having the third highest flows of pedestrians. It does appear that, when each junction type is looked at in isolation, i.e. looking at one junction type, higher pedestrian volumes mean drivers are more likely to give way to pedestrians, although the sample is limited as there are only two or three examples of each junction type.

4.22 We continue to consider the role of junction type in the context of pedestrian volumes within this Objective – see below - and also provide more detail in Objective 4.

Effect of the relative volume of pedestrian to drivers on driver behaviour

4.23 Using the count data for each case study junction, we calculated the number of pedestrians per vehicle at each junction over the whole three-day observation period. The lowest number of pedestrians per vehicle was 4.1 at Site 1: Kennington Park Road / Magee Street, while the highest number of 22.9 was recorded at Site 4: Clapham Old Town / Grafton Square (south of Polygon). Figure 4.15 provides a similar analysis to that for total pedestrian numbers; however, it also takes account of vehicle flows rather than solely looking at pedestrian numbers.

Figure 4.15: The proportion of drivers who give way according to the number of pedestrians per vehicle



Junction type	
🟩	One-way out
●	One-way out cycle track
▲	One-way in
◆	Two-way

4.24 There is a positive correlation between sites with a higher number of pedestrians per vehicle. Site 4 has 22.9 pedestrians per vehicle and 43% of drivers give way, compared to Site 5 where the number is 5.2 and only 16% of vehicles give way to pedestrians. This relationship is similar to that for the previous chart, but is less strong. This suggests that driver behaviour is more influenced by the absolute number of pedestrians using a junction, rather than by relative pedestrian and vehicle volumes. It should be emphasised at this point that this finding applies in the context of the case study junctions examined – all of which have much higher relative flows of pedestrians than drivers, and very low absolute numbers of vehicles.

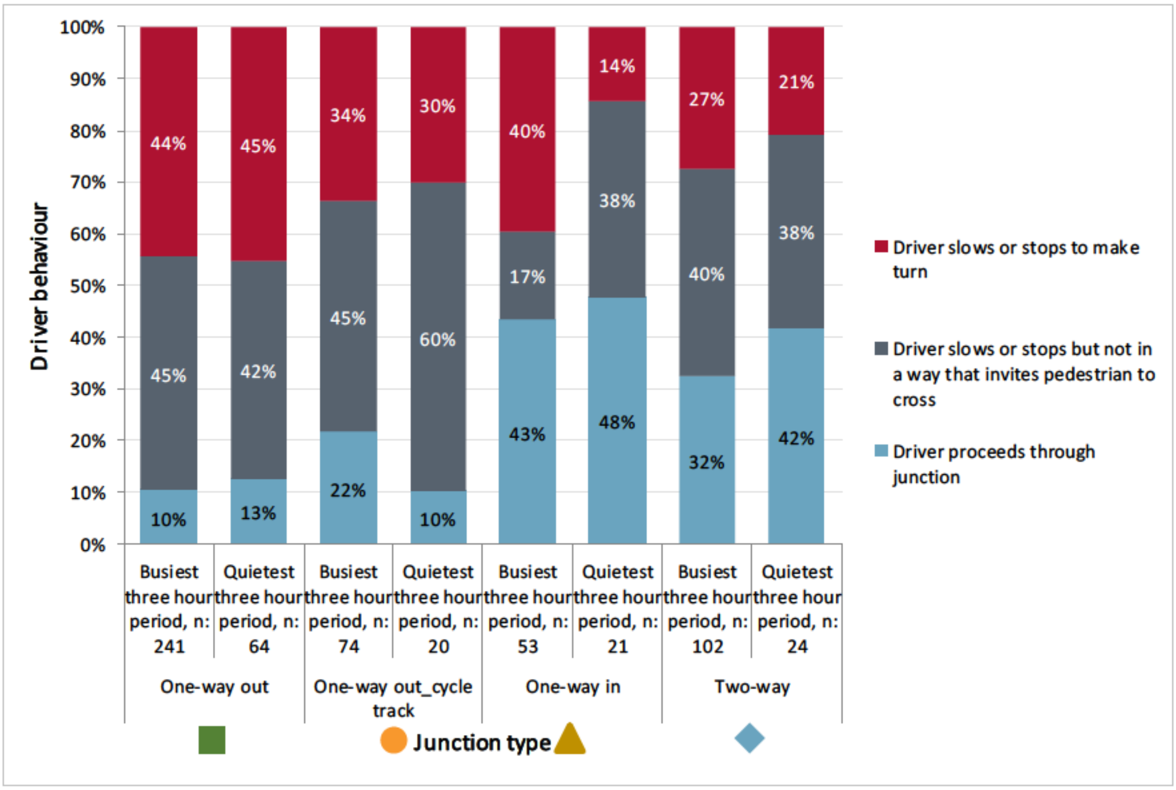
Effect of busier and quieter periods

4.25 A third way of assessing the effect of different pedestrian volumes is to look at the differences in observed driver behaviour during quieter and busier periods. We identified the quietest and busiest three-hour periods within the three-day period; this was based on the number of recorded interactions between pedestrian and drivers, a way of capturing the busiest or quietest time for both groups. We also avoided the early hours of the morning, which were technically the quietest, yet did not offer the opportunity to understand typical driver behaviour:

- Busiest three-hour period: Wednesday 1700-2000
- Quietest three-hour period: Wednesday 2000-2300

4.26 We then analysed driver behaviour in these two time periods to see if there were significant differences. Because this analysis is already on a subset of the data (i.e. three-hour time periods), the sample is insufficient to examine each site individually. This analysis is therefore by junction type (Figure 4.16). At most junctions, it seems drivers are more deferential to pedestrians in busier periods, however this pattern is not consistent across all junction types, and the small sample size means this conclusion can only be stated tentatively and would need further research to confirm. At one-way in, two-way junctions and the one way out junction with a cycle track (Site 1), drivers are less likely to give way to pedestrians during the quietest three-hour period, whereas driver behaviour remains almost the same at one-way out junctions.

Figure 4.16: Driver behaviour during the busiest and quietest three-hour periods, split by junction type



Junction type	
🟩	One-way out
●	One-way out cycle track
▲	One-way in
◆	Two-way

4.27 At one-way in junctions, 40% of drivers give way to pedestrians when busy, and only 14% when quieter. At two-way junctions 27% of drivers give way in the busy period, compared to 21% when quiet. At one-way out junctions, a high proportion of drivers (44%) at one-way out junctions give way in both time periods, while at the one-way out junction with a cycle track, 34% of drivers give way in the busy period, versus 30% in the quiet period. Due to the small sample size of this analysis, these differences were checked for statistical significance. The difference observed at one-way in junctions was found to be significant at the 95% level. While the differences at the one-way out with cycle track and two-way junctions were not.

4.28 One-way out junctions had the largest sample of the four junction types and Site 6 (one of the two one-way out junctions) was the busiest junction of all (199 of 241 during busy period, 52 of 64 during quiet period). This means that even its quiet period is almost as busy as other junctions' busy period. This could mean that there was not an effective 'quiet' period and so driver behaviour is a product of the busy-ness of this site. This would support the tentative finding that drivers are more likely to give way to pedestrians in busier periods.

Objective 4: Understand if the direction of traffic flow affects driver behaviour (i.e. one-way in or out of the priority junction, or two-way flow)

Drivers are more likely to give way to pedestrians when they are turning out of a side road, rather than turning in; and they are more likely to give way when turning left than right

4.29 We have already discussed the role of different junction types in Objective 3 and will continue this analysis in this section by comparing driver behaviour at the different junction types and by looking at the four possible turning movements.

4.30 The junction types are:

- **One-way out:**
  - 4. Clapham Old Town / Grafton Square (south of Polygon)
  - 6. The Pavement / Bromell's Road
- **One-way out with cycle track across junction mouth:**
  - 1. Kennington Park Road / Magee Street
- **One-way in:**
  - 5. Coldharbour Lane / Cambria Road
  - 7. Upper Tooting Road / Stapleton Road
- **Two-way:**
  - 2. Clapham Old Town / Lydon Road
  - 3. Clapham Old Town / Grafton Square (north of Scout Lane)

4.31 Again, due to the small sample of cyclist / driver interactions, it is only possible to analyse pedestrian / driver interactions broken down by junction type.

