Feasibility study for a central London cycle hire scheme

Final report November 2008

Prepared by Transport for London

Transport for London and the Clear Zones Partnership
### Contents

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<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Findings and recommendations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Section 1</strong></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>State of the art review</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td><strong>Background</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>1.1 Overview of existing schemes</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>1.2 Current position in London</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>1.3 Existing system</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>1.4 Conclusions of this section</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td><strong>Section 2</strong></td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Demand analysis and customer research</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>44</td>
</tr>
<tr>
<td></td>
<td><strong>Background</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>2.1 Differences between central London and Paris</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>2.2 Tourists and visitors</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>2.3 The after rail market and additional business trips</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>2.4 Market research</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>2.5 Demand analysis</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>2.6 The night time market and seasonality</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>2.7 Why a pilot fails</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>2.8 Impact to taxi trips</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>2.9 Conclusions of this section</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td><strong>Section 3</strong></td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Available land</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
</tr>
<tr>
<td></td>
<td><strong>Background</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>3.1 Land availability exercise</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>3.2 Space requirements</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>3.3 Conclusions of this section</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td><strong>Section 4</strong></td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Benefits, risks and opportunities</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td></td>
<td><strong>Background</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>4.1 Benefits of a cycle hire scheme</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>4.2 Risks and mitigations</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>4.3 Recommended additional measures</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>4.4 Opportunities</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>4.5 Conclusions of this section</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td><strong>Section 5</strong></td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Main findings and recommendations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>74</td>
</tr>
<tr>
<td></td>
<td><strong>Background</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>5.1 Main findings</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>5.2 Recommendations</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td><strong>Appendices</strong></td>
<td></td>
</tr>
</tbody>
</table>
Feasibility study for a central London cycle hire scheme

1. Transport for London (TfL) aims to achieve five per cent mode share for cycling by 2025, requiring a 400 per cent increase in cycling levels from the year 2000 daily cycle trips. London has already seen a significant rise in the number of people cycling with a 91 per cent increase on London’s major roads since 2000.

2. There is a pronounced increase in cycling usage across the Capital, more money is being spent on cycling facilities and more people are considering taking up this cheap, healthy and environmentally friendly form of transport. A cycle hire scheme would add further momentum to this trend and increase the accessibility of cycling for certain groups.

3. For these reasons, TfL was asked to conduct a study to test the feasibility of introducing a cycle hire scheme in central London.

4. The study has been initiated and produced by a partnership headed by the Clear Zones Partnership that consists of representation from the London Borough of Camden, the City of London, Westminster City Council, TfL and the Royal Parks.

5. This report focuses on high-level issues, which are critical to determine the feasibility of a central London cycle hire scheme.

6. From a technical perspective, a cycle hire scheme in London is feasible and a bespoke system for London could be implemented.

7. There appears to be a substantial market for a central London cycle hire scheme with around 55,000 potential daily trips by cycle hire based on existing information. There is an element of risk, however, in forecasting of this nature and the exact demand is difficult to estimate.

8. It is recommended that a minimum of 10,200 docking points with 6,000 bicycles would be required. They would be located at anything between 300 and 400 docking stations. A minimum density of eight stations per km² should be pursued.

9. There is significant market from ‘after rail’ commuters. However, sufficient space to cater for the full demand is unlikely to be available. Hence, it is not recommended to cater for this market initially.

10. The scale of any scheme is critical to its likely success. Cycle hire stations would need to be located at frequent intervals and placed at strategic locations. A phased implementation would allow the scheme to adapt to demand.

11. A pilot should not be used to estimate demand.

12. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area), coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles.

13. Cycle hire in other cities has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles.

14. There is a wide range of compatible scheme types, management systems and technologies from which to choose from.

15. A fixed docking station solution is more efficient for larger schemes.

16. Access to the bicycles must be easy and fast. A period of free use may be an attractive option.

17. Levels of theft and vandalism in the existing schemes that have been reviewed have generally not been as severe as predicted. It should be noted however, that London has high levels of bicycle theft. A deposit mechanism by users of the system is essential.
Findings and recommendations

18. Political buy-in from major landowners and authorities in central London would be essential for implementation, including TfL and the central London boroughs.

19. Land availability (and competing demands on central London public realm) is one of the main issues facing successful implementation. Space is at a premium around key trip generators / attractors. The existing partnership (TfL and Clear Zones) provides a good base that could attempt to resolve this issue.

20. It is not recommended to hand over advertising space to help finance the scheme as this is not supported by the central London boroughs, The Royal Parks or TfL. This would mean, however, that some share of the costs involved would fall on the public purse. It is recommended that other alternatives such as on-bike sponsorship are investigated.

21. Complementary measures to mitigate some risks (where individual London borough policies allow) have been suggested, potentially including a safety campaign, 20mph zones, cycle training, improved way-finding, engineering measures and conversion of one way streets to two way for cyclists.

22. The potential for generating revenue is low if a free rental period is recommended. (There is some revenue potential from registration fees to the scheme)

23. Integration of the systems to the wider public transport network would allow better accessibility and enhanced operation.

24. Some barriers and issues still remain and need to be addressed properly. These include:
   - Safety concerns
   - Navigational issues (difficult to navigate in central London)
   - Use of a bicycle by inexperienced users
   - Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other cycling measures.

25. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:
   - A deposit mechanism
   - An annual subscription or registration process
   - A strategic pricing structure
   - A Smartcard system
   - Innovative docking points to make the most use of available space
   - Very secure and easy to use docking points
   - Robust bicycles
   - Minimum use of vehicles to re-distribute bicycles
   - Simple maintenance
   - A visible and easily identifiable scheme
   - Available for use by tourists

26. There seems to be enough ‘potential’ space available which could be used (if appropriate) for the implementation of docking stations. The study has not determined, however, whether this space is located in areas where there is likely to be specific local demand. There is also potential for finding spaces in workplaces and private developments.

27. There are possible issues regarding the planning permission process and change in traffic orders that might be required to implement docking stations.

28. Even after implementation, the location and size of some of the stations would be subject to change as it is difficult to precisely determine demand on a local area basis. It is recommended to identify more spaces than originally required in order to mitigate this risk.

29. Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand and during periods of building and infrastructure construction.

30. Overall, the streets of central London have to accommodate an array of transport and street management needs, which would include facilities for a cycle hire scheme.
Benefits

31. The following benefits of a cycle hire scheme for central London have been identified:

1. Provision of a new individual transport mode (accessibility, connectivity with other modes, resilience to the public transport network, options for users)
2. Increase in the levels of cycling through reduced barriers to cycling such as access to a bike, maintenance and theft
3. Help to create a more walking and cycling focused city with less motorised traffic
4. Health benefits associated with increased levels of cycling
5. Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London
6. Reduction in overcrowding on buses and the underground in central London
7. Promote tourism

Risks

31. The main risks of a cycle hire scheme for central London are as follows:

1. Over/under estimation of demand
2. Theft and vandalism
3. Safety concerns and public liability issues
4. Space availability and planning permission process for the implementation of docking stations
5. Conflict with pedestrians
6. Conflict with other road users
7. Need for excessive re-distribution of bicycles, potentially increasing congestion and air pollution (albeit marginally)
8. Inefficient use of public infrastructure
9. Large investment required and inability to recoup costs
10. Political, financial and PR fall-out caused by an unsuccessful scheme
11. Inadequate complementary measures, wayfinding and routing to support successful scheme
Introduction

Objectives and aims of this report

32. This report aims to inform decision makers on the feasibility of a central London cycle hire scheme. The report, however, is not an agreement mechanism between the Clear Zone boroughs, The Royal Parks and TfL for the implementation of the scheme.

33. The report aims to provide information and recommendations for the implementation of a scheme. It does not, however, define all aspects of the scheme in sufficient detail so as to determine how it should be implemented.

Scope

34. The feasibility of a cycle hire scheme in central London has been investigated based broadly on the following aspects:
- State of the art review – to investigate the operation of schemes elsewhere and apply findings, where appropriate, to London
- Demand analysis – to predict demand for a central London cycle hire scheme
- Available land – to gain an indicative understanding of available land in central London required for the implementation of the scheme
- Benefits, risks and opportunities – identify indicative benefits, risks and mitigations as well as potential opportunities

35. The study area is focused in central London, Travelcard Zone 1. The reason for choosing this area is the high employment density and concentration of trips, and it crosses through at least three borough boundaries and includes the Royal Parks. The following map (page 9) shows the study area and employment density. It also relates to the area of responsibility of the Clear Zones Partnership.

Governance

36. An informal project board has been responsible for the overall direction and management of the study. If a scheme were to be developed, it is anticipated that the board will be amended in terms of lead, formality, structure and membership. The project board currently consists of:
- The Clear Zone Partnership
- The London Borough of Camden
- The City of London
- Westminster City Council
- Transport for London
- The Royal Parks
Section 1
State of the art review

Background

37. The main objective of the state of the art review is to research existing cycle hire schemes (mainly in Europe) to determine if it is technically feasible for implementation in London. It also aims to identify best practice/lessons learnt from other schemes that could be considered for the implementation of a central London scheme. This section includes the following areas:

1.1 Overview of existing schemes:
Provides a brief history of the main schemes, their operational characteristics, political and geographical context and best practice

1.2 Current situation in London:
Gives an overview of cycling in London

1.3 Existing systems:
Brief summary of the different operation systems available

1.4 Conclusions of Section 1

38. This section was collated based on existing available information and also from direct conversations with operators and city authorities. The authors also conducted a site visit of some of the schemes

39. The information in this section is considered to be accurate at the time of writing. However, some changes could have taken place subsequently to some of the schemes

40. The advantages and disadvantages of each scheme reflected in this report are based on the authors’ opinions and should not be used as a basis to judge the effectiveness of each scheme. Each scheme works under different circumstances, with implementation based on particular requirements

I.1 Overview of existing schemes

41. The following European cycle hire schemes were reviewed in detail:
- Vélib’, Paris
- Vélo’v, Lyon
- Cyclocity, Brussels
- Bicing, Barcelona
- Call a Bike, Berlin
- Call a Bike, Stuttgart
- OYBike, London

42. A brief review of cycle hire schemes in the Netherlands, Gothenburg, Beijing, Cambridge, Copenhagen and Vienna was also conducted

