Bristol City Council

SHARED PEDESTRIAN/CYCLE SPACE REVIEW

urban movement

RESEARCH | PLANNING | STRATEGY | DESIGN

CASE STUDIES

Index

	Page
Introduction	3
(UK) London: Byng Place, Camden	4
(UK) London: North End, Croydon	6
(UK) London: Islington Green	8
(UK) London: Spital Square	10
(UK) London: Station Forecourt, Kingston	12
(UK) London: Castle Street, Kingston	14
(UK) Peterborough: Bridge Street	16
(UK) Cardiff: Lloyd George Avenue	18
(Spain) Barcelona: Carrer d'Enric Granados	20
(Spain) Seville: Avenida de la Constitucion	22
(Spain) Seville: Calle Asuncion + Avenida Republica Argentina	24
(Germany) Berlin: Unterwasserstrasse	26
(Germany) Munich: Harras Local Centre	28
(Sweden) Stockholm: Stromgatan	30
(Sweden) Gavle: Drottninggatan	32
Summary + Conclusions	34

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INTRODUCTION

This paper presents a brief overview of the different ways in which pedestrian/cyclist interactions in pedestrian/cyclist-only spaces are handled in a selection of different streets in different UK and European cities.

For the purposes of clarity, the types of streets and space covered in this paper are those where motor traffic is very largely or entirely absent, or where pedestrians and cyclists are intended to share the same space alongside a separate carriageway for motor traffic. In addition, they are locations where the definition of the path that cyclists are intended to follow is either subtle, very subtle, or non-existent.

The streets/spaces in question may be formally designated as either fully 'shared' or as having parallel footways and cycleways. In the UK, such arrangements are indicated using signs to Diagram 956 (shared) or 957 (parallel) of the Traffic Signs Regulations and General Directions (TSRGD). In the non-UK examples, permission for bicycle traffic may be indicated using signs similar to TSRGD Diagram 955. Although not covered by this paper, pedestrian streets where bicycle traffic is banned commonly deploy TSRGD Diagram 951-type signs. (See below for key to signs.)

While the author has visited each street featured in this paper, detailed statistics and other evidence concerning the daily experience of pedestrian/cyclist interactions has not been obtained within the constraints of this piece of work. Therefore, comments are typically based on observations over relatively short periods on single visits.

The cities and streets covered by this paper are as follows:

- (UK) London: Byng Place, Camden
- (UK) London: North End, Croydon
- (UK) London: Islington Green
- (UK) London: Spital Square
- (UK) London: Station Forecourt, Kingston
- (UK) London: Castle Street, Kingston
- (UK) Peterborough: Bridge Street
- (UK) Cardiff: Lloyd George Avenue
- (Spain) Barcelona: Carrer d'Enric Granados
- (Spain) Seville: Avenida de la Constitucion
- (Spain) Seville: Calle Asuncion + Avenida Republica Argentina
- (Germany) Berlin: Unterwasserstrasse
- (Germany) Munich: Am Harras
- (Sweden) Stockholm: Stromgatan
- (Sweden) Gavle: Drottninggatan

While different types of treatment have been observed across a fairly wide variety of cities (in terms of size, location and culture), the coverage in this paper makes no claim to be comprehensive.

Diagram 956

Shared route for pedal cycles and pedestrians only

Diagram 957

Separated track and path for pedal cycles and pedestrians

Diagram 955

Route for pedal cycles only

Diagram 951

Riding of pedal cycles prohibited

(UK) London Borough of Camden: Byng Place

Description + Comments

Byng Place is a 'square' located on the 'Seven Stations' cycle track that runs eats-west through Camden. For the most part, this route comprises a bi-directional track on one side of the street, separated from the general carriageway by a raised concrete strip (see photo below). In 2010, the track through Byng Place - which was then little more than a tarmac square - was replaced by 'shared space' arrangement laid out to large, flat granite setts. A low kerb defines the vehicle path as it passes diagonally through the space, and pedestrians and cyclists share the broadly triangular-shaped spaces to either side. Fixed wooden tables and chairs were installed to encourage people to dwell in this space, which is frequented by students and others.