Driver behaviour at different junction types

4.32 We have already seen that driver behaviour appears to be different at different junction types. Figure 4.17 shows driver behaviour according to pedestrian location at each of the four junction types. It shows that generally, drivers using one-way out junctions are more likely to give way to pedestrians. When a pedestrian is already crossing the junction the following proportions of drivers give way to them:

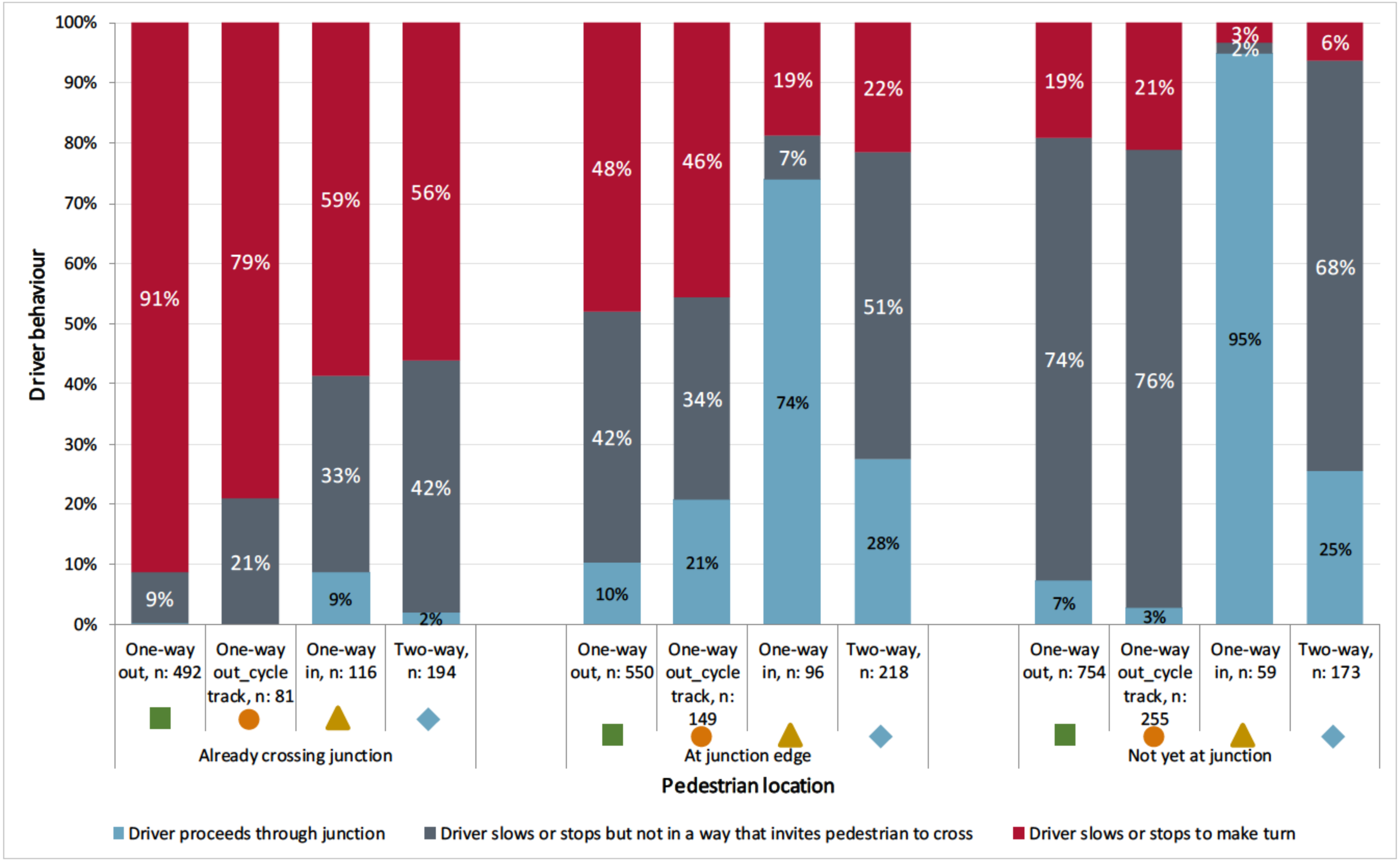
- 91% of drivers at one-way out junctions
- 78% of drivers at one-way out junctions with a cycle track
- 59% of drivers at one-way in junctions
- 56% at two-way junctions.

4.33 When the pedestrian is at the junction edge, the proportions of drivers who give way to them are lower:

- 48% at one-way out junctions
- 46% at one-way out junctions with a cycle track
- 19% at one-way in junctions
- 22% at two-way junctions.

4.34 All of the differences commented on here were found to be statistically significant.

Figure 4.17: Driver behaviour according to pedestrian location by junction type

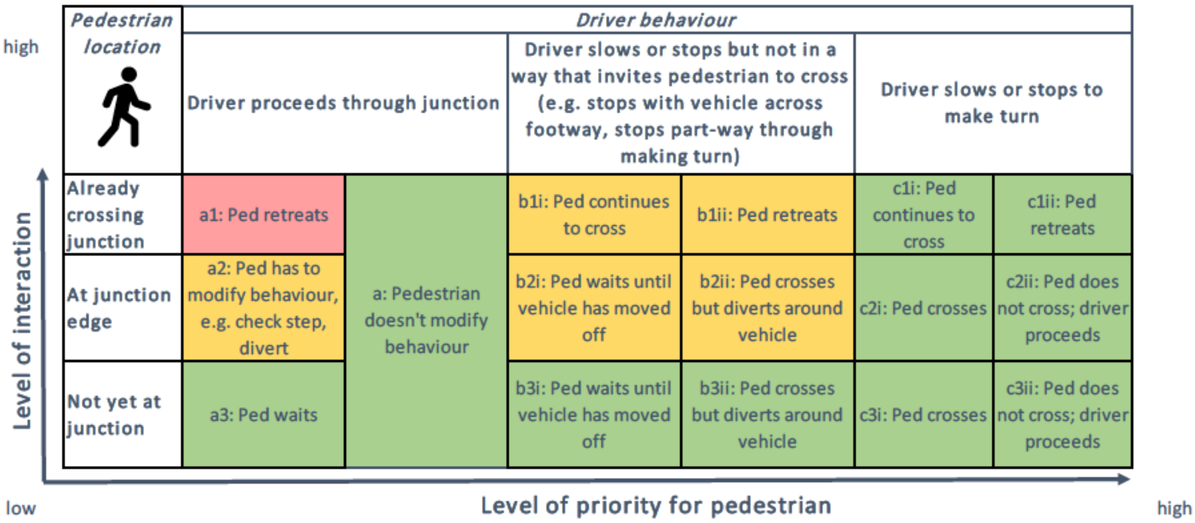


4.35 Interaction matrices for each junction type are shown in Figure 4.19; they reiterate that different junction types present different patterns. For descriptions of each interaction type, please refer to Figure 4.18 for the full pedestrian matrix.

4.36 Interactions noted at one-way out junctions tend towards the right hand side of the interaction matrix, i.e. driver slows or stops. If a pedestrian is already crossing or near the junction edge, the most common driver behaviour is to give way (c1i, c2i). If the pedestrian is not yet at the junction, drivers are most likely to proceed and stop on the footway, waiting for a gap in traffic (b3ii).

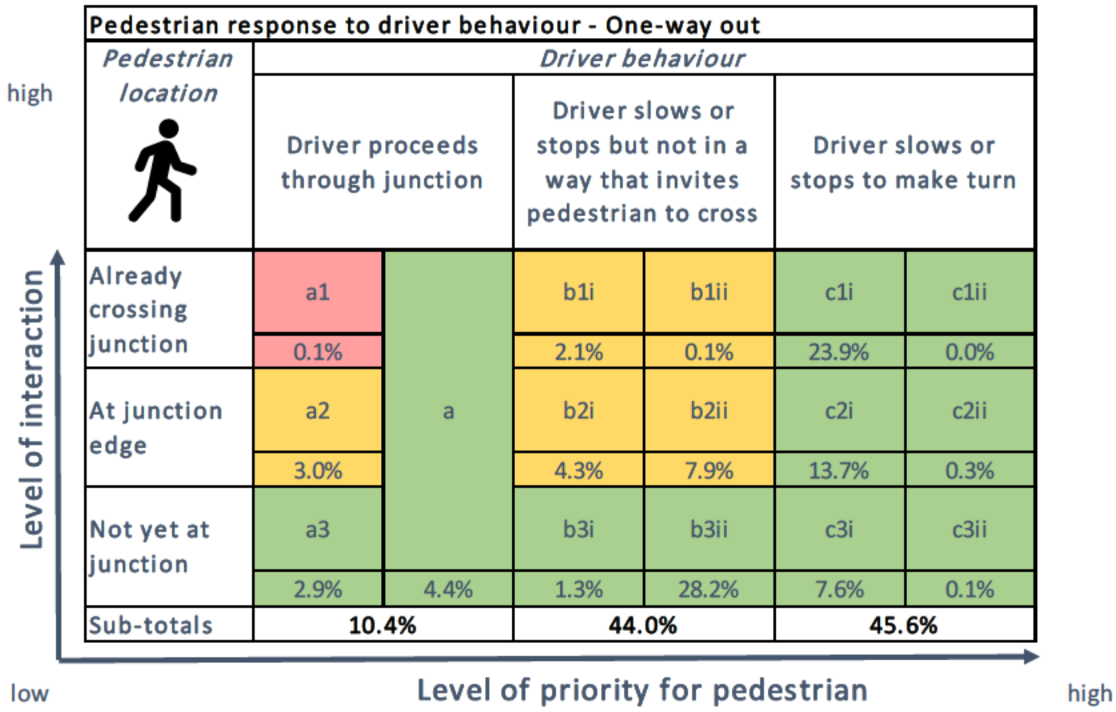
4.37 In contrast, one-way in junctions have the highest proportion of a2 and a3 interactions on the left of the matrix, where the driver proceeds and the pedestrian must modify their behaviour. Generally, at one-way in junctions, drivers tend to slow or stop only if there is already a pedestrian crossing (c1i); if there is a pedestrian at or near the junction edge, they tend to proceed (a2, a3). Two-way junctions have, perhaps unsurprisingly, a more mixed range of interactions.