43. The schemes were selected on the basis of size, operational characteristics and because they provide a broad range of different characteristics
I.1.1 Vélib’, Paris
(Operated by JCDecaux)

Scheme history
44. On 15 July 2007, the city of Paris launched the self-service cycle hire scheme known as Vélib’. Aiming to reduce pollution, help users to stay fit and raise the awareness of cycling, the scheme has been deemed very successful by Parisians (reflected in high levels of satisfaction in the latest poll). It has also had high usage and favourable press coverage. The system has been advertised as a quick and easy way to make short journeys

45. In its first year Vélib’ had 198,913 annual subscribers, 277,193 seven-day subscribers and 3,683,714 one-day subscribers. The bicycles were rented 26 million times with an average journey time of 18 minutes

46. The number of cyclists in Paris has increased continuously over the last few years, with a rise of 48 per cent between April 2001 and December 2006 (Mairie de Paris, 2008)

Operational characteristics
47. The scheme began with 10,648 bicycles and 750 docking stations located strategically around the city centre, targeting public transport stations, tourist attractions and commuter routes. There is a docking station located approximately every 300 metres, although in the core of the area this is as low as every 50 metres. There is an average density of eight bike stations per km². There is a ratio of 1.7 docking points for every bicycle to ensure docking space is always available. Currently there are 16,000 Vélib’ bicycles in circulation and there will be 20,600 bicycles and 1,451 docking stations by the end of 2008. This makes Vélib’ the largest system of its kind in the world

48. Users access bicycles directly at the docking point through a smartcard that has previously been sent to their address, or via a user terminal located next to the docking station

49. A €150 deposit is held on the user’s bank card when borrowing a bicycle and if the bicycle is not returned within 24 hours, the bank card is charged this amount in full

50. If a bicycle is hired and re-docked within two minutes, three times in a row, the bicycle is automatically identified as faulty and taken out of service

51. Ten electric vans and 400 staff are in charge of maintenance and re-distribution of the bicycles. Eighty per cent of maintenance is completed on site as there is an underground storage compartment at each docking station that holds maintenance equipment. A maintenance barge that travels along the river is also in operation

Tariffs
52. There is a 30-minute free period of use. For the first additional half hour €1 is charged and €2 for the second additional half hour. After this, the cost rises to €4 per additional half hour

Funding and political context
53. The scheme was implemented and is operated, free of charge to the city by JCDecaux, in return for rights to 1,600 advertising hoardings around Paris and space to allocate the cycle stations. JCDecaux also pays the City of Paris €3.5 million a year and a percentage of any revenue raised. JCDecaux neither invented nor pioneered cycle hire operations, but has applied it on a larger scale compared to any of its predecessors

54. Paris is broken down into 20 arrondissements, each having a directly elected council, which in turn elects an arrondissement mayor. A selection of members from each arrondissement council forms the Council of Paris, which in turn elects the Mayor of Paris

Geographical context
55. The Vélib’ scheme covers an area of approximately 90 km² in the heart of Paris and is highly visible to visitors. The distinctive bicycles, the large stations and the sheer number of users are apparent across the centre of the city. The scheme is effectively targeting the ‘near market’ – those who might consider cycling but need some incentive or encouragement to do so. The scheme also promotes the potential for air quality improvements and is part of the ‘urbanism’ agenda in Paris
1.1.1 Vélib’, Paris
(Operated by JCDecaux)

Key learning points

- Politically popular, received very well by the media
- Robust and relatively easy to maintain
- JCDecaux as the operator bears the scheme risks and liability
- High visibility
- Increased political momentum for improving cycling in the city
- Phased implementation (increasing scale of scheme) to target demand with the ability to make adjustments to the positioning of stations
- Cheap, accessible public transport alternative for Paris
- High cost of implementation (capital expenditure)
- Paris handed over city assets to a private company in order to fund the scheme
- The scheme could have declining usage in winter months

- The scale of scheme requires significant land contribution
- Approximately 1,000 bicycles have been stolen from their base since the beginning of October 2007, in part due to incorrect attachment to the docking points
- A safety campaign on bicycle safety was launched alongside the scheme, with every subscriber receiving a bicycle safety leaflet
- The scheme is being implemented in phases, with extra bicycles and docking stations added to specifically target areas of high demand
- Every Sunday roads and bridges along the Seine are closed to motorised traffic. This further encourages the use of the bicycles on weekends
- Each terminal at the docking station has instructions in several languages
- All wires on the bicycle are internal, to reduce vandalism
- Eighty per cent of bicycles are located on former car parking spaces
- Bicycle redistribution is minimised by targeting specific demand
- Redistribution due to maintenance is reduced as 80 per cent of repairs are completed at the docking stations
- All re-distribution vans are powered by bio-fuels

Operational characteristics

- The scheme has 4,000 bicycles and 400 docking stations that were implemented gradually and located strategically around the centre of Lyon. The scheme has higher visibility than the Paris Velib’ scheme because there was greater freedom to choose sites for docking stations. This resulted in the installation of large docking stations in prominent locations
- There is a 30-minute free period of use (with an average time of use of approximately 16 minutes) and each bicycle is used on average eight times per day. One bicycle is rented every two minutes in Lyon, contributing to approximately 20,000 trips a day
- Three vans redistribute bicycles although only 20 per cent of re-distribution by van is required since 60 per cent of redistribution occurs naturally and 20 per cent is forced; for example, when the docking station is full so the user re-docks at another station. In Lyon, there is a slightly lower ratio of 1.5 docking points per bicycle
- Access to a bicycle is via a user terminal. The system has 60,000 registered users of which 50 per cent are below 30 years of age and 33 per cent are students.

1.1.2 Vélo’v, Lyon
(Operated by JCDecaux)

Scheme history

- The Vélo’v scheme in Lyon was implemented in May 2005. It was the first large scale cycle hire scheme to be operated in Europe and was a flagship for JCDecaux, providing it with added impetus for advertising in France. The scheme also provided JCDecaux with vital experience which it utilised for the Vélib’ scheme in Paris by making a number of improvements

Operational characteristics

- The scheme has 4,000 bicycles and 400 docking stations that were implemented gradually and located strategically around the centre of Lyon. The scheme has higher visibility than the Paris Velib’ scheme because there was greater freedom to choose sites for docking stations. This resulted in the installation of large docking stations in prominent locations
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- Access to a bicycle is via a user terminal. The system has 60,000 registered users of which 50 per cent are below 30 years of age and 33 per cent are students.

Tariffs

61. The system offers the following tariff structures:

1. Long term card for which rental costs are as follows:
   - Registration fee €5.00
   - First 30 minutes free
   - Thirty to 90 minutes €0.50
   - Each hour thereafter €1.00
   - The card works like a pre-payment card
2. Short term card for which rental costs are as follows:
   - Registration fee €1.00
   - First 30 minutes free
   - Thirty to 90 minutes €1.00
   - Each hour thereafter €2.00
3. If the user has a Lyon public transport pass this can be used as a Vélo’v subscription card once a registration form has been completed. Rental costs are as follows:
   - Registration fees €5.00
   - First hour free
   - One hour to two hours €0.50
   - Each hour thereafter €1.00
   - This card works like a pre-payment card
62. A €150 deposit is held on the user’s bank card when borrowing a bicycle and if the bicycle is not returned within 24 hours the card is billed
Funding and political context

63. The scheme was implemented and is operated by JCDecaux, giving it the rights to advertising in Lyon similar to the contract awarded in Paris. It seems that the contract awarded by the government to JCDecaux for Lyon was on a much smaller scale, with a lower prevalence of advertising around the city.

64. Like Paris, Lyon is divided into a number of municipal arrondissements (nine in Lyon), each of which is identified by a number and has its own council and town hall.

Key learning points

65. JCDecaux implemented the Lyon scheme two years prior to the Paris scheme, which allowed it to fine tune and improve the system in Paris. Below is a summary of the adjustments that it has made in response to the lessons learnt from the Lyon scheme:

1. Docking points: The points in Paris are more curved and ‘sleek’ (as shown in the pictures below) allowing the bicycle to be docked more easily. The pedal sometimes hits the docking station in Lyon and the docking point is more difficult to access. This issue has also been addressed in Paris.

2. Bicycles: The bicycles used in the two schemes are quite similar but a number of improvements have been made in Paris such as reducing the number of parts, improving the strength of the bicycle and making the bicycle easier to fix. These changes significantly reduce the maintenance costs of the scheme. There are also better lights on the Vélib’ bicycle, improving safety when cycling in the dark.

3. Accessing bicycles: In Lyon, to obtain a bicycle a user needs to type in their details in the terminal at the docking station. In Paris, once the user is registered, they get a smart card, which they can use on the individual docking points to obtain the bicycle, allowing much easier access to the bicycles and significantly reducing queuing at the docking station terminals.

Scheme history

66. Launched in September 2006, Cyclocity is a small-scale scheme with only 250 bicycles and 23 stations. It was implemented in a single phase by JCDecaux following the experience gained from the scheme in Lyon.

Operational characteristics

67. Registered customers may hire any of the 250 bicycles available from the 23 hubs downtown in a network of stations, which are around 300 metres apart. Members must be at least 14 years old to register for the scheme. Bicycles, as in Paris and Lyon are available 24-hours-a-day, seven-days-a-week.

Tariffs

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Key learning points

68. Since its implementation, Cyclocity has experienced relatively low levels of use. The reasons for this could be due to one of the following:

1. Scheme size is too small. Based on research undertaken by London Analytics (2007) on the network effect and the law of increasing returns, the take-up of a cycle hire scheme increases at a greater rate than the extent of implementation. This means that scaling down a project would reduce demand much more rapidly than it reduces supply. With only 23 docking stations, the available origin destination pairs in Brussels are limited, hence the possible low up-take of the scheme.

2. The bicycles are heavier than those used in Paris and Brussels has many cobbled areas which may discourage users.

3. There is a charge for the first 30 minutes of use, (this period is free in Barcelona, Paris and Lyon). Customer research undertaken for London shows that a charge for the initial 30 minutes could reduce up-take by up to 15 per cent. However, in a smaller city and with limited network options this impact could be higher.
Scheme history
72. The Bicing scheme in Barcelona was implemented in May 2007. The tender process took nine months, including a three-month public consultation period, before Clear Channel was awarded the contract.