In practice, cyclists tend to follow the alignment of the former bi-directional track through the space: in other words, to travel broadly parallel to, and north of, the vehicle path. This remains the most direct route. After the relatively constrained space provided by the kerbed track, the freedom of space within the square allows for cyclists to overtake one another more easily.

The scheme has attracted criticism from some cycling activists, largely on the grounds of the loss of clear segregation. Some criticism seems also to arise from a dislike of 'shared space' as a concept; which in turn arises from concern that the term is often used to describe aesthetic improvements that may actually decrease the quality of the cycling experience.

In Byng Place, based both upon the collision record and on the author's extensive personal experience both on foot and on bike, effective and courteous negotiation between pedestrians and cyclists seems to ensure that uncomfortable or hazardous conflicts are, at worst, very rare.

Below left: transition from segregated bi-directional track to 'shared space'. Above: 'before' photo showing segregated track through tarmac square. Below: 'after' photo showing popular new public space.

(UK) London Borough of Croydon: North End

Description + Comments

North End is a classic example of a 'pedestrianised' street in the shopping heart of a large town centre. It is comparable in character to Bristol's pedestrianised Broadmead. As always with such places, a certain amount of controlled vehicular access is permitted, and the controls here also permit some cycling. However, the precise constraints on cycling are somewhat confusing.

All the photos on this page are taken at the southern end of North End, from the junction with Church Street, George Street and High Street. 'Except cycles and for loading 6pm-10am' could be read as meaning that cycles are excepted at all times with loading excepted between 6pm and 10am; it is, however, intended to mean that both may only take place outside the main shopping peak hours.

At the north End of the pedestrianised area, at the Poplar Walk junction, there are simple 'No Entry' signs prohibiting southbound access for all vehicles at all times. One way working in that vicinity also means that any northbound cyclists leaving the pedestrianised area are technically unable to continue north. In short, the arrangements for cycling are a bit of a mess.

Several site visits by the author indicate that there is generally a steady trickle of people riding bikes both north and south in the pedestrianised North End during shopping hours. However, the obvious dominance of activity on foot, as well as the formal priority accorded to pedestrians, seems to mean the vast majority of cyclists ride cautiously and in a circumspect manner. There does not appear to be any record of a problem with uncomfortable or hazardous pedestrian-cycle conflicts.

Below left: looking north along North End from High Street - someone cycling north while someone else pushes their bike south. Above: another northbound cyclist. Below: the entry restrictions at this point.

(UK) London Borough of Islington: Islington Green

Description + Comments

Islington Green is a triangular green space in the crook of the junction between Upper Street and Essex Road. A street runs along the north side of the green, providing vehicular access from/ to Upper Street only, while permitting through movement on foot and by bike.

The short eastern half of this street, to which motor vehicles are not permitted access, is laid out as a single surface in Yorkstone slabs. A sinuous cycle path through this space is marked by means of flush granite 'kerbs' and a small number of cycle symbols inlaid in the surface.

Cycle flows outside of peak hours are very low, but this can be a fairly popular cut-through at busier times. Although the footway is notionally to either side of the cycle path, pedestrians are often seen to walk in the latter.

The street runs slightly downhill from west to east, meaning that the speed of cycling tends to be somewhat higher in that direction. However, despite the relatively common presence of pedestrians in the subtly-marked cycle path, there appears to be no evidence that this leads to uncomfortable or hazardous conflicts between the two user groups.

Below left: the eastern junction with Essex Road of the motor-traffic free route through Islington Green. Above: the 'cycle carriageway' is subtly marked. Below: a view east from the western end of the route.

(UK) London Borough of Tower Hamlets: Spital Square

Description + Comments

Spital Square is a street that lies just east of the boundary of Tower Hamlets with the City of London. The section of street in question is the eastern half of Spital Square, which connects the western half to Lamb Street, in the east. This section is part of the privately-owned Bishops Square development. Through walking and cycling is permitted on an east-west axis (there is also very limited local access for service vehicles).