Figure 4.18: Matrix of pedestrian responses to driver behaviour for reference



Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross (e.g. stops with vehicle across footway, stops part-way through making turn)		Driver slows or stops to make turn	
Already crossing junction	a1: Ped retreats	a: Pedestrian doesn't modify behaviour	b1i: Ped continues to cross	b1ii: Ped retreats	c1i: Ped continues to cross	c1ii: Ped retreats
At junction edge	a2: Ped has to modify behaviour, e.g. check step, divert		b2i: Ped waits until vehicle has moved off	b2ii: Ped crosses but diverts around vehicle	c2i: Ped crosses	c2ii: Ped does not cross; driver proceeds
Not yet at junction	a3: Ped waits		b3i: Ped waits until vehicle has moved off	b3ii: Ped crosses but diverts around vehicle	c3i: Ped crosses	c3ii: Ped does not cross; driver proceeds

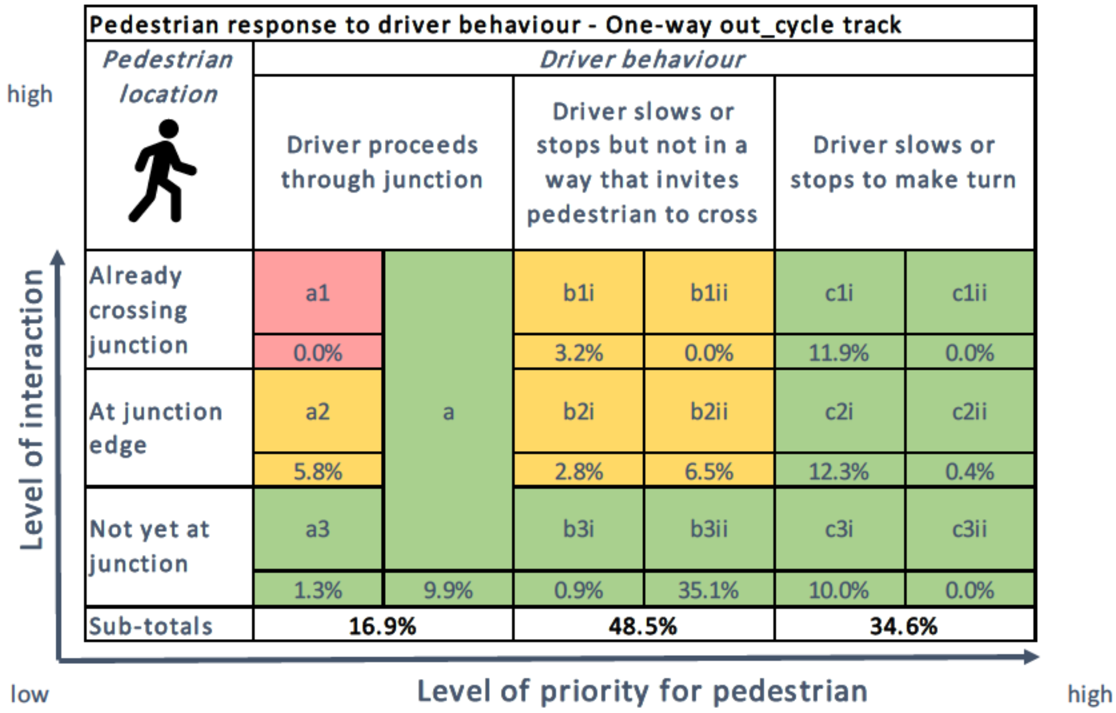
Figure 4.19: Pedestrian / driver interaction matrices by junction type



Pedestrian response to driver behaviour - One-way out

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1	a	b1i	b1ii	c1i	c1ii
	0.1%		2.1%	0.1%	23.9%	0.0%
At junction edge	a2		b2i	b2ii	c2i	c2ii
	3.0%		4.3%	7.9%	13.7%	0.3%
Not yet at junction	a3		b3i	b3ii	c3i	c3ii
	2.9%	4.4%	1.3%	28.2%	7.6%	0.1%
Sub-totals	**10.4%**		**44.0%**		**45.6%**	

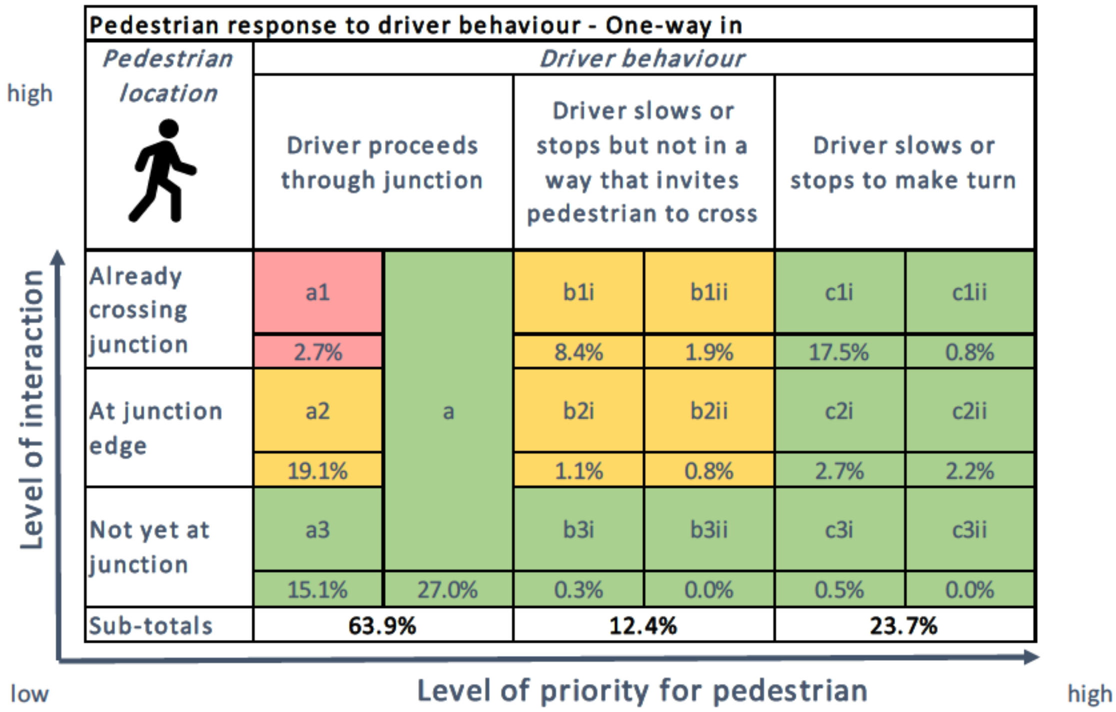
n = 1878



Pedestrian response to driver behaviour - One-way out_cycle track

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1	a	b1i	b1ii	c1i	c1ii
	0.0%		3.2%	0.0%	11.9%	0.0%
At junction edge	a2		b2i	b2ii	c2i	c2ii
	5.8%		2.8%	6.5%	12.3%	0.4%
Not yet at junction	a3		b3i	b3ii	c3i	c3ii
	1.3%	9.9%	0.9%	35.1%	10.0%	0.0%
Sub-totals	**16.9%**		**48.5%**		**34.6%**	

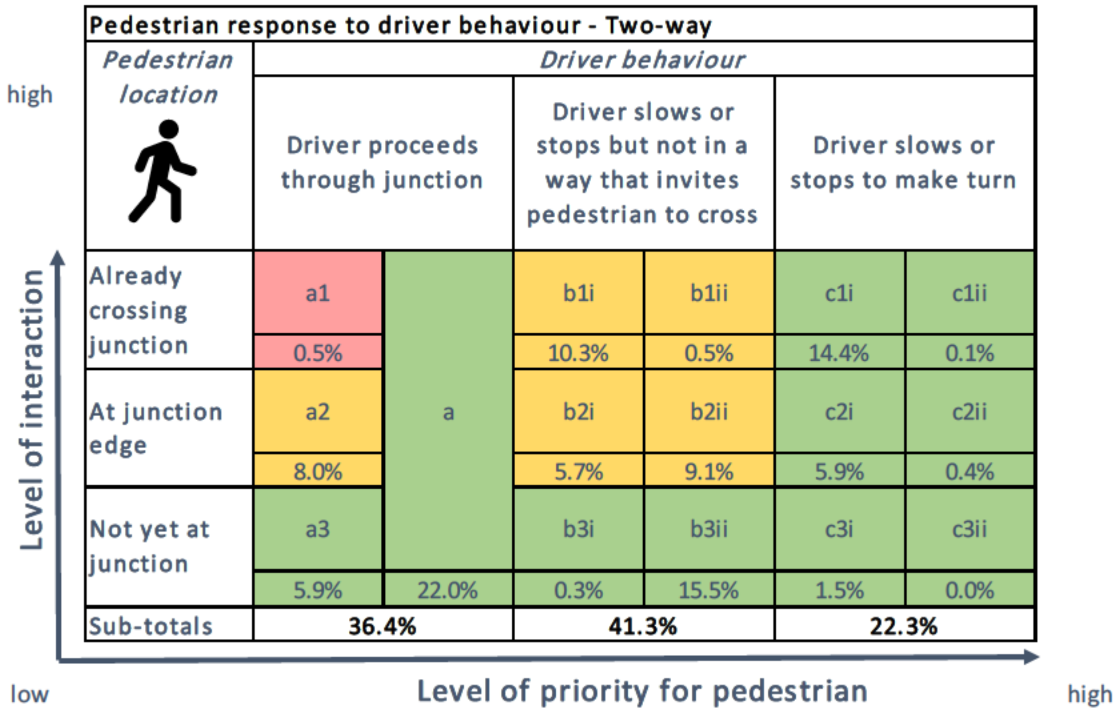
n = 538



Pedestrian response to driver behaviour - One-way in

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 2.7%	a	b1i 8.4%	b1ii 1.9%	c1i 17.5%	c1ii 0.8%
At junction edge	a2 19.1%		b2i 1.1%	b2ii 0.8%	c2i 2.7%	c2ii 2.2%
Not yet at junction	a3 15.1%	27.0%	b3i 0.3%	b3ii 0.0%	c3i 0.5%	c3ii 0.0%
Sub-totals	63.9%		12.4%		23.7%	

n = 371



Pedestrian response to driver behaviour - Two-way

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.5%	a	b1i 10.3%	b1ii 0.5%	c1i 14.4%	c1ii 0.1%
At junction edge	a2 8.0%		b2i 5.7%	b2ii 9.1%	c2i 5.9%	c2ii 0.4%
Not yet at junction	a3 5.9%	22.0%	b3i 0.3%	b3ii 15.5%	c3i 1.5%	c3ii 0.0%
Sub-totals	36.4%		41.3%		22.3%	

n = 750

Driver behaviour for different turning movements

4.38 The following presents an analysis of driver behaviour according to pedestrian location when making one of the four possible turning movements:

- Left turn out
- Right turn out
- Left turn in
- Right turn in

4.39 Figure 4.20 shows that drivers are more likely to give way to pedestrians using the continuous footway when turning out and when turning left; this applies across all pedestrian locations. They are most likely to give way when making a left turn out of the side road and least likely when making a right turn in to the side road; although there is only a slight difference in driver behaviour during left and right turn in movements. 87% of drivers give way to pedestrians who are already crossing when they are turning left out of the side road; this compares to around 57% of drivers who give way to when turning right or left in to the side road.

4.40 When the pedestrian is at the junction edge, the proportion of drivers who give way when turning left out of the junction falls to 47% and to 29% when turning right out. It falls to 22% for left turn in and 7% for right turn in. When pedestrians are not yet at the junction, 19% of drivers give way when turning left out of the side road, compared to 0% of right turn in drivers.

4.41 We hypothesise that drivers are more likely to give way when turning out of the side road as it is less busy than the main road. By contrast, drivers turning in are doing so from a busier main road, with vehicles approaching them from behind. Equally, drivers making right turns (whether in or out) may be less inclined to give way to pedestrians on the continuous footway as they have to factor in other traffic in their turn, and take advantage of potentially infrequent gaps in the traffic to proceed. Drivers turning left do not have to cross another lane of traffic.

4.42 A high proportion of drivers stop but not in a way that invites pedestrians to cross when turning out and the pedestrian is yet to arrive at the junction (74% for left turn out and 90% for right turn out). Drivers were observed proceeding on to the continuous footway because no pedestrian was on or near it. However, they would then need to stop to wait for a gap in traffic on the main road before proceeding.

4.43 Full interaction matrices for each turning movement are included in Figure 4.21. For descriptions of each interaction type, please refer to Figure 4.18 for the full pedestrian matrix They show the high proportion of b3ii (pedestrian crosses but diverts around a vehicle that is already stopped across the continuous footway) and c1i (pedestrian continues to cross as vehicle slows or stops) interactions noted for turning out movements. They also illustrate the higher number of all “a” column interactions observed for turning in movements, i.e. driver proceeding through the junction.

Figure 4.20: Driver behaviour according to pedestrian location by turning movement

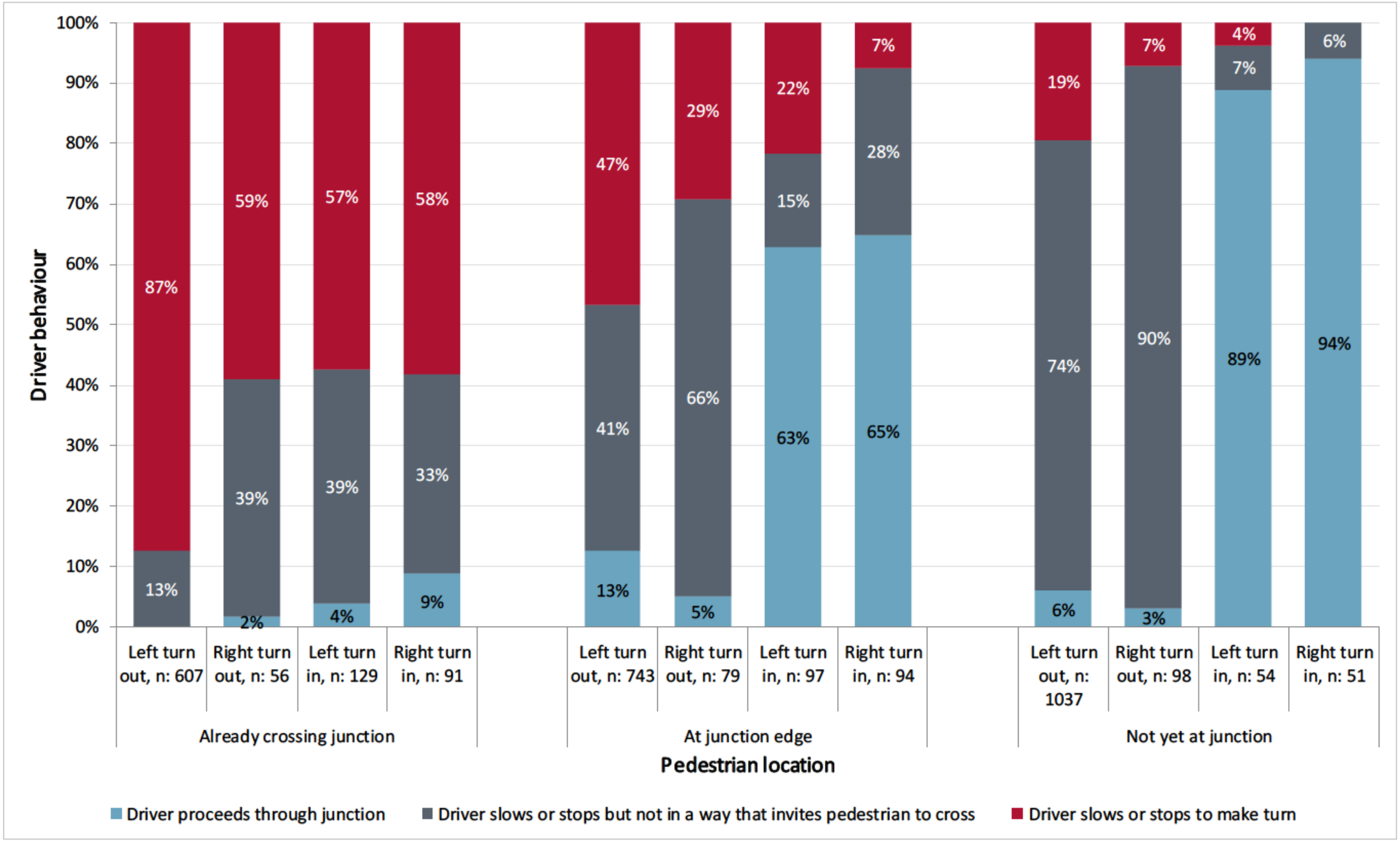
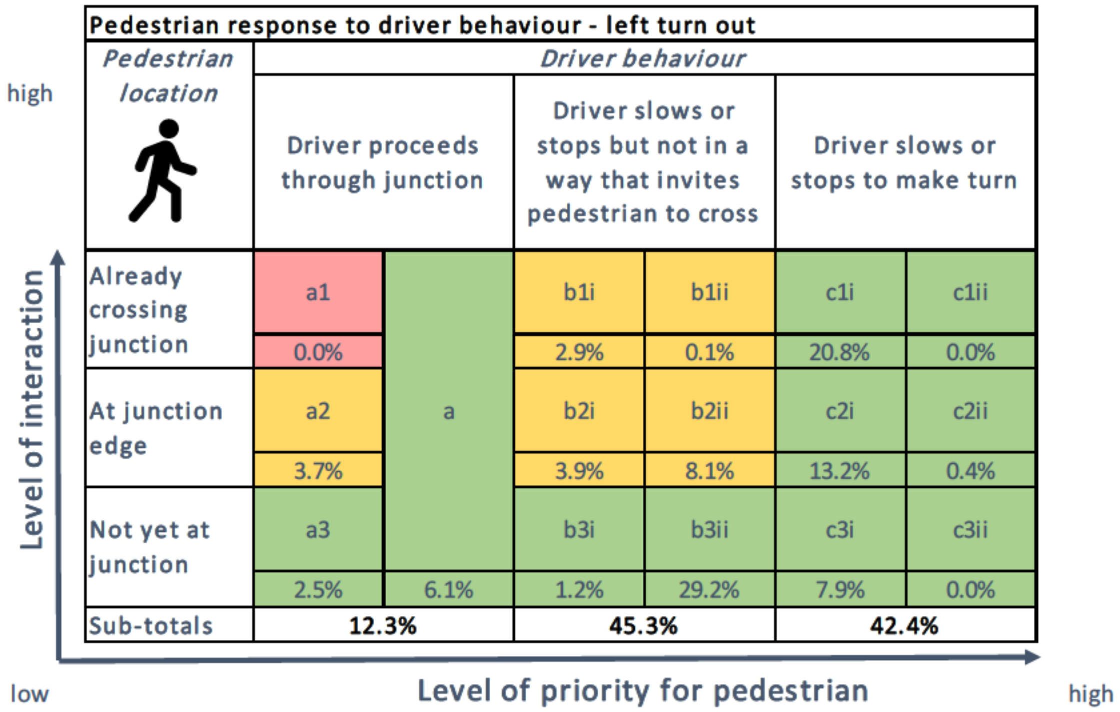