Operational characteristics
73. The scheme began with 1,500 bicycles and 100 docking stations located strategically around the centre. The scheme has been increased to 6,000 bicycles and around 200 stations. The main aim of the scheme was to provide a new public transport mode to become the last leg of people’s journeys. The objective was not to get people out of their cars but instead predicting a modal shift from other public transport modes and walking trips.

74. By November 2007, the system had 90,000 registered users, contributing towards 22,000 trips a day on average, with 15 trips per bicycle. The average trip is 15 minutes duration and 3km long. Peak use periods are between 08:00-10:00 and 14:00-16:00, but most of all in the evening, around 20:00.

75. Users access the bicycles by swiping a smartcard at the terminal located next to the docking station. The system then unlocks a bicycle and informs the user which bicycle to pick-up.

76. The scheme has been extremely successful with a bike being used on average 15 times a day. The success of the scheme was not as predicted and as a result the demand has been underestimated. This has resulted in higher operational costs and sometimes bicycles not being available at some locations. Even so, the scheme is still extremely popular among users. This is reflected in the high level of subscriptions that has been maintained throughout the operation of the system.

Tariffs
Bicing operates a two-tariff structure:

<table>
<thead>
<tr>
<th>Annual subscription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration fee</td>
</tr>
<tr>
<td>First 30 minutes</td>
</tr>
<tr>
<td>Additional 30 minutes up to two hours</td>
</tr>
<tr>
<td>Penalty for exceeding two hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weekly ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration fee</td>
</tr>
<tr>
<td>First 30 minutes</td>
</tr>
<tr>
<td>Additional 30 minutes up to two hours</td>
</tr>
<tr>
<td>Penalty for exceeding two hours</td>
</tr>
</tbody>
</table>

Cancellation of the service for exceeding two hours of use after three notices.

81. Key learning points

- The scheme has been very well received by the media.
- Good weather in Barcelona promotes use; weather can be a big factor in variations of use.
- The scheme has helped to provide political momentum for improving cycling in the city.
- Implementation has been phased in order to best meet demand (similar to Paris and Lyon).

Funding and political context
78. The City of Barcelona decided to pay Clear Channel a fixed sum each year to implement, maintain, operate and expand the scheme, rather than fund it through advertising. Some of the funding comes from the on-street car parking charges. A third of the cost is also covered by the revenue generated from registration fees and extended time usage.

79. Barcelona is similar to London with respect to the governance of the city, with a central authority body and a number of districts working together. The city council has jurisdiction in the fields of city planning, transportation, municipal taxes and public highways. These competencies are shared with the Generalitat de Catalunya or the central Spanish Government.

Geographical context
80. Barcelona’s climate is evidently favourable for a cycle hire scheme. However, the topography is less so. A gradual but significant slope away from the coastline has led to a number of redistribution vans operating to move the bicycles from the coast back up the slope, as the demand characteristics result in the movement of all the bicycles down the hill.

81. Key learning points

- The scheme is integrated with smart ticketing.
- The scoping process included a public consultation.
- The scheme caused unrest among local cycle hire companies which led to the scheme being made open to residents of Spain only.
- Topography causes a large number of vans to be required in order to re-distribute the bicycles. Ten vans re-distribute bicycles, the same number as in Paris but for less than a quarter the number of bicycles.
- Some conflicts with pedestrians have been reported.
- Demand has been higher than expected and as a result users are sometimes required to wait in order to be able to pick up or drop off their bicycle. Barcelona has implemented various measures to deal with this. In the first instance, the user is given an additional free minute if the docking station is full. The user can also call the operation centre who will dispatch a van to pick up or deliver additional bicycles.
- All of the relevant stakeholders were on board from the start, leading to the predicted land availability problems never materialising.
- At the time of writing [T2]very few people had been injured with no fatalities reported.
- There has been some vandalism.
1.1.5 Call a Bike, Berlin
(Operated by Deutsche Bahn)

Scheme history
82. Call a Bike was implemented in Berlin in July 2002 with 2,000 bicycles located at intersections (of which there are approximately 3,400) across an area of 100km². The population of Berlin is 3,394,000, with approximately 800,000 living in the core area. Levels of cycling in Berlin are high with a large increase over the last 10 to 15 years.

Operational characteristics
83. There are approximately 40,000 Call a Bike customers in Berlin, contributing to the 120,000 Call a Bike customers across the whole of Germany. This has been steadily increasing since October 2001. Usage is concentrated during the evenings and weekends, and the majority of customers tend to be occasional users.

84. This system does not require docking stations. Instead the system uses a mobile phone to activate and de-activate the bicycles. Users register online. Once registered they call the phone number printed on the bicycle they wish to use (unique to the specific bicycle). They receive a four-digit code, which is then tapped into a tactile screen to unlock the bicycle. Once the trip is finished the user only needs to leave the bicycle at a junction and lock it. The system will then ask the user whether he or she wishes to continue using the bicycle later or wishes to ‘free it up’. If the user wishes to free up the bicycle the locking device on the bicycle returns a four-digit code. The user then calls the unique number again, provides the code, and informs the provider where the bicycle was left.

85. In Berlin, there are six, full-time staff (and a further four, part-time in the summer) using two vans to re-distribute and maintain the bicycles.

Tariffs
86. Call a Bike costs eight cents per minute, with a daily tariff cap of €15 and a weekly tariff cap of €60.

Funding and political context
87. The Berlin scheme is initiated and funded entirely by Deutsche Bahn with no financial commitment from the city authority. Permissions from the authority are not necessary, giving Call a Bike complete flexibility in locating its bicycles.

Geographical context
88. Berlin is relatively flat, and there are few natural obstacles, making it ideal for cycle hire. Berlin has, however, experienced economic decline since the fall of the Wall, and this has affected all walks of life in Berlin and may be a limiting factor in the scheme’s success.

Key learning points
89. The scheme was implemented at no cost to the city authority and without handing over assets or space.

- Booking is done entirely by telephone and the lock is attached to the bicycle, hence no on street infrastructure is required.
- Bicycles can be left literally anywhere, giving the scheme flexibility.
- However, there are no guarantees provided of a bicycle being available at a certain time or place.
- Bicycles are free standing and hence can potentially be knocked over (although this was not witnessed during site visit).
- Very little re-distribution effort is required.
- The scheme experiences relatively low levels of use. This is primarily down to insufficient coverage, ie not enough bicycles for the areas covered by the scheme.
I.1.6 Call a Bike, Stuttgart
(Operated by Deutsche Bahn)

History of scheme
90. Stuttgart uses a slight variation of the Deutsche Bahn scheme. Due to concerns over streetscape clutter and the busy streets in Stuttgart, the city preferred a system that was fixed to stations, similar to the hire bicycle schemes mentioned previously. The system uses the same type of bicycle and uses a mobile phone for activation. However, the bicycle must be re-docked to a docking station before the bicycle can be ‘signed off’

Operational characteristics
91. There are 52 docking stations spread over 40 locations housing 450 bicycles. Stuttgart uses an innovative concept for the operation of the system, named Neu-Arbeit or ‘New Work’. It is a church organised system with a formerly unemployed mechanic and two young adults (with learning difficulties or in socially difficult circumstances) maintaining, cleaning and re-distributing the bicycles. The scheme enables them to learn the value of a day’s work, and provides them with an income during a six-month contract. A centrally controlled computer hub looks at where stations are full/empty and sends orders to the van. It is a successful and politically popular measure.

Funding and political context
92. The City Council went to tender and chose Call a Bike over other providers. This was mainly due to cost, but it also saw Call a Bike as a successful, viable option. The city didn’t want a single private company to control on-street advertising
93. The city wanted to increase levels of cycling, and saw cycle hire as a driving force. The initiative worked, and there is now plenty of political support for cycling with momentum for introducing more cycling measures and allocation of more funding

Geographical context
94. The ‘bowl-shape’ of Stuttgart has meant that the scheme is only available right in the heart of the city, with a few stations located up the hill in any direction. This bowl-shape also worsens the pollution in a particularly car heavy city, so cycle hire was seen as an opportunity to help address this problem.

Key learning points
- The scheme is in operation in London and has not experienced significant theft or vandalism problems
- The size of the scheme is still small and only covers a very specific geographical area

I.1.7 OYBike, London
(Operated by OYBike)

History of scheme
95. OYBike was implemented in Hammersmith and Fulham in August 2004. Currently, there are 130 bicycles in operation; 100 are on the streets of west London, and 30 are located at the University of East London. In three years OYBike has had only 11 bicycles stolen (five of which have been returned and are now back on the street)

Operational characteristics
96. Bicycles are secured to Sheffield Stands which can accommodate up to three bicycles. This equates to approximately 12 bicycles per car parking space (making it the best scheme for space utilisation). Bicycles are locked by a cable connected to a station, attached to the Sheffield Stand
97. Users contact a phone number where a unique pin code is then read out to them and sent back by text messaging. This pin code is entered into the lock to release the bicycle. After use the bicycle is locked into any empty port on an available OYBike station. A unique pin will appear on the lock display that must be sent back to OYBike to end the hire period
98. The bicycles can incorporate other bicycle accessories, for example, kiddie trailers or trolleys. For a full scheme in London, OYBike believes that a system needs a density of 100 bicycles per km2

Tariff
99. Users have to pre-register with an initial usage credit of £10. Optional theft insurance is available at an additional cost of £10. It is currently paid by 10 per cent of users.

100. The bicycles are free to use for 30 minutes and are then £2 per hour up to a maximum of £8 per day

101. Key learning points
- The docking solution utilised by OYBike means that a large number of bicycles can be housed in a small area (up to 12 in a car parking space compared to four or five if a Paris style docking post is used)
- The bicycles are not supported when docked and hence can potentially be knocked over quite easily
- The cost of implementation is relatively low because they make use of existing cycling infrastructure is used
- The scheme is in operation in London and has not experienced significant theft or vandalism problems
- The size of the scheme is still small and only covers a very specific geographical area
1.1.8 Other schemes

102. Other schemes are currently in operation across the world and are summarised as follows:

Netherlands

103. A cycle hire and parking scheme is in operation, run by Ned Rail, that allows customers to hire or park bicycles at major rail stations around Holland. There is a large store of bicycles in a building near to, or as part of, the main station. Users register to use the scheme and can then hire the bicycles from these stores, cycling them to their destination (usually workplace) and parking them on one of the existing cycle stands. The scheme is successful as a large number of cycle stands were implemented at the same time and the large number of commuters coming into the main stations provide ample demand for the scheme.