When first opened, in 2005, Spital Square was a broad, undifferentiated single surface in granite. At some point after 2008, a 'cycle lane' was marked through the space by way of two parallel lines of blue thermoplastic paint. This would appear to have been a response to concerns about actual or perceived conflict between pedestrians and cyclists. A 5mph speed limit is now advertised, with signs also asking cyclists to stick to the lane and be aware of pedestrians.

At peak times it is a popular route for both walking and cycling, and maintains a reasonably high pedestrian footfall through much of the day due to the many shops, restaurants and offices in the immediate vicinity.

Although the signs ask cyclists to keep to the 'lane', it is not wide enough for opposing cyclists to pass one another and, in any case, pedestrians commonly walk in it. However, the blue markings do clearly legitimise cycling in the street, and since the blue markings are on a direct line through the street, cyclists tend to follow it fairly closely. There seems to be no evidence of any material pedestrian/cyclist conflict issues.

Based on the author's observations, the instruction for cyclists to keep to the lane may be unhelpful, since it gives specific cause for cyclists to object to pedestrians in 'their' space (and vice versa).

Below left: the sign shows a 5 mph limit and asks cyclists to keep to the 'lane'. Above: people walking across the full width of the street. Below: the 'lane' is notionally bi-directional but wide enough for only one bike.

(UK) Royal Borough of Kingston: Station Forecourt

Description + Comments

Kingston Station forecourt is an example of a shared pedestrian/cycle area that previously had a very clearly-defined cycle path through it, but which has now been relaid as undifferentiated surface (at the author's recommendation).

The arrangement relates to parallel signalised pedestrian and cycle crossings of the town centre's ring road - crossings that connect the station to the commercial centre. The cycle crossing is more closely aligned with the desire line of the vast majority of pedestrians, including heavy peak flows of train passengers. For this reason, and also because of the sheer weight of demand at peak times, many pedestrians crossed the ring road where cycles are supposed to. This despite the clear markings (see top right photo opposite).

The cycle path through the space is part of a very useful route that enables cyclists to avoid the town's one-way system and mixing with the heavy traffic on ring road. But although it is therefore well-used, the realities of pedestrian of movement in the space in front of the station meant that designating the track, through what was/is in any case a formally shared space, was of very limited practical value and led 'my space/ your space' confrontations between different users.

The revised arrangement continues to be well used by people on feet and on bikes, and site observations by the author, allied to verbal reports from Council officers, indicate that the space is shared harmoniously.

Above: 'before' photos showing a clearly-defined cycle path, but in an area marked by the 'Diagram 956' sign as formally shared. Left and below: 'after' photos of the now undifferentiated shared area.

(UK) Royal Borough of Kingston: Castle Street

Description + Comments

Castle Street lies on the main walking and cycling route into the town centre from the railway station (see above). Around 130m long, it was changed to its current layout in 2006, having previously been a no-through street with relatively narrow footways, conventional kerbs and a carriageway that accommodated parking and loading along one side. Now it is a pedestrian zone through which two-way cycling is permitted and to which limited vehicular access is permitted between 7am and 10am.

The changes allowed many of the fronting retail units to grow as, or to become, cafes and restaurants; so that what are notionally footways on either side of the street are commonly used for seating, and also for trees and other useful street furniture. Most longitudinal movement on foot and by bike therefore now takes place in the centre of the street.

This 3m central strip is laid out in small-element block paving that is, in parts, a darker grey than the larger slabs to the sides. A dished channel acts as the boundary to the central strip, the street otherwise having a level surface. Vehicle entry at the north end is controlled by automatic bollards; at the southern end there is a 'No Entry' sign with an 'Except Cycles' panel. Signs at both entries indicate 'Pedestrian Priority'.

While small 'Diagram 957' signs are provided at occasional points along the street, this is, in practice, much more of a 'Diagram 956' type of street - with pedestrians and cyclists sharing the same central space. Castle Street is not an important through route, and cycling volumes are not heavy. Observations indicate that interactions between the two user groups are harmonious, with cyclists found to cycle appropriately slowly and cautiously, and sometimes to push their bikes, when the street is crowded with pedestrians.