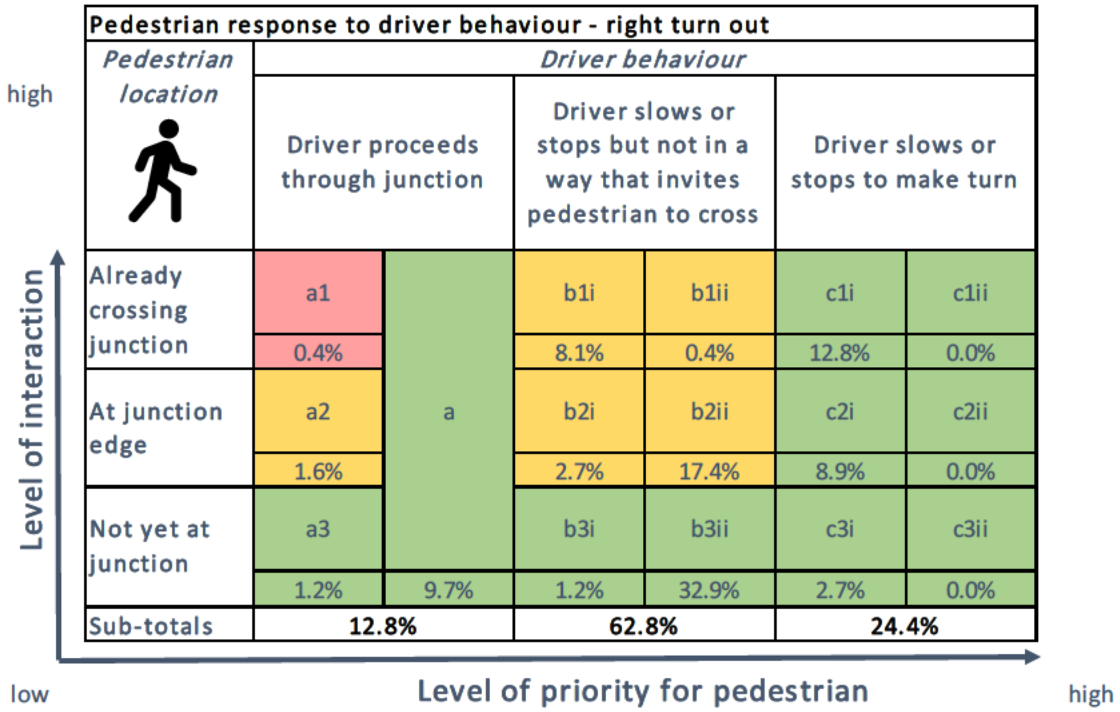
Figure 4.21: Pedestrian / driver interaction matrices by turning movement



Pedestrian response to driver behaviour - left turn out

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.0%	a	b1i 2.9%	b1ii 0.1%	c1i 20.8%	c1ii 0.0%
At junction edge	a2 3.7%		b2i 3.9%	b2ii 8.1%	c2i 13.2%	c2ii 0.4%
Not yet at junction	a3 2.5%	6.1%	b3i 1.2%	b3ii 29.2%	c3i 7.9%	c3ii 0.0%
Sub-totals	**12.3%**		**45.3%**		**42.4%**	

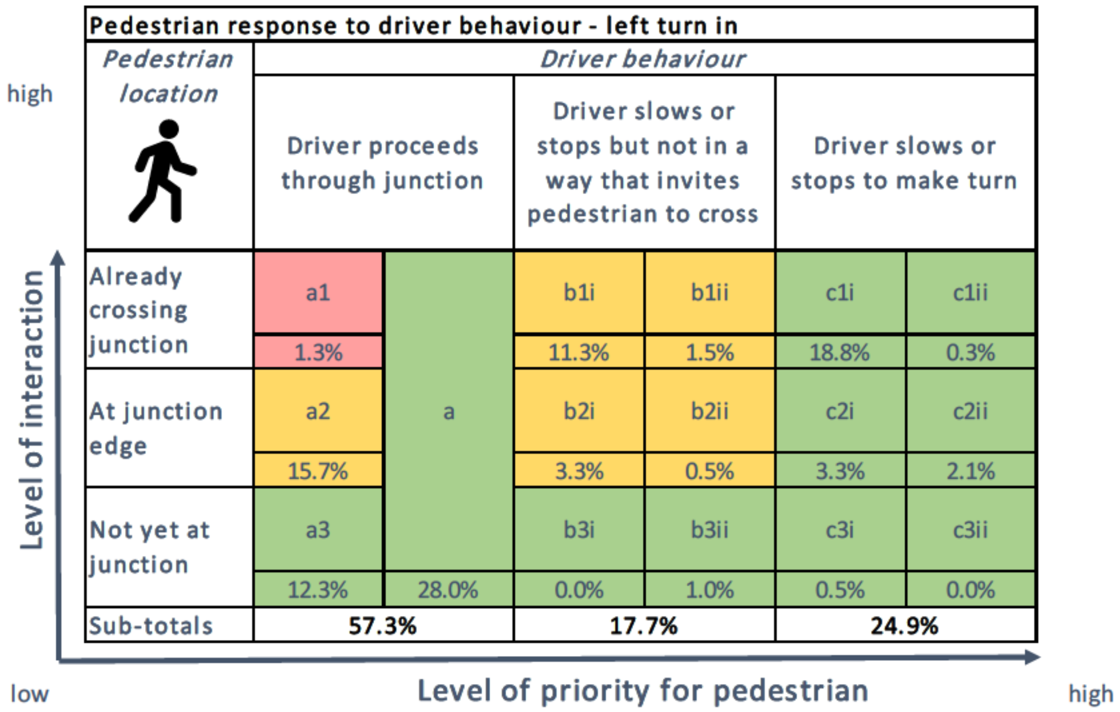
n = 2542



Pedestrian response to driver behaviour - right turn out

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.4%	a	b1i 8.1%	b1ii 0.4%	c1i 12.8%	c1ii 0.0%
At junction edge	a2 1.6%		b2i 2.7%	b2ii 17.4%	c2i 8.9%	c2ii 0.0%
Not yet at junction	a3 1.2%	9.7%	b3i 1.2%	b3ii 32.9%	c3i 2.7%	c3ii 0.0%
Sub-totals	**12.8%**		**62.8%**		**24.4%**	

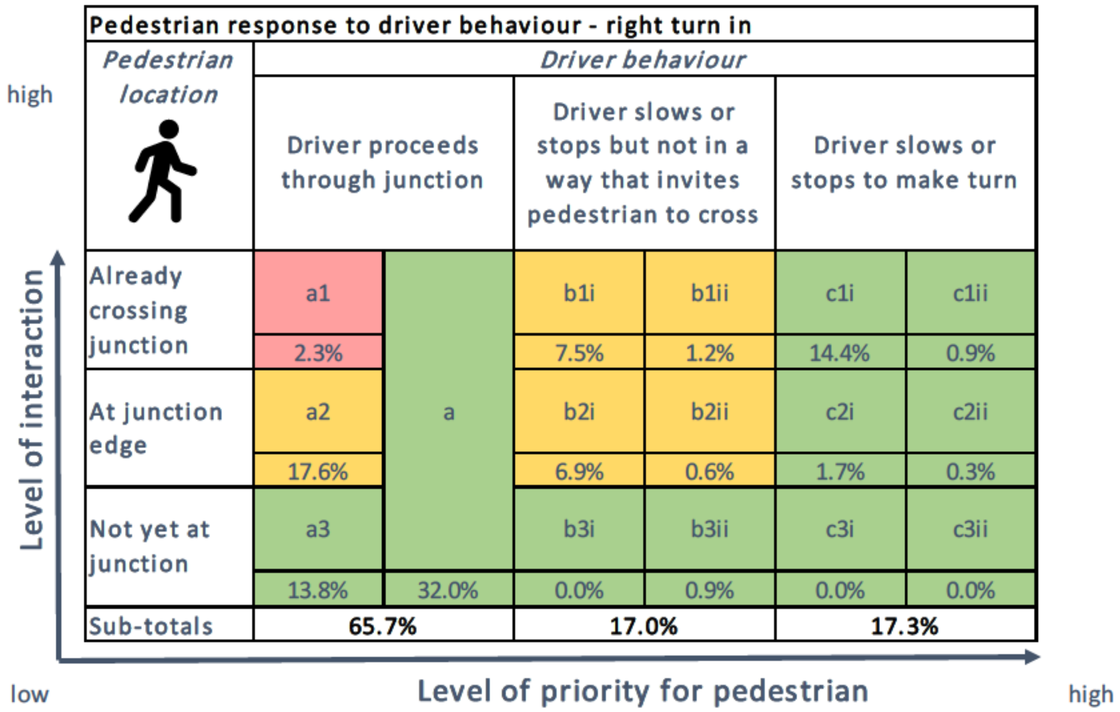
n = 258



Pedestrian response to driver behaviour - left turn in

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 1.3%	a	b1i 11.3%	b1ii 1.5%	c1i 18.8%	c1ii 0.3%
At junction edge	a2 15.7%		b2i 3.3%	b2ii 0.5%	c2i 3.3%	c2ii 2.1%
Not yet at junction	a3 12.3%	28.0%	b3i 0.0%	b3ii 1.0%	c3i 0.5%	c3ii 0.0%
Sub-totals	**57.3%**		**17.7%**		**24.9%**	

n = 389



Pedestrian response to driver behaviour - right turn in

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 2.3%	a	b1i 7.5%	b1ii 1.2%	c1i 14.4%	c1ii 0.9%
At junction edge	a2 17.6%		b2i 6.9%	b2ii 0.6%	c2i 1.7%	c2ii 0.3%
Not yet at junction	a3 13.8%	32.0%	b3i 0.0%	b3ii 0.9%	c3i 0.0%	c3ii 0.0%
Sub-totals	**65.7%**		**17.0%**		**17.3%**	

n = 347

Objective 5: Evaluate whether certain design elements and the junction's geometry influences driver behaviour and compliance with that geometry