104. Key characteristics of the Ned Rail scheme:

- There are 17,000 bicycle lockers (to store bicycles)
- Around 100,000 secure manned bicycle parking spaces
- Cost is €2.85 a day for hire of bicycle
- For hiring a luxury bicycle for longer distances the cost is €7
- Yearly membership is €91 (the majority use this method)
- A modal shift from car to bicycle and train has been witnessed
- The scheme operates in 90 buildings over the country
- A 1,000 customers a day makes the scheme profitable
- Storage is the scheme’s primary function; rentals and repairs are additional services to attract extra customers

Gothenburg, Sweden

105. The cycle hire scheme in Gothenburg is purely for employees of companies signed up to the scheme. It works in a similar way to the Ned Rail scheme, with a store of bicycles around main stations. However, only employees from the companies that have signed up to the scheme can access the bicycles. There are stores for the bicycles at the member companies’ offices. The scheme is funded through advertising and offers its members four hours of free use per day on the bicycles.

Beijing, China

106. The city put 50,000 bicycles for rent across the city ahead and during the Olympic Games to curb pollution and ease congestion. Brand new bicycles were available at 230 outlets close to subway stations, commercial districts, Olympic venues, hotels and office buildings as well as in sizeable communities. These were offered by Beijing Bicycle Rental Services.

Cambridge, England

107. In October 1993, Cambridge implemented a cycle hire scheme but it was considered to be a failure. Within 24 hours, all 300 bicycles had been stolen, ending up in rivers, ditches or used to smash windows. The main reason for its failure was the lack of deposit, providing no incentive for people to return the bicycles.

Copenhagen, Denmark

108. Copenhagen Citybike has been in operation since 1995 and is one of the few (if not only) schemes to offer the service for free. Hire is undertaken on a deposit basis using a similar mechanism to that seen on supermarket trolleys in Britain (coin operated). Once the user wishes to stop using the bicycle, they take the bicycle to the nearest stand. However, this is not compulsory and they can elect to simply leave the bicycle anywhere at the cost of their 20DKK deposit (approximately €2.70). The bicycles are strictly available within a designated zone only – taking a bicycle outside is illegal, and will result in a fine.

Feasibility study for a central London cycle hire scheme
1.1.9 Lessons learnt from the review of existing schemes

113. Looking at the examples of cycle hire schemes across Europe, a number of themes can be identified that are consistent with each:

1. In cities with a low modal share of cycling, cycle hire has helped to address this and has also led to more people cycling on regular bicycles.

2. There is a relatively high population living or working in the centre of the city, predominantly where the bicycle stations are located. This provides a blanket demand helping to ensure the scheme’s success.

3. Each scheme has had a pronounced funding stream. Whether it is through advertising hoardings, revenue from car parking spaces or the direct funding from the city authority.

14. Finally, it must be stressed that the schemes are all very different, making comparisons difficult. They differ in size, funding, strategic objectives and style of bicycles and docking mechanisms. No one scheme is the best, they all offer different advantages and disadvantages that should be considered when exploring the possibilities for London.

### Vienna, Austria

109. Vienna initially operated the Viennabike scheme but this was a failure due to high levels of theft. The deposit mechanism used was similar to the Copenhagen Citybike system except, coincidentally, a nearby supermarket used the same mechanism, enabling thieves to steal the bicycles using supermarket tokens. Citybike now operates a JC Decaux system whereby credit card details are given, and the customer pays for the time they have had the bicycle for. Since improvements have been made the system has been successful. Vienna has also implemented a bicycle system to re-distribute bicycles.

### Other cities

110. In 2001, Oslo installed a 1,200 bicycle program for the Norwegian capital, and in 2006, Stockholm implemented a 1,000 bicycle system. Drammen and Trondheim in Norway, Seville in Spain and Rennes and Caen in France have also implemented cycle hire programmes for their cities.

111. Washington, San Francisco, Milan, Tel-Aviv, Montreal and Chicago are currently all tendering, or investigating the possibility of implementing a cycle hire system.

112. Appendix 1 is a table of all known systems in Europe as well as proposed systems throughout the rest of the world.
Feasibility study for a central London cycle hire scheme

115. The following summarises the lessons learnt and key recommendations for London:

- Annual subscription or registration promotes ownership of the scheme for the general public. Witnessed most notably in Stuttgart, residents actually feel a sense of responsibility for the bicycles and feel they need to look after them. Registration also enables the deposit system to work and eases the charging mechanism allowing accounts to be billed directly.
- A strategic pricing structure is required, which may differ depending on the business model. The length of the free period of use, the scale of price increases and the type of charge can all be used to manage demand and promote usage in accordance with the type of scheme, as defined in the business model.
- Smart card usage makes it particularly easy to access bicycles, as seen with the difference between the Lyon and Paris schemes. Queues at docking terminals are unpopular and may limit the success of the scheme.
- Station location choice is imperative to create an effective, safe, usable network and to minimise the requirement for bicycle re-distribution. Where re-distribution is required, this should be done in an environmentally friendly and efficient way.
- Innovative methods to identify land to locate stations will be needed, such as the car parking utilisation seen in Barcelona and Paris.
- The bicycles need to be robust and able to docked easily into a secure docking station. They could potentially be used up to 10 times a day. They will be outside at all times and open to vandalism and being bumped around. They must be sturdy, strong and secure, while at the same time be easy to manoeuvre. They also need to be as difficult to steal and vandalise as practically possible.
- Maintenance must also be easy, with as much work completed on site as possible. Standardised parts, on site storage facilities and versatile trained staff will help this process run smoothly.
- The scheme needs to be visible and easily identifiable to its customers. Any potential scheme would be self-promoting, with more and more people using the scheme increasing its visibility, promoting further growth in usage.
- ‘Teething’ problems should be ironed out as soon as possible after the introduction of a scheme as users will switch away quickly if the scheme is problematic. This can be achieved with the targeting of demand through a phased introduction of the system.
- Finally, project governance should be made clear from the start. The implementation of schemes in cities which have established strong, effective working relationships has been far quicker and smoother.

116. London’s population was 7.5 million in 2005 and is growing by approximately 90,000 people per year. There are approximately 10 million journeys by public transport and a further 17.2 million by car each day in London. Some 22 per cent of trips in London are completed by walking or cycling, with these modes experiencing more growth than any other. In 2004, 0.4 million journeys were made by bicycle, while walking accounted for 5.6 million journeys. London’s geography is ideal for cycling, as central London and many parts of Inner and Outer London are relatively flat. Journeys in central London alone account for four per cent of the total journeys across London, but three quarters of these trips in central London are completed by cycling or walking. There are also 14,000 people entering London by bicycle in the morning peak each day.

117. London had been experiencing a long-term decline in cycling since 1950. However, in recent years, particularly in central and Inner London, cycling has been steadily increasing, with an 83 per cent growth in the number of cyclists over the past seven years. TfL’s data shows that cycle usage is increasing significantly, and the demand for cycle parking and other infrastructure has steadily increased as a result of this increased demand. The modal share of cycling in London is currently around 1.9 per cent.

118. Bicycle ownership is high, with about 17 per cent of Londoners owning a bicycle with approximately 1.4 million bicycles owned in the city. Just under one in three Londoners have access to a bike, with one in ten cycling at least once a week. Four in ten 11-15 year olds cycle at least once a week. Men aged 25-44 are the demographic group most likely to cycle, accounting for 40 per cent of all cycle trips.

119. There is a noticeable gap in attitudes between cyclists and non-cyclists. Cyclists think the bicycle is fast, convenient, reliable, healthy, good value and enjoyable, giving a sense of control and freedom. However, non-cyclists perceive cycling as dangerous and something which they wouldn’t wish to be associated with, although the idea of cycling is appealing from an environmental, health and enjoyment point of view.

120. The barriers to cycling or cycling more often are either infrastructure related, which can be addressed by hard measures such as cycle lanes; or image related barriers which require a softer approach such as training and advertising.

121. The poor image of cyclists (which is even held by many cyclists themselves) is highlighted as an important, but possibly underestimated, barrier to continued growth in cycling. Many parents do not support their children cycling to school because they are concerned about their child’s safety.
Feasibility study for a central London cycle hire scheme

The following table shows the distribution of cycle trips between different areas of London on a typical weekday:

<table>
<thead>
<tr>
<th>Number of cycle trips</th>
<th>Trips</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within central London</td>
<td>5,934</td>
<td>2</td>
</tr>
<tr>
<td>Within Inner London</td>
<td>84,430</td>
<td>30</td>
</tr>
<tr>
<td>Within Outer London</td>
<td>117,145</td>
<td>41</td>
</tr>
<tr>
<td>Between central and Inner</td>
<td>43,194</td>
<td>15</td>
</tr>
<tr>
<td>Between central and Outer</td>
<td>7,268</td>
<td>3</td>
</tr>
<tr>
<td>Between Inner and Outer</td>
<td>20,711</td>
<td>7</td>
</tr>
<tr>
<td>Between Greater London and rest of UK</td>
<td>6,483</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: LATS 2001

Casualty figures are highly variable, but there were approximately 3,000 people slightly injured in casualty related accidents involving cyclists and 500 killed or seriously injured in greater London in 2006 (which is a 50 per cent decline on baseline figures). The following table shows the number of accidents occurring in each of the London boroughs, which are either wholly or partially in central London Travelcard zone 1:

<table>
<thead>
<tr>
<th>Borough</th>
<th>Number of casualty related incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fatal</td>
</tr>
<tr>
<td>City Of London</td>
<td>0</td>
</tr>
<tr>
<td>Westminster</td>
<td>1</td>
</tr>
<tr>
<td>Camden</td>
<td>2</td>
</tr>
<tr>
<td>Islington</td>
<td>1</td>
</tr>
<tr>
<td>Hackney</td>
<td>3</td>
</tr>
<tr>
<td>Tower Hamlets</td>
<td>1</td>
</tr>
<tr>
<td>Southwark</td>
<td>0</td>
</tr>
<tr>
<td>Lambeth</td>
<td>1</td>
</tr>
<tr>
<td>Kensington &amp; Chelsea</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>

Source: London Road Safety Unit

Congestion Charging has had a very positive effect on cycling levels in central London. Cycle flows into the charging zone have increased by around 30 per cent. Overall baseline data on cycling levels in 2000/2001 is limited. However, TfL’s London Travel Report 2003 (TfL 2004) shows that of the 26 million journeys made every day in London, including people commuting, 300,000 are made by bicycle. Roughly the same numbers of journeys are made by taxis, minicabs and the Docklands Light Railway (DLR) together. There has been an overall increase of 49 per cent of inbound pedal cycles into the central London charging zone. Modal share for bicycles has increased from four per cent in 2002 to seven per cent in 2006 inside of the central London charging zone. Cycling kilometres have increased by 43 per cent during the same period.