Castle Street during a typically busy period - a space dominated by pedestrian movement, but through which cycling is permitted. The sign bans motor traffic, rather than explicitly permitting cycling.

(UK) Peterborough: Bridge Street

Description + Comments

Bridge Street is a motor traffic-free street running through the heart of Peterborough city centre. For around the past two decades, cycling has been permitted, but only before 9am and after 6pm, and although this restriction previously did not apply on Sundays, it was extended from Monday-Saturday to seven days in October 2014.

The story behind this extension is of particular interest. Consultation drew 200 responses from organisations and individuals, with those against the idea outnumbering those for it by 7.5:1. Despite this, the Council approved the extension on the grounds that "public safety must ultimately outweigh what is a relatively small inconvenience to cyclists".

The only evidence cited concerning 'public safety' is anecdote that does not even relate to actual collisions: "Many people have reported or witnessed near misses between shoppers and irresponsible cyclists."

This story, which is familiar one, emphasises the desirability of having some rational means of assessing the likely pros/cons of sharing, to weigh against such influences as opinion, 'fears' and lobbying from powerful groups.

It also raises the important issue of the alternatives that cyclists have if they're excluded from such streets. While the consequence in this case was described by a Councillor as "a relatively small convenience", the view of Sustrans is that "there are no alternative north-south routes through the city".

Another key issue was raised by a Councillor who said, "The ban is not enforceable". If cyclists are not allowed to share, but consider that there is no acceptable alternative, the consequence may well be non-compliance or less cycling.

Left: the north end of Bridge Street with a sign advertising the 9am-6pm ban. Above: a scene just prior to 9am one weekday. Below: the southern end of the street, showing clutter that adversely affects both user groups.

(UK) Cardiff: Lloyd George Avenue

Description + Comments

Lloyd George Avenue is a 1km-long 'boulevard' that runs north-south between the city centre and Cardiff Bay. The arrangement is a dual carriageway to the west of the corridor and a landscaped area for walking and cycling to the east. The cross section of this area, from the east side property line is: 2m footway; 3m cycle path; 3m tree-line; 6m footway; 8m planting strip; carriageway. 'Diagram 957' signs are displayed, indicating that cyclists are expected to ride in the designated path parallel to the footway(s).

In practice, as these photos show, people walk and cycle more or less wherever they please. This seems to cause few, if any, real problems, because of the low density of both walking and cycling flows across such a wide facility. However, the layout and supporting signage is likely to make some people object to encroachment in 'their space' by the wrong kind of user.

There are some sections where the formally separate paths are merged into shared pedestrian/cycle space, indeed 'coerced' might be a better word. This occurs at the signalised crossings of the very lightly-trafficked side streets, where guard-railing restricts the path for both pedestrians and cyclists to a single crossing point. This is not only an inappropriate articulation of relative priorities between motor traffic flows one the one hand and walking and cycling on the other, it means that the 'rules of engagement' between walking and cycling change frequently along the length of the street; and this is both confusing and potentially unsettling for users of both kinds.

The layout of Lloyd George Avenue would likely benefit from simplification, with full sharing of the space being the most appropriate response under current and foreseeable levels of use by people both walking and cycling.

Left: the layout on the east side of Lloyd George Avenue, looking south. Above: foot and cycle paths forced together and shared at crossings. Below: cyclists and pedestrians 'where they're not supposed to be'.

(Spain) Barcelona: Carrer d'Enric Granados

Description + Comments

Carrer d'Enric Granados is a relatively short motor traffic-free street in central Barcelona that runs north-south between two of the main streets that are part of the city centre's comprehensive one-way system. It seems to be almost unique in a city that has elsewhere done much to improve conditions for safe cycling through an increasingly extensive and comprehensive network of on-carriageway cycle tracks protected by intermittent but frequent PVC/rubber separators (e.g. 'armadillos').

As can be seen from the photos, the street is laid out with the historic footways to either side of two lines of trees, with the former central carriageway now a shared pedestrian and cycle space. There is a uniform, paved single surface throughout, the only visual or physical surface differentiation being a nominal cycle path denoted by darker-coloured setts with the lighter coloured slabs.