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A ramp and give way lines set behind the continuous footway encourage drivers to slow and stop before the continuous footway

At very deep continuous footways drivers are less likely to stop at the give way markings behind the footway

Tight corner radii and restricted sightlines can slow drivers when turning, encouraging them to give way to pedestrians and cyclists

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4.44 Objective 5 provides an opportunity to bring in more qualitative findings to complement the quantitative analysis presented throughout this report. Our qualitative findings are drawn from site visits undertaken at each case study site. These visits provided the study team (which included an experienced highway engineer and urban designer) with an opportunity to assess each junction and observe road user behaviour first hand. These visits formed the basis of the site factsheets. In addition, qualitative observations were also made during the analysis of video footage. The following section is largely qualitative in its analysis, but quantitative evidence has been included where possible to support findings.

4.45 It must also be emphasised at this point that several design elements may influence behaviour at once, so it can be difficult to identify the role of a single factor among several confounding factors.

Give-way lines set behind, and ramp leading to continuous footway encourage drivers to give way in two stages

4.46 For turning out movements, a vertical deflection of a ramp on the approach to the continuous footway, coupled with the give-way line set behind the continuous footway, appear to encourage drivers to slow and stop behind the continuous footway. Drivers are used to (and obliged to in the Highway Code) slowing and stopping when they see dashed give-way markings, while the ramp provides a physical traffic calming measure to lower vehicle speed.

4.47 Many drivers were observed effectively giving way in two stages when turning out of the side road. The first was at the dashed give way line behind the footway, to allow pedestrians to cross; the second was at what can be considered the notional give way line where the side road joins the main road, to wait for a gap in traffic. The screenshots shown in Figure 4.22 illustrate this behaviour at Site 6.

Figure 4.22: Driver giving way in two stages

A red vehicle approaches the junction (far right of image) as one pedestrian is already crossing the continuous footway and two others are approaching it.

The red vehicle slows to stop at the give way line marked behind the continuous footway. The three pedestrians proceed across the footway.

Once the pedestrians have cleared the footway, the driver proceeds on to it. They wait there to join main road traffic.

At very deep continuous footways drivers are less likely to give way to pedestrians

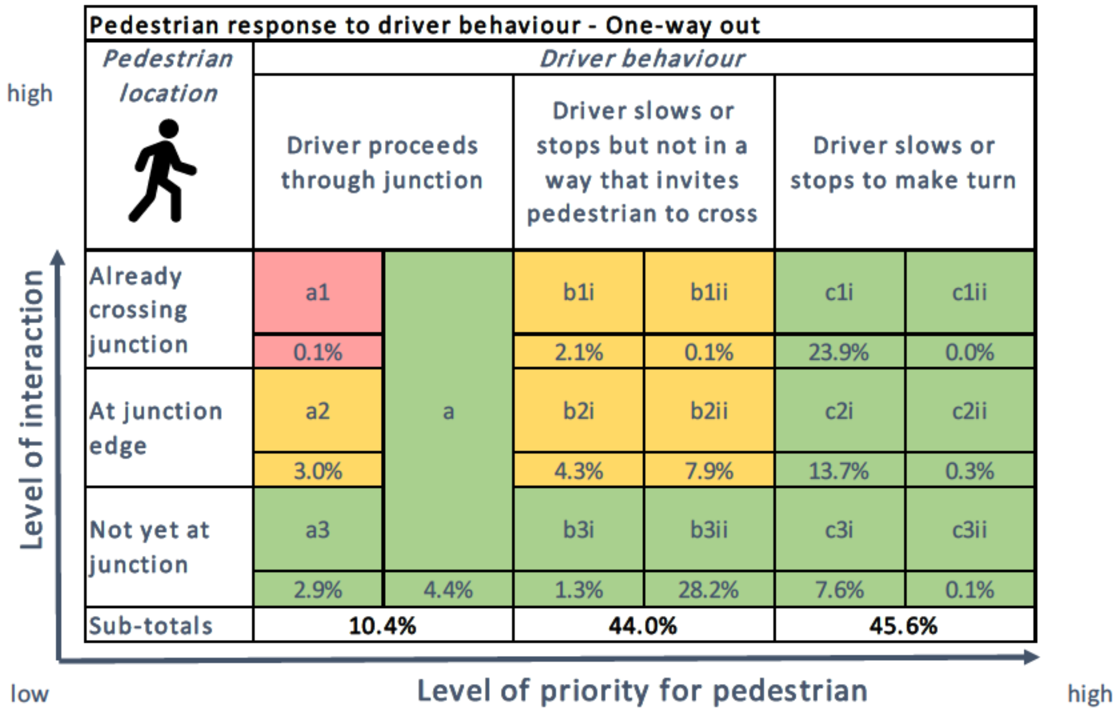
4.49 Having illustrated how drivers turning out tend to give way behind the continuous footway, this behaviour was less common at two of the case study sites because the continuous footway was very deep. At Sites 2 and 3, the footway across the junction mouth is approximately 7m deep; Figure 4.23 shows Site 2. This compares to 2.5m in the example shown at Site 6 in Figure 4.22.

Figure 4.23: Deep continuous footway at Site 2: Clapham Old Town / Lydon Road

4.50 We observed that drivers were less likely to slow and stop at the dashed give way line at Sites 2 and 3 because it was set back a long way from the junction mouth. If drivers stopped at this give way point, they would be unable to see clearly on to the main road, and they are even several metres behind pedestrians crossing on the footway itself. Drivers therefore tended to proceed on to the footway and wait there (this behaviour is illustrated in Figure 3.19 in Objective 1).

4.51 This observation is supported by data from the interactions analysis, which showed that a greater proportion of drivers proceed onto and stop on the continuous footway at Sites 2 and 3 than at one-way out only junctions (Sites 4 and 6). At Sites 4 and 6, 45.6% of drivers slowed or stopped to make their turn, while 44% stopped on the continuous footway (Figure 4.24). In comparison, for turning out movements only at Sites 2 and 3, 26% of drivers slowed or stopped to make their turn and 57.9% stopped on the continuous footway (Figure 4.25).

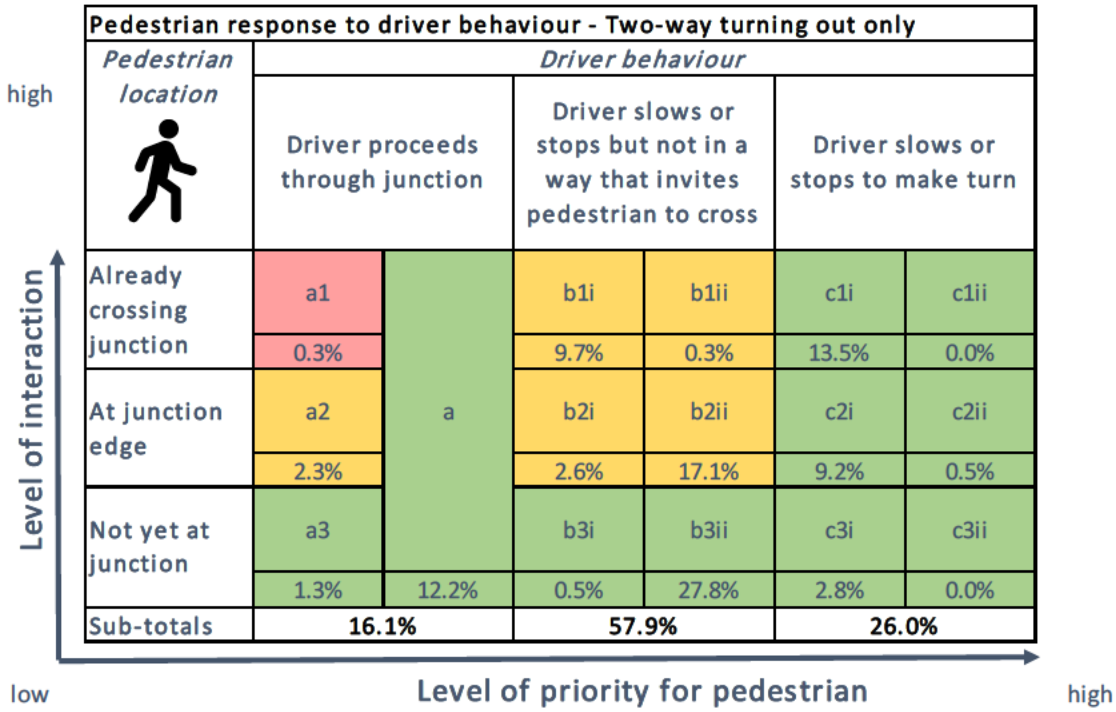
Figure 4.24: Pedestrian / driver interactions at one-way out junctions