The cycle hire study area is restricted to Central London; cycle trips made within this area account for just two per cent of the total trips made (based on 2001 data).

127. Casualty figures are highly variable, but there were approximately 3,000 people slightly injured in casualty related accidents involving cyclists and 500 killed or seriously injured in greater London in 2006 (which is a 50 per cent decline on baseline figures). The following table shows the number of accidents occurring in each of the London boroughs, which are either wholly or partially in central London Travelcard zone 1:
1.2.3 Bicycle theft in London

128. The following table shows the numbers of recorded bicycle thefts in each of the London boroughs which are either wholly or partially in central London Travelcard Zone 1.

<table>
<thead>
<tr>
<th>Borough</th>
<th>Theft/Taking of Pedal Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005/06</td>
</tr>
<tr>
<td>Westminster</td>
<td>1,453</td>
</tr>
<tr>
<td>Camden</td>
<td>1,521</td>
</tr>
<tr>
<td>Islington</td>
<td>1,821</td>
</tr>
<tr>
<td>Hackney</td>
<td>1,111</td>
</tr>
<tr>
<td>Tower Hamlets</td>
<td>1,307</td>
</tr>
<tr>
<td>Southwark</td>
<td>1,191</td>
</tr>
<tr>
<td>Lambeth</td>
<td>1,196</td>
</tr>
<tr>
<td>Kensington &amp; Chelsea</td>
<td>919</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,519</strong></td>
</tr>
</tbody>
</table>

Source: London Metropolitan Police

129. It is likely that the figures presented are an underestimation of the true total as, according to the Metropolitan Police, up to 50 per cent of bicycle thefts go unreported.

1.2.4 Clear Zones Partners position on cycling

(Information taken from borough Local Implementation Plans)

Westminster

130. Westminster City Council is fully supportive of TfL’s Cycling Action Plan4. The City council is committed to the current London Cycling Network Plus (LCN+) programme, as well as developing certain routes through the Royal Parks as ‘Green Corridors’ in partnership with the Royal Parks. The Council is also dedicated to increasing the amount of cycle parking in the borough. The borough has concerns over matters such as street clutter and competition rules that all local authorities are bound by in terms of developing a possible cycle hire scheme through a formal procurement process. The Council is also committed to the London road safety target of a 50 per cent reduction in the number of cyclists killed or seriously injured in road accidents.

131. With regard to a potential cycle hire scheme, if implemented, the Council has made it clear that consideration will be made to docking stations replacing small areas of visitor car parking, especially in squares, of which there is an ongoing space rationalisation programme.

Camden Council

134. Camden Council is fully supportive of promoting cycling as a sustainable form of transport that has both environmental and health benefits. It has made great strides in introducing cycle training for both young people and adults. A number of promotional events are carried out throughout the year including a staff ‘bike to work day’ and training. Camden aims to encourage cycling within...
the workplace through leading by example. Camden Council has, for a number of years, operated a scheme of pool cycles for council staff. Camden is also committed to improving safety and providing cycle facilities such as cycle parking and cycle lanes. The needs of cyclists are considered when designing and implementing any scheme. Camden has a cycling plan that outlines the Council’s objectives and targets, including reducing cyclist casualties, monitoring and the implementation of cycle facilities and cycle parking.

135. Perhaps the greatest barrier to cycling in Camden is cycle theft. In the year 2004/05 there were 1,517 reported cycle thefts in Camden, one of the highest cycle-theft rates in London. It is estimated by the Metropolitan Police that the actual figure is approximately 50 per cent higher, as many bicycle thefts are not reported.

The Royal Parks

136. The Royal Parks allows access to its green spaces for cyclists. This is determined by ensuring that the safety and enjoyment of other park users are not adversely affected. Wherever possible, cycle routes in the park link with designated cycle routes outside the park. Generally, cycle routes in the parks tend to be kept to the perimeter. This is because the parks get very crowded. It also helps preserve the landscape character and quality.

137. The Royal Parks is implementing projects for improving cycling provision, both for commuters and cyclists who do not currently use the parks. Their participation in the feasibility study for cycle hire is welcomed and gives an indication of their commitment to cycling.

1.2.5 Is there potential for cycle hire in London?

138. There is a pronounced increase in cycling usage across the Capital, more money is being spent on cycling facilities and more people are considering taking up this cheap, healthy and environmentally friendly form of transport. A cycle hire scheme would add further momentum to this trend and increase the accessibility of cycling for certain groups.

139. Safety is improving and traffic is lower in central London mainly, as a result of the Congestion Charge, although it should be noted that congestion in the original zone has slightly increased since the western extension. There are still some issues that need to be addressed to improve the chances of success of a scheme. Cycle routes are improving all the time, but this must continue, alongside increasing the number and legibility of signs. A cycle hire scheme is likely to increase the number of inexperienced cyclists on the roads. Appropriate safety advice should be given to a potential scheme operator if such a scheme were to go ahead. It is proposed that sections of highway network should also be examined and where appropriate, engineering measures are implemented in order to improve safety for cyclists. Location of docking stations must take into account conflict with other users (mainly pedestrians) and also urban realm and site heritage issues.
1.3 Existing systems

1.3.1 Analysis of different docking mechanisms

146. The following table provides details on the main types of docking mechanisms that have been utilised in existing schemes:

<table>
<thead>
<tr>
<th>Docking Mechanism</th>
<th>How does it work?</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>Fixed ‘posts’ to which the bicycle is attached</td>
<td>Easy to locate, a visible sign of the location of stations and the extent of the scheme</td>
<td>Expensive and relatively inflexible</td>
</tr>
<tr>
<td>Semi-flex</td>
<td>Hire stations equipped with cables (attached to a wall or existing cycle stand), which are attached to bicycles when docked. Bicycles are taken out and returned by use of telephone and pin code</td>
<td>Able to accommodate up to ten bicycles in a single car parking space (compared to four with the fixed system)</td>
<td>Bicycles are prone to falling over and being regarded as untidy on the streetscape</td>
</tr>
<tr>
<td>Flex</td>
<td>Bicycles are self-locking; a metal pole is locked through the spokes. Bicycle is then left in a specific area and accessed by telephone and pin code</td>
<td>Extremely flexible and convenient for the user once they have accessed a bicycle</td>
<td>Difficult to find bicycles and the system relies on trust in terms of returning bicycles and communicating to the system the location of a returned bicycle</td>
</tr>
</tbody>
</table>

Train station orientated

143. This is a scheme based purely on demand at and around mainline rail stations. Pricing allows longer-term hire, typically one day. It could offer a bicycle option for mainline commuters, which can be combined with secure conventional cycle parking and cycle shops. This would not be the wide-scale scheme seen in other cities and may suffer as a result. Tourists would not be likely to use the scheme and it would also be dependant on procuring space around train stations, which is in very short supply. There is also likely to be much lower demand for such an option as it does not remove the barrier of cycle theft which people experience when parking their bicycle on the street.

Bike library

144. This is a scheme that loans bicycles out for longer periods of time (ie half a day or more). This would be more appropriate for the after rail trips and for tourists but may be problematic regarding competition with private firms. They will have far fewer trips per bicycle than a docking station type scheme as they are hired for longer periods of time. They are also more susceptible to theft.

Pool bikes

145. This scheme would focus on providing bicycles to large employers across the capital. Membership would orientate around which company people worked for, and provisions for parking and showering would be required at offices.
1.4 Conclusions of this section

147. A detailed review of existing schemes has lead to the identification of best practice, the definition of success factors and specific recommendations for London. The next sections of this report will address questions on existing demand, space requirements and other key factors. However, a number of conclusions can be made from the review of existing schemes:

1.4.1 Main findings

148. From a technical perspective a cycle hire scheme in London may be feasible and, subject to the results of the demand analysis in the next section, a bespoke system for London could be created.

149. Theft and vandalism in the existing schemes that have been considered have generally not been as severe as predicted. However, the relative levels of bicycle theft compared to cycle hire theft in these cities was not covered by this study.

150. Cycle hire has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles.

151. Delivery of any comprehensive scheme will require full support (institutional and political) from TfL, the London boroughs / local authorities, the Greater London Authority and other stakeholders such as Network Rail and the Royal Parks.

152. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area) coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles. A cycle hire scheme could increase the momentum of this trend and break some of the existing barriers to cycling in London including:

- Access to a bicycle
- Theft
- Parking and storage
- Maintenance

153. Some barriers and issues will still remain and need to be addressed properly. These include:

- Safety concerns
- Navigational issues (difficult to navigate in central London)
- Use of a bicycle by inexperienced users
- Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other measures
- Payment mechanisms for hiring the bicycles (payment, deposits, smart cards, credit cards etc)

154. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:

- A deposit mechanism
- An annual subscription or registration process
- A strategic pricing structure
- A Smartcard system
- Strategic location of docking stations
- Innovative docking points to make the most use of available space
- Robust bicycles
- Minimum use of vans to re-distribute bicycles
- Simple maintenance
- A visible and easily identifiable scheme
- Available for use by tourists

155. On street advertising space is not supported by the London boroughs, the Royal Parks or TfL as a funding option for central London. However, there may be opportunities from sponsorship and discreet advertising that is not on street.

156. A pilot scheme is not recommended as it would fail to estimate demand adequately as the success of the scheme depends on the correct number and density of stations to cater for the potential demand.