The link is not strategically important for either mode, and the demand for walking and cycling is correspondingly modest, with flow densities being low for both. The former eastern footway runs adjacent to an unbroken run of railings with planting behind, and has had a series of benches deployed along it. The former western footway runs adjacent to a number of active frontages and seems, as a consequence, to be where most people now walk.

The central section is used for cycling and walking in both directions. Observations suggest that the subtly-marked cycle path is not stuck to rigidly by the cyclists, but there is no indication that strict adherence to the path is required or expected, or that cycling outside the markings causes any problems.

Left and above: the view from the north, the cycle symbol indicating that cycling is permitted (but not exclusively) and a subtly-marked indicative path for cycling. Below: the view from the south (from Google).

(Spain) Seville: Avenida de la Constitucion

Description + Comments

The Avenida de la Constitucion is the set-piece main street that runs broadly north-south in the heart of Seville's historic centre. In addition to movement on foot and by bicycle, the street also carries trams that travel along the city's single, relatively short line. General motor traffic is excluded.

The street is very popular for walking, and is often very busy with tourists, lying as it does next to the city's famous cathedral. It is very wide, however, and seems to cope very well with the different demands for movement and other activities placed upon it. Most longitudinal movement on foot takes place, as might be expected, towards the sides of the street, where there are active frontages and trees providing shade. The tram tracks run slightly off-centre (towards the eastern side), with a subtly-marked cycle path running adjacent to the west.

Signs make plain that, although the street is a designated cycle route, movement on foot has priority over movement on bike. The street is laid out as a single surface in grey granite, with the cycle path marked by intermittent metal studs of a bespoke design with a cycle symbol.

Many cyclists broadly follow this path, as it is the most convenient, being away from the main pedestrian flows and outside the tram tracks. However, cycling is also observed within the tracks (the tram service is not especially frequent) and outside the marked cycle path. Similarly, people are observed to walk across the full width of the street. However, this does not appear to cause any problems, since the street is adequately wide relative to the flows of people on both foot and bicycles. The marked cycle path confirms the legitimate presence of cyclists, and describes where most will be; but it is not, and is not expected, to be rigidly followed.

Left: relative priorities between pedestrians and cyclists are clearly indicated. Above: cyclists seem comfortable riding between the trams tracks. Below: the notional cycle path is marked with bespoke studs.

(Spain) Seville: Calle Asuncion + Avenida Republica Argentina

Description + Comments

Avenida Republica Argentina is a main street in western central Seville, at the east end of which, at a large roundabout, it forms a junction with Calle Asuncion. The latter was previously a conventional street, but was transformed into a largely traffic-free street within the last five years. Avenida Republica Argentina is not a directly relevant case study for this review; but the point where it meets Calle Asuncion is of interest.

As the photo below shows, a cycle track on the main street runs through what was previously a fairly wide footway. With fronting development like cafes and bars generating much activity, this space can be quite contested at times, yet it forms part of a key city cycle route. Therefore, although it is something of a squeeze, it was considered best to deploy a clear, designated cycle track, rather than to use more subtle markings, or go for a fully shared arrangement.

Calle Asuncion is now a street with a bi-directional cycle track laid out in materials that contrast (though harmoniously) with the adjacent 'carriageway'. Although the latter provides for vehicular access, this is for strictly-controlled servicing only, so that the street is very largely traffic-free and the 'carriageway' is typically used by promenading pedestrians.

Pedestrian activity can be quite dense at the busiest times, and cycling flows are relatively modest. Although users do not always stick to their designated paths, this seems to cause few if any problems. Signs indicate that cycle access is formally banned during the following periods: 4-9pm on Monday and Friday; and 10am-9pm on Saturday and Sunday. While this appears to be to allow for regular markets or similar events, the photos opposite were taken on a Monday evening, during which no such events were in progress and cycling was still taking place.