Pedestrian response to driver behaviour - One-way out						
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.1%	a	b1i 2.1%	b1ii 0.1%	c1i 23.9%	c1ii 0.0%
At junction edge	a2 3.0%		b2i 4.3%	b2ii 7.9%	c2i 13.7%	c2ii 0.3%
Not yet at junction	a3 2.9%	4.4%	b3i 1.3%	b3ii 28.2%	c3i 7.6%	c3ii 0.1%
Sub-totals	**10.4%**		**44.0%**		**45.6%**	

n = 1878

Figure 4.25: Pedestrian / driver interactions at Sites 2 and 3 (two-way junctions, turning out movements only)



Pedestrian response to driver behaviour - Two-way turning out only						
Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.3%	a	b1i 9.7%	b1ii 0.3%	c1i 13.5%	c1ii 0.0%
At junction edge	a2 2.3%		b2i 2.6%	b2ii 17.1%	c2i 9.2%	c2ii 0.5%
Not yet at junction	a3 1.3%	12.2%	b3i 0.5%	b3ii 27.8%	c3i 2.8%	c3ii 0.0%
Sub-totals	**16.1%**		**57.9%**		**26.0%**	

n = 392

Tight corner radii encourage drivers to slow

4.52 Many of the case study sites have tight corner radii, delineated with radius kerbs to clearly indicate vehicular space and encourage drivers to turn accordingly. In general, this appears to slow down vehicles while making their turn, whether in or out of the junction. Facilitating slower speeds means drivers are able to stop more readily in order to give way to pedestrians. Sites 2 and 3 acted as counterfactuals in that their turning radii were comparatively large, plus the width of the junction mouth between the two corners was greater than at other locations; here vehicles were observed to cross the continuous footway at higher speeds.

4.53 Although the delineation of tighter corner radii encourages drivers to slow, the most effective design appeared to be where there was a reasonable kerb upstand between footway and carriageway which further discouraged vehicles from cutting the corner. The use of bell bollards at Site 7 appeared very effective in ensuring vehicles complied with junction geometry (Figure 4.26), albeit at the expense of adding clutter to the pedestrian environment.

4.54 The quantitative data recorded did not record vehicle speed, so is not able to support this finding one way or the other.

Figure 4.26: Tight corner radius with bell bollard at Site 7

Restricted sightlines slow turning drivers

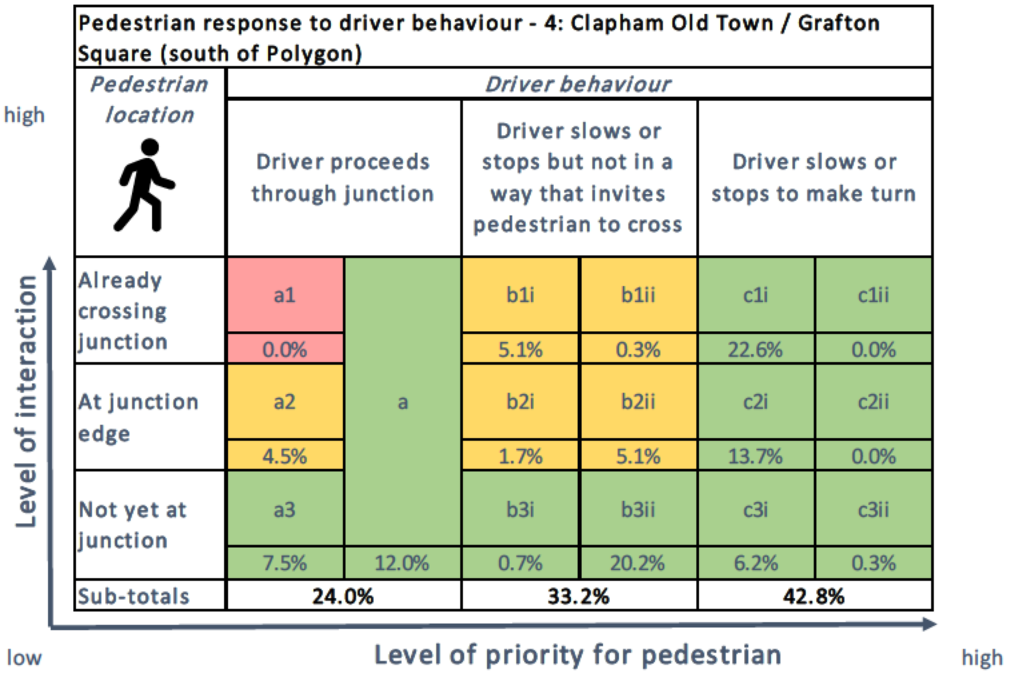
4.55 Sites which had relatively restricted sightlines due to enclosure by adjacent buildings, hedges, fences or trees had the effect of making drivers more cautious when turning out. Figure 4.27 shows an example from Site 6 where sightlines are restricted due to the narrow street and tight building lines. In contrast, Site 4 has more open sightlines for drivers to look right for approaching traffic on the one-way main road (see Figure 4.28).

Figure 4.27: Restricted sightlines at Site 6: The Pavement / Bromell's Road

Figure 4.28: More open sightlines at Site 4: Clapham Old Town / Grafton Square (south of Polygon)

4.56 The data on driver behaviour supports this finding: 24% of drivers slow or stop when turning out of Site 4, compared to 7.9% at Site 6. Figure 4.29 and Figure 4.30 show this and the corresponding proportion of drivers who slow or stop, or who stop on the continuous footway. While this data supports the finding that restricted sightlines can make drivers more cautious when turning out, it should be noted that sightlines are but one of many different factors influencing driver behaviour at these sites so this finding may be due to confounding factors.

Figure 4.29: Pedestrian / driver interactions at Site 4: Clapham Old Town / Grafton Square (south of Polygon)

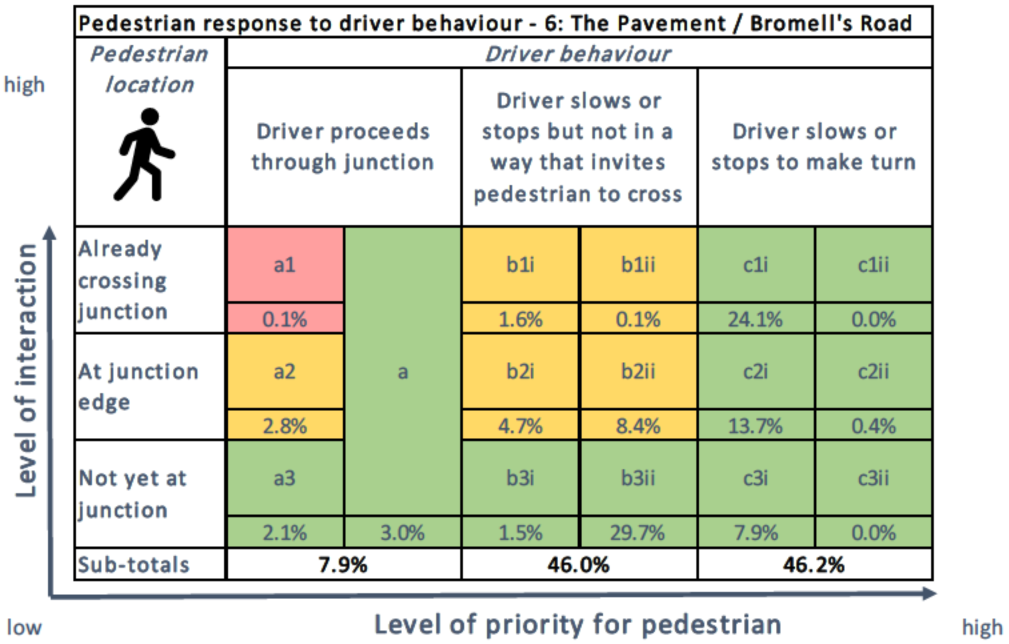


Pedestrian response to driver behaviour - 4: Clapham Old Town / Grafton Square (south of Polygon)

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.0%	a 12.0%	b1i 5.1%	b1ii 0.3%	c1i 22.6%	c1ii 0.0%
At junction edge	a2 4.5%		b2i 1.7%	b2ii 5.1%	c2i 13.7%	c2ii 0.0%
Not yet at junction	a3 7.5%		b3i 0.7%	b3ii 20.2%	c3i 6.2%	c3ii 0.3%
Sub-totals	24.0%		33.2%		42.8%	

n = 292

Figure 4.30: Pedestrian / driver interactions at Site 6: The Pavement / Bromell's Road



Pedestrian response to driver behaviour - 6: The Pavement / Bromell's Road

Pedestrian location	*Driver behaviour*					
	Driver proceeds through junction		Driver slows or stops but not in a way that invites pedestrian to cross		Driver slows or stops to make turn	
Already crossing junction	a1 0.1%	a 3.0%	b1i 1.6%	b1ii 0.1%	c1i 24.1%	c1ii 0.0%
At junction edge	a2 2.8%		b2i 4.7%	b2ii 8.4%	c2i 13.7%	c2ii 0.4%
Not yet at junction	a3 2.1%		b3i 1.5%	b3ii 29.7%	c3i 7.9%	c3ii 0.0%
Sub-totals	7.9%		46.0%		46.2%	

n = 1586

Continuous footway near a signalised crossing

4.57 A particular observation was made only at Site 7: sometimes pedestrians would stand waiting on the continuous footway, rather than crossing it. This seems to be due to two factors relating to the specific context and layout of the continuous footway at Site 7. Firstly, it is adjacent to a signalised crossing of nearby Upper Tooting Road. Pedestrians would sometimes stand on the continuous footway looking to cross nearly in line with the signalised crossing (Figure 4.31 shows this). This may be partly due to the fact that the signalised crossing is aligned on an angle and the pedestrians are seeking a more direct and shorter movement. Secondly, the footway is next to the entrance to Tooting Bec tube station – a convenient meeting place, and also a place of orientation when exiting the station. This resulted in some pedestrians trying to meet or congregate in the continuous footway space, not realising that vehicles could turn across it.