157. The implementation of a scheme has to be undertaken as part of an integrated package of measures to improve cycling; hence it will need to include, or link into, existing additional measures such as:

- Marketing and communications campaigns (with the various partners and stakeholders involved)
- Training
- Additional infrastructure (cycle parking, cycle lanes, improvement to junctions)
- Safety and cyclist responsibility campaigns
- Signage / legibility

158. Given the experiences learnt from schemes elsewhere, and having examined the current situation in London, then the objectives of a cycle hire scheme in central London could be as follows:

- Provision of a new emissions-free individual transport system that will enable short-trips within central London
- Address barriers to cycling such as access to a bicycle and theft
- Increase modal share of cycling and contribute to TfL and borough-wide objectives on cycling
- Help create a more walking and cycling focused city with less motorised traffic
- Health benefits associated with increased levels of cycling
- Journey time and journey time reliability benefits
- Reduction in overcrowding on buses and the Underground in central London
- Promote tourism
Section 2
Demand analysis and customer research

Background

159. It is crucial to know if sufficient demand exists to ensure a scheme is feasible and represents value for money. The successful implementation of other schemes around the world provides the opportunity to learn from their experiences in terms of provision of service (density of docking stations, number of bicycles etc) and usage of bicycles. Average daily use of the bicycles is a critical success factor for the scheme, both in terms of efficient use of the infrastructure and in promoting cycling. Being able to forecast demand will also help match the potential number of users with sufficient bicycles and docking stations. Furthermore, it will improve understanding of potential markets

160. This section includes the following areas:

2.1 Differences between central London and Paris:
Highlights the main geographical and socio-demographic differences of the two cities. This allows the central London cycle hire scheme to be placed within the context of the city’s specific characteristics

2.2 Tourists and visitors:
Provides an estimate of daily tourist and visitor trips made in central London suitable for cycle hire.

2.3 The after rail market and additional business trips:
Provides an estimate of trips made by after rail commuters from rail terminals to their final work destination in central London. It also provides an estimate of additional trips made by after rail commuters (in addition to their journeys to and from Zone 1)

2.4 Market research:
Provides an estimate of the likely uptake of a cycle hire scheme for the various markets

2.5 Demand analysis:
Provides an estimate of potential demand for a cycle hire scheme in central London

2.6 The night time market and seasonality:
Provides a brief explanation of the night time economy and possible seasonality

2.7 Why a pilot fails:
Explains in detail why a pilot scheme is not recommended

2.8 Impact to taxi trips:
Brief analysis of potential modal shift from taxis to cycle hire

2.9 Conclusions of this section

161. An analysis of existing data was undertaken to provide a realistic overall estimate of potential demand. This allowed the calculation of potential cycle hire trips from the total number of trips currently made within central London

162. More specifically, an analysis was made of all trips which have an origin and destination within London’s Travelcard Zone 1. This is based on the results of the London Annual Travel Survey 2001 (LATS 2001), which includes all residents from within the M25. Tourist and visitor trips were estimated from other sources, while after rail commuter trips were taken from LATS rail data. This analysis was then combined with the market research data to calculate the proportion of trips likely to switch to a cycle hire scheme. Appendix B shows data sources used for this study

163. It is worth mentioning that prior estimates of demand for cycle hire made by other cities have been exceeded by actual uptake (Barcelona, Lyon, Paris). This does not mean that this will necessarily be the case in London, although a risk of underestimating demand might be present

5 At the time of writing LATS 2001 data was the most recent available source
2.1 Differences between central London and Paris

164. London Analytics was commissioned to look at the elements of the Parisian success from the demand analysis point of view. Paris was selected as it is the biggest scheme currently in operation. Also the city of Paris shares some characteristic with London as a ‘world city’ (similar population, number of visitors, public transport provision, etc). The findings were then compared to the study area in London

165. The main differences between the study in London and the existing scheme in Paris are as follows:

- Smaller deployment area – 40 km² in London compared with 87 km² in Paris
- Lower population within the deployment area – 400,000 in London compared with 6,500,000 in Paris
- Lower population density – 12,000 people per km² in central London compared to 24,000 in Paris
- Fewer trips are made by the inhabitants of the metropolitan area – 815,000 (Zone 1 to Zone 1) in London compared to 6.5 million in Paris.
- Fewer trips above 1 km – 256,000 trips in London compared to 3.25 million in Paris (average weekday)
- Higher cycling mode share in Central London (increase of 86 per cent since 2000 in London compared to 46 per cent in Paris in the same period up to the introduction of Vélib’)
- Much greater employment density in London than Paris. Paris has 1.6 million jobs with a density of 18,390 jobs per km² – London has 1.53 millions jobs with density 45,000 jobs per km². By 2025 London is expected to have 1.89 million jobs with a density of 55,588 jobs per km²

166. The observed uptake in Paris is around three per cent (including trips by tourists and visitors). Of all existing trips, three per cent are made by cycle hire. The majority of these trips are made by residents within the deployment zone (the Boulevard Périphérique)

167. Based only on trips made by residents London has fewer potential trips than Paris, resulting in a possible lower predicted usage of cycle hire. However, in addition to resident trips, many thousands of trips in London will be made by tourists, business visitors and rail commuters

2.2 Tourists and visitors

168. London has a significant number of visitors and tourists – 26 million a year in greater London (compared to 15 million in Paris). They also stay longer with an average length of stay of 4.6 nights (compared to 2.1 nights in Paris).

169. Based on tourist and visitor data from the London boroughs, it has been assumed that 75 per cent of trips are made in central London. For example, even if a tourist or a visitor stays in Outer London they are likely to travel into central London for some of their stay. Many tourists will stay (and make trips) within central London for the entirety of their stay

170. Assuming a conservative rate of three trips per day and a trip length distribution profile similar to that of trips made by residents (around 30 per cent of trips are longer than 1km) this gives an estimated 230,000 daily trips of more than 1km by tourists and visitors to London

171. The calculation is as follows: 26 million visitors and tourists a year equates to around 71,233 arriving daily. Each staying 4.6 days and undertaking three trips per day equates to around 983,000 daily trips. Of these, 75 per cent are undertaken in central London and around 31 per cent are of more than 1 km. This equates to 230,000 daily trips of more than 1 km by visitors and tourists to London

2.3 The after rail market and additional business trips

172. Around 522,000 trips terminate in central London at National Rail stations, most of which take place in the morning peak. The busiest eight stations produce approximately 300,000 trips, for which the journey between the station and the final destination, within Zone 1, is in the range 1 km–8km (LATS 2001)

173. LATS data indicates that the average Zone 1 commuter makes 0.56 trips per day in Zone 1 (in addition to their journeys to and from Zone 1). Commuters coming from outside the greater London (not included in LATS) area are bound to make additional trip throughout the day, in addition to their journey to and from work

174. If we assume same travel patterns, 58 per cent of the 522,000 trips terminating at a central London National Rail station would make 0.56 additional trips throughout the day. This equates to 168,000 additional journeys during the working day. This figure is used in table 2.5.1 to estimate total demand

2.4 Market research

175. The key output required from the market research was an estimate of the likely uptake of a cycle hire scheme on an average day

176. Supplementary aims were to:
- Identify the segments most likely to use a scheme and the characteristics of scheme users
- Explore the relative importance of different barriers to use
- Examine the sensitivity to some key aspects of the design of the scheme
178. The market research involved two complementary surveys: 720 face-to-face interviews conducted ‘in-situ’ (on street or at station in central London) and 2,009 online / web surveys. The research was carried out in December 2007. Figure 2.4.1 and table 2.4.1 show the potential uptake of trips as predicted by the market research.

Figure 2.4.1  
Market research results

180. The uptake is fairly consistent across all the different user groups. The average percentage uptake, nine per cent, is significantly higher than the observed uptake in Paris of approximately three per cent.

181. The reason for a higher uptake in London could be explained by the following factors:

- The cost and level of congestion on the public transport network is higher in London than in Paris and hence a mode shift to bike might be a more attractive option. A weekly Travelcard in London costs approximately 50 per cent more than in Paris.
- From the recent increase of levels of cycling in London it could be said that Londoners have a better disposition to cycling than Parisians.
- The age profile for the comparable metropolitan populations of Ille de France and Greater London shows that 50 per cent of the population of Greater London, compared to 45 per cent of the population of Ille de France is between 15 and 44 years old – the age group most likely to cycle.

182. Although there is a natural tendency to be affirmative in stated preference surveys, only those respondents that said they would ‘definitely’ use the system were included in the uptake figures. Also, the study was conducted during the winter months, so figures are considered to be realistic. The following figure (2.4.2) shows the mode of transport that the cycle hire journey would have replaced in both the in-situ and web survey. Both surveys show that the majority of the mode shift would be likely to come from bus and the underground. The vast majority of the ‘none of these’ responses are referring to trips that are currently walked.

Figure 2.4.2  
Customer research; Mode replaced by cycle hire

<table>
<thead>
<tr>
<th>% Uptake predicted in customer research</th>
<th>Leisure</th>
<th>Commuter</th>
<th>Student</th>
<th>UK Visitor</th>
<th>Overseas visitor</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>leisure (203)</td>
<td>11%</td>
<td>16%</td>
<td>16%</td>
<td>17%</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>commuter (117)</td>
<td>10%</td>
<td>10%</td>
<td>13%</td>
<td>16%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>student (121)</td>
<td>14%</td>
<td>19%</td>
<td>18%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>tourist (227)</td>
<td>14%</td>
<td>12%</td>
<td>10%</td>
<td>17%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>total (561)</td>
<td>11%</td>
<td>12%</td>
<td>11%</td>
<td>12%</td>
<td>10%</td>
<td>11%</td>
</tr>
</tbody>
</table>

179. Table 2.4.1  
Uptake predicted by customer research for different user groups who would ‘definitely’ use the system.
2.4.1 Other findings from the market research

183. Supplementary information was captured from the market research. This includes the following:

- Accessing bicycles by telephone was seen as a minor deterrent – 14 per cent of respondents said that they would definitely not use these types of system.
- There was some interest in hiring for a whole day: 26 per cent of respondents said they would prefer to hire for the whole day. This reflects the fact that a cycle hire scheme could complement longer day hire schemes provided by private companies.
- Scheme uptake is likely to be around 20 per cent less after dark.
- A free period of use is a significant incentive.