Left: Footway and cycle track on Avenida Republica Argentina, just west of the junction with Calle Asuncion.
Above and below: Calle Asuncion showing the different surface materials and the part-time cycling restriction.

(Germany) Berlin: Unterwasserstrasse

Description + Comments

Unterwasserstrasse runs along the west side of the Kupfergraben waterway in central Berlin, and is part of a north-south pedestrian and cycle link that connects two of the city's biggest streets: Unter den Lindin to the north; and Leipziger Strasse to the south. The street itself provides strictly-controlled motor vehicle access to properties lying immediately adjacent, but otherwise is designated as a pedestrian street, with cycling also allowed (see sign below right).

It is laid out as an asphalt carriageway with a paved footway to the riverside and a narrow paved strip running along the often blank walls of the buildings that line it on the other side.

A line of lighting columns to the waterside helps to ensure cyclists stay in the carriageway, which is in any case a much better surface for cycling.

However, the presence of the lighting columns in a relatively narrow footway means that pedestrians often walk in the nominal carriageway. This does not seems to present any problems, however, as the route is not a busy one for any mode and flows of both pedestrians and cyclists are not dense.

Unterwassestrasse is an example of a street where no special efforts have been made to create good walking and cycling conditions. It has a modest and very functional role, will be little known by anyone who doesn't use it regularly, and is certainly not a place that will feature in tourist guides. Rather, it is simply an example of a local access street from which all but essential motor traffic is excluded but in which walking and cycling is permitted. Under these circumstances, allowing the relatively light flows of cyclists to use the same space as similarly light flows of pedestrians is therefore no more than common sense.

Unterwasserstrasse is a riverside path that acts as a cut-through for pedestrians and cyclists. Immediate local motor vehicle access to specific properties is strictly controlled by automatic bollards.

(Germany) Munich: Harras

Description + Comments

Harras is a local centre to the south-west of the city's central core, with the focus of activity being the triangular space at the junction of Albert-Rosshaupter-Strasse and Plinganserstrasse.

This space was the subject of a comprehensive public realm scheme constructed in 2011 and 2102. This transformed arrangements in the centre from a large roundabout with a four lanes of circulating traffic, an inaccessible central island, and no cycle facilities, into a triangular-shaped 'peninsularised' public space with seating, a fountain, wider footways and new cycle tracks.

To one side of the cycle track is the footway, and to the other, between the cycle track and the main carriageway, there is either a line of parking or 2-3m paving strip. The materials used for all parts of the scheme that are not running lanes on the main carriageway - including the surfacing of the parking bays - are flat natural stone setts, and these are cut in exactly the same way and pattern orientation whether the area is footway, cycle track or parking bay.

The cycle track is defined by very shallow - though not quite flush - kerbs to both sides (around 10mm, no more than a rain check), and by occasional cycle symbols on the track surface. Clearly, the designers have sought to achieve a visually attractive and harmonious streetscape, while also providing dedicated space for cycling and walking.

The overall effect is visually homogenous, creating an almost single surface that has the air of being shared. However, the cycle track describes what is the obvious route for cyclists through the space and there is plenty of space for walking, also in the right place. This means that pedestrians do not tend to get in each other's way.

In many ways, the design at Harras operates as a very expensive version of a shared space that has a subtly-marked cycle path through it. As to cost, this is clearly felt to have been justified as part of a transformational urban realm scheme. As to interactions between pedestrians and cyclists, the design seems to respond effectively to the volume of flows of both user groups and to the places where they want to be and move.

Left: aerial view before (left, 2007) and after (right, 2013) construction of the Harras public realm scheme.
Above and below: very low kerbs and subtle markings are used to differentiate footway and cycle path.

(Sweden) Stockholm: Stromgatan

Description + Comments

Stromgatan is a street that runs alongside the Norrstrom waterway, which separates the main part of modern Stockholm's city centre to the north from, to the south, the island of Gamla Stan, the city's historic core and very popular with tourists. The street is also part of a walking and cycling link to the main Central Station, a little way to the north and west.

A popular waterfront promenade, the western section of Stromgatan, between Vasabron to the west and Norrbro to the east, is traffic free. The section forms a cross with Stockholm's main north-south pedestrian spine of Drottninggatan and the pedestrianised Riksbron bridge.