Figure 4.31: Pedestrians standing on continuous footway at Site 7, looking to cross Upper Tooting Road

5 Summary of findings

5.1 This research has analysed driver behaviour at seven case study locations and drawn conclusions about how this behaviour changes according to differing junction types, vehicle movements, pedestrian volumes and design elements. This section summarises our findings under each research objective to answer the overall research aim:

> To determine how continuous footways influence driver behaviour and the consequent level of risk for pedestrians and cyclists

Objective 1: Analyse if drivers give way to pedestrians using the continuous footway (at each site and on average across all sites)

5.2 Drivers are more likely to give way to pedestrians who are on or very near the continuous footway. 78% of drivers slowed or stopped to give way to pedestrians who were already crossing the continuous footway, compared to 17% of drivers who gave way to pedestrians who were not yet at the continuous footway.

5.3 Overall it is apparent that there are low levels of interaction between drivers and pedestrians, which means the likelihood of a negative interaction occurring is small, and therefore consequent risk is considered low. 77.1% of all recorded interactions involved the pedestrian or driver giving priority to the other with little or no change of behaviour required (coded green in the matrices). For a further 22.5% of interactions, pedestrians had to slightly alter their behaviour to accommodate the driver, e.g. check their step or divert (coded yellow in the matrices). In only 0.4% of cases did the pedestrian have to make a sudden change of behaviour (coded red).

5.4 These findings are consistent across all case study junctions, however there are notable differences in driver behaviour between junctions (see further findings below).

Objective 2: Analyse if drivers give way to cyclists using the major road (at each site and on average across all sites)

5.5 It is important to note that the sample of cyclist / driver interactions is limited due to the relatively small number of cyclists and drivers: 154 interactions recorded across all three days at all seven junctions, compared to 3,537 pedestrian / driver interactions. Findings for the following Objectives 3 and 4 are therefore limited to pedestrians only.

5.6 Among our sample, the vast majority of drivers give way to cyclists who are using the main road. 97% of drivers gave way to cyclists who are level or ahead on the carriageway, while 61% of drivers gave way to a cyclist who is two or more car lengths away from the junction.

5.7 Similar to Objective 1, this indicates that the likelihood of a negative interaction occurring is small, and there is a low level of consequent risk for cyclists when drivers use junctions with a continuous footway treatment. 91% of recorded interactions involved the cyclist or driver giving priority with little or no change of behaviour (green); with only 9% requiring a slight change in the cyclist's behaviour to accommodate the driver (yellow). No sudden changes of behaviour (red interactions) were recorded.

Objective 3: Evaluate the effect of different volumes of pedestrians or cyclists on driver behaviour

5.8 Drivers are more likely to give way to pedestrians when pedestrian volumes are higher: at the site with the highest number of pedestrians, 46% of drivers gave way to pedestrians versus 15% at the site with the fewest pedestrians. This pattern interacts with junction type, which appears to play a key role in whether or not drivers are more likely to give way. The consequent risk for pedestrians appears to be lower when overall pedestrian flows are higher.

Objective 4: Understand if the direction of traffic flow affects driver behaviour (i.e. one-way in or out of the priority junction, or two-way flow)

5.9 Drivers are more likely to give way to pedestrians when they are turning out of a side road, rather than turning in; and they are more likely to give way when turning left than right.

5.10 87% of drivers turning left out of a side road gave way to a pedestrian already crossing the continuous footway. This proportion falls to 58% of drivers who took a right turn in. When a pedestrian was not yet at the continuous footway, 19% of drivers gave way to them when turning left out of a side road, versus 0% of drivers who were turning right in.

5.11 The respective likelihood of drivers giving way at these junction types means that the consequent risk for pedestrians is lowest when vehicles are turning left out of a side road, second lowest for right turn out and third lowest for left turn in. It is highest when vehicles are turning right in to a side road.

Objective 5: Evaluate whether certain design elements and the junction's geometry influences driver behaviour and compliance with that geometry

5.12 A ramp and give way lines set behind the continuous footway appear to encourage drivers to slow and stop before the continuous footway. However, at very deep footways drivers are less likely to stop at the give way markings behind the footway. At two sites with the deepest footways (approximately 7m), 26% of drivers slowed or stopped at the give way line. This compares to 45.6% of drivers at two comparator sites with narrower footways (approx. 2.5m).

5.13 Tight corner radii and restricted sightlines help encourage drivers to slow when turning, making them more likely to give way to pedestrians and cyclists. Vertical deflections on corner radii such as kerb upstands or items of street furniture can help make sure drivers comply with the geometry.

Key characteristics that influence driver behaviour: case study examples

5.14 In this section, three short examples case study sites are presented to illustrate certain key characteristics which influence the patterns of driver behaviour recorded at each one.

Site 6: The Pavement / Bromell's Road

5.15 Site 6 is the case study junction with the highest proportion of drivers slowing or stopping to give way to pedestrians and cyclists (46%). The characteristics that appear to lead to drivers giving way more often are:

- High volumes of pedestrians (highest of all junctions)
- One-way out movement, left turn only
- Give way lines set behind ramped continuous footway
- Continuous footway not too deep (2.5m)
- Restricted sightlines
- Slow speed of traffic approaching on Bromell’s Road (20mph limit)

Site 5: Coldharbour Lane / Cambria Road

5.16 Site 5 is the case study location with the lowest proportion of drivers slowing or stopping to give way to pedestrians and cyclists (16%). The characteristics that appear to influence this are:

- Low volume of pedestrians (lowest of all junctions)
- One-way in movement only (both left and right turn in)
- There is a ramp but as vehicles are turning in off a busy main road, it is less effective in modifying driver behaviour
- Corner radii are relatively tight, however there is a wide space between the two delineated corners, which may encourage vehicles to make the turn at speed
- The sightlines into the junction are quite clear and drivers also know that no vehicles will be exiting the junction as it is one-way in

Site 3: Clapham Old Town / Grafton Square (north of Scout Lane)

5.17 Site 3 had a mixture of driver behaviour but some of the more common interaction types recorded at this site required pedestrians to modify their behaviour. It appears that various elements of its design may contribute to drivers not slowing or stopping to give way:

- Relatively low volumes of pedestrians – it was the median of the seven case study junctions in terms of pedestrians flows
- Two-way flow (i.e. includes turning in movements)
- Wide junction mouth with relatively large turning radii compared to other continuous footway locations; drivers, particularly turning in, could do so at speed
- Unrestricted sightlines for drivers turning in and drivers turning right out, meaning drivers may feel more confident about making the turn at higher speed
- Deep continuous footway so drivers cannot see in both directions on to the main road from the give way line, and are more likely to drive onto the continuous footway without stopping

6 Suggestions for further research

6.1 To build upon the findings from this research and develop a more refined understanding of how different road users behave at continuous footways, we recommend the following further research:

- A comparative analysis of junctions with continuous footways to junctions with a more conventional design. These junctions should be comparable in terms of surrounding land use and place context, as well as the volume and type of pedestrian, cyclist and vehicle movements.
- A comparative analysis of junctions with and without continuous footways, as defined above, focussing on driver speed through the junction.
- A before and after analysis of the implementation of a continuous footway. Analysis using a consistent methodology should take place shortly before the change is made and then after analysis should take place at least one year after installation, once road user behaviour has had a chance to adjust.
- An analysis focussing on the role of pedestrian behaviour. Through our observations, it was evident that in some instances, drivers' behaviour was influenced by their interaction with pedestrians, for instance when pedestrians seemed not be paying attention (e.g. looking at their phone while crossing), some drivers were more cautious.
- An analysis focussing on the user experience of continuous footways from a variety of perspectives of people with disabilities, including, as an essential component of this analysis, those with visual impairment because of their reliance on tactile paving and kerbs to indicate a change of function.
- An analysis considering how children behave at continuous footways, and how road safety education can include this type of junction layout. This is specifically due to the lack of a kerb and tactile paving marking the limits of carriageway and footway.
- Further research looking at more detail at the role of different pedestrian volumes on driver behaviour. Our analysis indicated that larger pedestrian flows were associated with more drivers giving way to pedestrians, however a larger sample across more junctions would be required for this finding to be more robust.

CONTROL INFORMATION

Prepared by	**Prepared for**
Steer Davies Gleave 28-32 Upper Ground London SE1 9PD +44 20 7910 5000 www.steerdaviesgleave.com	Transport for London
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[redacted]	Richard Crappsley
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