2.5 Demand analysis

184. Altogether, 815,000 trips occur entirely within Zone 1 on a typical weekday (LATS 2001). However, 1km to 8km is considered to be the distance over which cycling is time-competitive with all other modes. Any trip of less than 1km can be walked in less than 12 minutes (at a speed of 5 kph), hence cycling might not be competitive. On the other hand, an 8km trip would take more than half an hour by bike (at an average speed of 15 kph), at which point bus or underground becomes a better alternative. As the entire study area is within the 8km range, only trips that are less than 1km should be discounted. Of the 815,000 daily trips, 256,000 of these are over 1km.

185. If the predicted uptake from the market research is applied to all trips (of more than 1km), which have an origin and destination within London’s Travelcard Zone 1, it is possible to estimate the number of trips by journey purpose that would be undertaken by cycle hire. This is shown in table 2.5.1 below:

Table 2.5.1
Estimated breakdown of cycle hire trips by journey purpose (except after rail market)

<table>
<thead>
<tr>
<th>Zone 1 to Zone 1 daily trips over 1km</th>
<th>Uptake predicted by customer research</th>
<th>Estimated number of potential daily cycle hire trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trips by residents of greater London (inside M25) excluding after rail (LATS 2001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usual workplace</td>
<td>70,400</td>
<td>8%</td>
</tr>
<tr>
<td>Other work related</td>
<td>21,760</td>
<td>8%</td>
</tr>
<tr>
<td>Education</td>
<td>11,776</td>
<td>12%</td>
</tr>
<tr>
<td>Shopping and personal business</td>
<td>75,008</td>
<td>10%</td>
</tr>
<tr>
<td>Leisure</td>
<td>67,328</td>
<td>10%</td>
</tr>
<tr>
<td>Other (inc escort)</td>
<td>28</td>
<td>9%</td>
</tr>
<tr>
<td>Total trips in zone 1 over 1km</td>
<td>256,000</td>
<td>10%</td>
</tr>
<tr>
<td>Additional business trips</td>
<td>168,000</td>
<td>8%</td>
</tr>
<tr>
<td>Visitor trips based on visitor numbers and length of stay data*</td>
<td>230,000</td>
<td>8%</td>
</tr>
<tr>
<td>Total daily trips (excluding after rail)</td>
<td>616,160</td>
<td>8%</td>
</tr>
</tbody>
</table>

Data provided by Visit London.
2.5.1 The after rail demand

190. The reason why the after rail market is not included in the analysis above is that the service patterns for this market are significantly different. For the after rail market around 300,000 trips (suitable for cycling – in the range 1km to 8kms) terminate at the eight central London mainline stations. Assuming an uptake of eight per cent, this would mean that around 24,000 trips would be by cycle hire.

191. Of these 24,000 trips, 90 per cent of them would take place in the morning peak (between 07:00 and 10:00). This equates to 21,600 trips concentrated in a three-hour period. In principle this means that to cater for this market 21,600 bicycles would be required (as the demand is concentrated over a short period of time).

192. Even if a significant re-distribution effort took place that could turn around bicycles in one hour this would mean that around 7,200 bicycles would be required along with the necessary logistics and equipment to re-distribute them.

193. Another issue is that this large number of bicycles would then need to be located in the centre of London but not all would be used until the afternoon peak (as a return journey to the rail station). This means that a significant number of bicycles would only make two trips per day. This would bring down the average use per bicycle per day, making a potential scheme less cost effective.

2.5.2 Number of docking stations

194. Finally, the space necessary to allocate 21,600 bicycles or even 7,200 bicycles at the main railway stations is not available in the short-term. Even allocating bicycles immediately adjacent to the railway station would be a significant challenge.

195. In Paris the cycle hire stations are intentionally located away from the mainline stations. From the rationale above it is suggested that London follows the same principle and that the after rail market is not catered for in the initial implementation of a potential scheme in London.

196. There is the opportunity to cater for this market but its implementation needs to be over a longer period of time. The complex and substantial redevelopment plans for main railway stations such as Victoria and Cannon Street coupled with the different on-street logistics needed for a scheme that caters for the after rail market, means that further studies will be required.

197. The exact number of docking stations within the deployment area will be determined during the implementation of the scheme. It has, however, been decided that a similar density to the one provided in Paris should be pursued. This is a minimum of eight docking stations per km2. Of course, the number of stations varies depending on the average number of bicycles per station.

198. Operators have suggested that a ratio of 1.7 spaces per bicycle should be provided as a minimum, as is the case in Paris. Based on this, and the initial provision of 6,000 bicycles, it equates to 10,200 docking points.

199. Again, there is no exact figure as to the number of points per docking station. Paris has an average of 24 but this varies depending on each site. Some sites will have more than 24 docking points, some will have less. Some sites have up to 75 spaces. In London this will be determined when the scheme is implemented and experience elsewhere shows that adjustments will need to take place once the scheme is operational.

200. It is, however, recommended that enough bicycles are concentrated at each docking station. This is preferred to having too many docking stations with few bicycles as this would make re-distribution more difficult. The following analysis is provided based on 6,000 bicycles and 10,200 spaces in a deployment area of 40 km2.

Table 2.5.3

<table>
<thead>
<tr>
<th>Average number of docking points per docking station</th>
<th>Average number of docking stations required</th>
<th>Average number of stations per km2</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>464</td>
<td>12</td>
</tr>
<tr>
<td>24</td>
<td>425</td>
<td>11</td>
</tr>
<tr>
<td>26</td>
<td>392</td>
<td>10</td>
</tr>
<tr>
<td>28</td>
<td>364</td>
<td>9</td>
</tr>
<tr>
<td>30</td>
<td>340</td>
<td>9</td>
</tr>
<tr>
<td>32</td>
<td>319</td>
<td>8</td>
</tr>
<tr>
<td>34</td>
<td>300</td>
<td>8</td>
</tr>
</tbody>
</table>

201. As can be seen above, the minimum density required is achieved with 300 stations. On the other hand, 392 stations provide good density with a good concentration of bicycles. Finally, 425 docking stations might be difficult to achieve (based on space availability). Based on the assumptions and the calculations above it is recommended that anything between 300 and 400 stations are provided.
2.6 The night time market and seasonality

The night time market and seasonality

202. The pattern of use through the day in Paris largely mirrors the use of the metro and buses. This study has not examined in detail how cycle hire trips would be distributed throughout the day in London, but it is expected that usage will be high at peak times. It is forecast that demand from tourists will result in usage outside peak hours. Use of the scheme is likely to drop off significantly after dark as this was identified in the customer research as a barrier to use.

Chart 2.6 shows the seasonal use of bicycles in London. It highlights that the flow in the highest month, July, is 77 per cent higher than that in the lowest month, February. Use of cycle hire is likely to be less variable according to season and more dependent on day-to-day weather conditions. This is because users are able to make opportune trips without ‘committing’ to take their own bicycle out. However, seasonal variation can be expected and it will probably follow the same pattern observed as with private bicycle use.

2.7 Why a pilot fails

203. A small-scale pilot should not be used to estimate demand. Due to the network effect of increasing returns, the success of a scheme cannot be determined by a reduced-scale initial implementation. A pilot, if used to test demand, would fail. Sustrans (2005) consulted an expert panel from people who had already set up schemes. The first recommendation from the report stated that:

‘A large scale launch of a central London cycle hire scheme is important. If a scheme is to become part of the public transport system there needs to be sufficient bicycles at frequent intervals, much as is the case for bus stops. Bicycles need to be available not only at stations and major interchanges but at intervals frequent enough to make it possible to easily access a bicycle if one is not immediately available at the first choice location.’

204. It is not recommended to implement a disperse scheme, for example with cycle hire stations at strategic locations only. The success of schemes elsewhere has been reliant on having a critical density of stations. This gives people the security to realise that as long as they stay within the deployment zone they will be able to find somewhere to pick up or drop off a bicycle.

2.8 Impact to taxis and business travel in general

205. The customer research suggested that one per cent of people from the in-situ interviews and three per cent of people in the web-based survey said that they would definitely use cycle hire instead of the taxi they were about to take. This reflects primarily the fact that very few people surveyed were about to use a taxi. This sample is not of an adequate size to reach any generalised conclusions about the potential for cycle hire to replace taxi trips. It is reasonable to assume, however, that there may be barriers to the use of hire bikes instead of taxis. These include the need to carry large items of luggage.

206. Although more market research would be required to provide a more accurate figure this would be expensive, difficult and time consuming (due to the nature of taxi trips).

207. As with the taxi market, further research would be required to determine how important cycle hire could be for general business travel during the working day. This market could be particularly important for any scheme, as much of the other usage may be restricted to peak hours only. Business trips may complement visitor trips in maintaining a reasonable level of usage outside peak hours, but the impact of this has not been assessed due to budgetary and time restrictions on this study.
2.9 Conclusions of this section

2.9.1 Main findings

208. Market research has shown that the potential uptake for a cycle hire scheme is on average nine per cent. The breakdown by each market sector is as follows:
- Leisure – eight per cent
- Commuters – eight per cent
- Students – 12 per cent
- UK visitors – six per cent
- Overseas visitors (tourists) - 10 per cent

209. There are around 55,000 potential daily trips by cycle hire based on existing information (excluding the after rail market). There is always an element of risk, however, in forecasting and the exact demand is difficult to estimate.

210. Based on the information available it is concluded that there is enough demand to make a central London scheme feasible.

211. It is recommended that a minimum of 6,000 bicycles would be required, located at anything between 300 and 400 stations. A minimum density of eight stations per km2 should be pursued.

212. Due to space availability and operational issues it is suggested that the after rail market is not catered for in the initial implementation of any scheme.

213. Due to the network effect of increasing returns, the success of a scheme cannot be determined by a reduced scale initial implementation – a trial would not work.

214. Mode shift from taxis to cycle hire is undetermined due to the very small sample size returned. Equally, cycle hire for general business travel during the working day has not been estimated in detail.

2.9.2 Demand analysis – limitations

215. Location specific demand has not been investigated in detail. This should be done during implementation in order to work out the optimum location and size of cycle hire docking stations.