The layout of this section of Stromgatan comprises a central strip for movement paved in relatively large natural stone slabs, with rough granite setts to either side.

The setts are uncomfortable to cycle on and for some to walk on. As a result, most movement is anticipated, and found, in the smooth central section. This is notionally bisected into a pedestrian path nearest the water and a cycle path nearest the building line. The means of 'separation', however, is an intermittent line of brass-looking studs; while the surface of the bi-directional cycle path also features some cycle symbols in the same metal.

Separation is therefore very subtle, and in the paved area works in practice a single, shared surface. The form of treatment has been chosen to complement the surroundings historic built fabric, and although the street can be quite busy with both pedestrians and cyclists, the design seems to strike a good balance between working well and looking good. If necessary at the very busiest times, the wide strip of setts nearest the building line can act as 'expansion space' for both user groups.

Left: the western section of Stromgatan, looking towards the Stadhus (City Hall). Above: pedestrians and a cyclist both on the 'wrong' side of the path. Below: the definition of pedestrian and cycle areas is subtle.

(Sweden) Gavle: Drottninggatan

Description + Comments

Gavle's Drottninggatan is a street that runs east-west through the heart of this relatively small city, between the railway station in the east and the west of the city centre adjacent to the river and Concert House. Around 800m long, it is very largely traffic free and forms the principal shopping spine for the city.

The layout of the street varies along its length, with three broad themes. In the eastern section is, for the most part, laid out in four strips identified by different materials. There is a nominal footway on either side of the profile and, between these, there is (a) a path that supports bi-directional cycling and also acts as the carriageway for very strictly controlled local access/servicing motor traffic and (b) a broad strip containing seats, planters, cycle parking and other street furniture. Although cyclists stick to the central path (as it is clearly the best surface and most direct route for their purposes), some people also walk in that part of the street. With the existing volumes of both flows, this seems to cause no obvious problems.

Most of the western section is laid out as shared space, with signs indication pedestrian priority. Here there is no marked cycle path and the layout is essentially a single surface with a line of substantial planters and cycle parking racks down the centre. In short sections, one side of the street is entirely taken up with cafe seating, and here the pedestrian and cycle flows - which can both be high at the busiest times - seem to be squeezed into too small a gap comprising only about 40% of the street's overall width.

In some other sections, typically leading to and from the junctions with the north-south streets that periodically cross Drottninggatan, there is a cycle path marked with dashes of white paint on an otherwise single surface.

The main differences between the eastern and western sections is that the latter has larger shops units and tends to be busier with pedestrian activity. Accordingly, the shared arrangement seems to have been considered a more efficient use of space than designating different parts of the street for different users, as found in the quieter eastern section.

Left: the eastern section, showing clear but subtle differences between the different areas. Above: the western section, with a 'shared' layout. Below: the nominal cycle path shown in some 'shared' sections.

SUMMARY + CONCLUSIONS

A variety of design techniques is used to manage the interaction of pedestrians and cyclists in motor traffic-free streets and spaces. These range from undifferentiated surfaces, through the use of features to denote a notional cycle path, to the clearer designation of one part of the street for walking and another for cycling.

A range of formal and informal signs is also deployed, some advising the legal status concerning access, others emphasising priority for pedestrians, and others indicating (advisory) speed limits. Some streets also have timed restrictions on cycling access, e.g. during core shopping hours or when markets take place.

While there are some objective methods for assessing the appropriateness of sharing between pedestrians and cyclists (based on flows relative to available width - see the companion Reference Documents report), very little information has been obtained concerning how or why design or management decisions were made for each case study street.

None of the case studies is from the Netherlands, for the simple fact that, on study tours of Amsterdam, Utrecht and Houten, the author found very little space that is shared by pedestrians and cyclists. (That which was found was usually either a path through a park or a short, traffic-free link between two streets.) One reason for this is that cycling levels are typically so high on many Dutch city streets that sharing is inappropriate. Another is that the Dutch approach to network management is good at creating 'Cycle Streets' where motor traffic volumes and speeds are so low that cycling in the 'carriageway' is safe and attractive; and so cycling does not need to be mixed with walking.

Taken together, the case study streets show that, in practice, there is no clear dividing line between 'fully shared' pedestrian/cycle space and 'fully segregated' pedestrian and cycle paths. What is found is more of a continuum, with undifferentiated single surfaces at one end physically separate footways and cycle tracks at the other. What changes along this continuum is the subtlety with which a route or path for cycling is marked, the level of expectation of observance of this path (by both user groups), and the methods used to require cyclists to adhere to this path.

Where the design of any given street/space lies along this continuum is determined according to local circumstances; and to find the best approach it will always be helpful to answer the following two key questions:

Q1. Taking into account the physical constraints of the space in question, are the levels of movement on foot and by bike suitable for sharing? This question concerns the density of flows, not just the volumes.

Q2. If the answer to Q1 is 'yes' then, taking into account the local context, what is the best response in terms of design and management?

The companion report on Reference Documents identifies some methods to help answer Q1, and these are considered further in section 6 of the Main Report of this review.

If the answer to Q1 is 'no', thoughts must turn to whether clear segregation of users in that space is appropriate, or whether provision for cycling should be made in a suitable alternative location.

If the answer to Q1 is 'yes', the answer to Q2 will depend on local factors like the sensitivity of the built environment, the nature of fronting land uses, and the patterns of pedestrian and cycling activity. So, for example, streets in Conservation Areas may require a different treatment from those that are not; shopping streets will not be treated in the same way as routes through parks; and designs where walking and cycling is largely parallel will differ from those where pedestrians often cross the main cycling desire line.

Concerning the more detailed aspects of street design and management, the case studies draw attention to the following issues:

- Where a 'cycle path' is marked in some way, cyclists do not always keep scrupulously within that path; and this is commonly because pedestrians do not always stay out of it.

- Generally, marking a subtle cycle path through a shared space seems to work best as a means of legitimising the presence of cyclists where pedestrians have priority, but not sole rights. There should be no expectation of rigid observance of the path by either user group.

- Whatever markings or signs there may or may not be, the approach to sharing that applies in most case study streets is essentially as follows: "This is a pedestrian space in and through which cycling is permitted." In other words, people on foot have priority, and people on bikes should adapt their behaviour accordingly.

- It is important to avoid signs that require cyclists to act in ways that are impractical; e.g. to keep to a path that is too narrow or often blocked by pedestrians, or to ride as slow as 5mph. Such signs will likely introduce conflict between pedestrians and cyclists ("my space/ your space"), not resolve it.

- Decisions to restrict cycle access to certain time periods require full consideration of their potential implications. While such restrictions may not be unreasonable in themselves (e.g. because the street becomes too crowded with pedestrians at times), suitable alternative provision for cycling must either already exist or be made.

- Whether part- or full-time, where cycling is prohibited in any given street, the failure to provide suitable alternative routes for cycling will likely produce one or both of two outcomes: cyclists will flout the restriction; and/ or people will be discouraged from cycling (and hence policies to grow cycling will not be achieved).

- The scope of this particular commission has meant that it was not possible, in most locations, to explore the basis for decisions concerning the design and management regimes observed. However, media reports concerning the extension, from six days a week to seven, of the 9am-6pm ban on cycling in Peterborough's Bridge Street, highlight the general issue of the need for decisions to be rational and evidence-based

- In the Peterbrough case, the decision appears to have been taken chiefly because "Many people have reported or witnessed near misses between shoppers and irresponsible cyclists", and despite both a strong public consultation response in opposition to the proposal, and the lack of consideration of an alternative route.

- Anecdote concerning a minority can, in practice, undermine a rational approach as to what is best for all. It is essential, therefore, for any decision about where and how to share space between pedestrians and cyclists is made using facts about activity, not just 'reports'. It is also strongly recommended that an objective method is employed to assess pedestrian and cycle flow densities, in the context of the physical constraints and other characteristics of the street/space in question.

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