216. Key cycling routes have also been excluded from the analysis thus far. Although it should not be crucial for the implementation of the scheme, a potential cycle hire scheme would influence where cycle route improvements should be prioritised.

Section 3 Available land

Background

217. To gain an indicative understanding of the available land in central London required for the implementation of the scheme, a brief exercise was conducted with the different partners.

218. The objective of this exercise was to test, in a simple and practical way, how difficult it would be to identify available land for the location of cycle hire docking stations. The exercise did not aim to identify specific locations or to gain commitment from the London boroughs to use suggested sites for the implementation of the scheme.

219. This section includes the following areas:

3.1 Land availability exercise:
   - Brief explanation of land availability exercise undertaken with the central London boroughs

3.2 Space requirements:
   - Description of requirements for allocation of docking stations

3.3 Conclusions of this section
3.1 Land availability exercise

220. Individual short meetings took place with transportation officers in the London Borough of Camden, the City of London, Westminster City Council and the Royal Parks. The main findings from the available land study are as follows:

- One hundred and forty-nine off-street spaces had been identified fairly easily with no significant gaps in coverage of the study area.
- There seems to be enough potential space available, which could be used if appropriate for the implementation of docking stations.
- There is potential for finding spaces in workplaces and private developments.

221. Although the exercise fulfilled the objective of the feasibility study it did not cover the following issues:

1. No political commitment could be given to the provision of these spaces as this study was intended to enable this position to be reached.
2. The exercise did not cover space availability at mainline railway stations.
3. The exercises did not highlight possible issues regarding the planning permission process that might be required to implement docking stations.
4. The exercise did not highlight possible issues regarding competition for space in the highway.

5. Some of the spaces identified might not be suitable due to road safety concerns, location or other technical issues.
6. No attempt was made to match available space to specific demand as it was not part of the scope of the study. However, it remains unproven how good is the fit between the selected sites and local demand. This remains a risk and further work would be required if a scheme was to be implemented.

223. The information provided on possible and probable locations for cycle hire docking stations are shown in Appendix D. An extract of the map is shown in figure 3.1 overleaf as an example.

3.2 Space requirements

224. The demand study has identified a requirement for between 300 and 400 spaces throughout central London to place docking stations, if a scheme were to go ahead. Due to implementation issues the exact number of stations is subject to change (although not significantly). However, from conversations with the various scheme operators the following requirements for space allocation have been captured:

- The precise location of the stations will not be determined until the scheme is defined in detail.
- Even after implementation, the location and size of some of the stations is subject to change as it is difficult to precisely determine demand on a local area basis.
- Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand.
- It is likely (as expressed by existing operators) that some stations will need to be re-positioned. It is recommended to identify more spaces than originally required in order to mitigate this risk.

- It is essential that stations are located near to key areas of high demand such as at visitor attractions, underground stations and large offices. The key visitor attractions for Westminster, Camden, the City of London and the Royal Parks are provided in Appendix C.
- A good coverage is required throughout the whole deployment area so that people know that they are close to a docking station.

Figure 3.1
Probable and possible available land in the City of London (extract of full map)
3.3 Conclusions of this section

225. There seems to be enough ‘potential’ space available, which could be used (if appropriate) for the implementation of docking stations.

226. There is potential for finding spaces in workplaces and private developments.

227. Institutional and political buy-in from the various stakeholders is crucial to secure the space required to implement a cycle hire scheme. This is currently not secured with the boroughs.

228. Some issue may arise with local residents as a result of potential loss of private vehicles parking space if a docking station is provided at parking bays.

229. Any decision to allocate space to docking stations will have to consider that this space will be lost to other potential uses, including conventional cycle parking, car club bays, and charging points for electric vehicles.

230. There are potential risks regarding the planning permission process and changes in traffic orders that might be required to implement docking stations.

231. From conversations with the various operators the following recommendations were identified:

- Even after implementation the location and size of some of the stations is subject to change as it is difficult to precisely determine demand on a local area basis.
- Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand.
- It is likely that some stations will need to be re-positioned. It is then recommended to identify more spaces than originally required in order to mitigate this risk.
- It is essential that as often as possible, stations are located near to key areas of high demand such as at visitor attractions, Underground stations and large offices.
- A good coverage is required throughout the whole deployment area so that people know that they are close to a docking station.

Section 4
Benefits, risks and opportunities

232. The aim of this section is to explore potential benefits and risks of a cycle hire scheme. This will inform decision makers and also steer the implementation of the scheme. This section is not exhaustive but focuses on the main topics.

233. This section includes the following areas:

4.1 Benefits of a cycle hire scheme:
Brief explanation of the potential benefits in relation to existing barriers to cycling, as well as additional benefits exercise undertaken with the central London boroughs.

4.2 Risks and mitigations:
Description of the main risks associated with the implementation of a cycle hire scheme, as well as a brief description of possible mitigation measures.

4.3 Opportunities:
Brief description of existing opportunities associated with a cycle hire scheme.

4.4 Conclusions of this section
4.1 Benefits of a cycle hire scheme

234. The perceived benefits of cycling in central London as identified by the customer research are as follows:

Figure 4.1
Benefits of cycling in central London as identified by customer research

235. It is interesting to note that ‘risk of personal injury’ scores highly with 54 per cent of people mentioning it as a detrimental factor.

236. Potential benefits related to a cycle hire scheme might be as follows:

1. Providing a new individual transport mode (accessibility, connectivity with other modes, resilience to the public transport network, options for users). A cycle hire scheme would provide a new mode of public transport to central London. This would serve to raise the profile of cycling and also to demonstrate a significant political commitment by the city towards cycling. It could help to fill ‘gaps’ in the public transport network and ensure connectivity to and between other modes. It would also add more resilience to the system by providing a third option when there are problems with the Underground or buses.

2. Increasing levels of cycling through reduced barriers to cycling: access to a bike, maintenance and theft. The provision of a cycle hire scheme in central London would allow people who were otherwise put off owning a bicycle, due to concerns over theft or maintenance, to try cycling in central London. Experience elsewhere has also suggested that once people start using a cycle hire scheme a high proportion of them decide to start using their own bicycle.

3. Helping create a more walking and cycling focused city with less motorised traffic. While mode shift from cars is predicted to be quite low, a cycle hire scheme can help create momentum to introduce additional measures to benefit cyclists. These will help to create a much more cycle and walking friendly city.

4. Health benefits associated with increased levels of walking and cycling. Cycling has been demonstrated to cause significant health benefits. According to the BUPA ‘One rough calculation’ suggests that new cyclists covering short distances can reduce their risk of death (mainly due to the reduction of heart disease) by as much as 22 per cent. This is taken from Rutter H. Modal shift. Transport and health.

5. Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London. According to a UKDOT Journey Times Survey (1996): ‘For journeys entirely within central London, the average time was 33 minutes by car, compared with 18 minutes by bike. By public transport the journeys took, on average, 31 minutes by rail and 38 minutes by bus. Taxi journeys took 20 minutes on average.’

6. Reducing overcrowding on buses and the Underground in central London. A cycle hire scheme in central London would help to marginally reduce overcrowding at peak times on the Underground and bus network in the area of London where congestion is at its worst. It also has the potential to reduce overcrowding in other areas if, as has been experienced in other cities, the cycle hire scheme causes an increase in levels of private cycling.

7. Promoting tourism. Implementing a cycle hire scheme would also enable greater freedom and accessibility for tourists who would be able to experience the sights of London by bicycle at a low cost.
4.2 Risks and mitigations

The main risks and potential mitigation measures which have been identified as part of the study are shown in the following table:

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inaccurate demand forecast</td>
<td>Phased approach, flexibility of delivery, flexible contractual arrangements</td>
</tr>
<tr>
<td>2. Theft and vandalism</td>
<td>Deposit, unique design, CCTV, sense of ownership, robust docking technology</td>
</tr>
<tr>
<td>3. Safety concerns (public liability issues)</td>
<td>Cycle training, starter packs, targeted safety campaign, quiet routes, minimise risk to tourists</td>
</tr>
<tr>
<td>4. Political buy-in land contribution / planning permission</td>
<td>Project to include all partners in the process as early as possible, start the process as soon as possible, political buy-in, use expertise available within TfL and boroughs</td>
</tr>
<tr>
<td>5. Conflict with pedestrians (expected)</td>
<td>Safety campaign, enforcement, review clarity of cycle/pedestrian areas</td>
</tr>
<tr>
<td>6. Excessive re-distribution of bicycles</td>
<td>Detailed matching of supply and demand, detailed tender development process</td>
</tr>
<tr>
<td>7. Poor uptake of the scheme</td>
<td>Good design, maintenance, pricing and marketing and communications</td>
</tr>
</tbody>
</table>

### 4.2.1 Underestimation of demand

Several cities have underestimated demand—notably Barcelona, which has more than 200,000 registered users for a scheme of just 6,000 bicycles. The bicycles are used an average of 15 times per day and queues at docking stations can be common.

As a result of this, the demand study for central London has focused on using market research as the main factor on which to base potential use of the scheme. Despite this, some uncertainty does remain. The risk that this poses to the project can be mitigated by the following actions:

- Flexible delivery and contractual arrangements allowing a demand responsive roll-out
- A phased implementation that allows the rapid expansion of the system or particular stations in order to meet unexpected demand
- The use of pricing in order to manage demand
- Not to cater for the after rail market initially. This means not placing docking station immediately adjacent to railway terminals (as is the case in Paris)

### 4.2.2 Theft and vandalism

Levels of theft and vandalism have not been as high as predicted in many of the schemes implemented across Europe. In Barcelona, for example, less than five per cent of bicycles were either stolen or vandalised in the first year of operation. In Paris, the percentage has been higher at around ten per cent.

However, part of the reason for this is that some people didn’t dock their bicycle properly. This allowed opportunist thieves to take bicycles without using force. Such occurrences have, however, become less frequent as people have got accustomed to using the scheme. London is in a fortunate position to be able to learn from examples such as this and ensure that the design is ideally suited to the demands that the Capital will place on it.

Experience learned from OYBike has been very positive. OYBike currently has 130 bicycles, 100 of which are on the streets of west London. In three years it had 11 bicycles stolen (five of which have been returned and are now back on street). OYBike also commented that the majority of problems of this nature occur in the first few weeks after implementation and can be easily minimised by avoiding locations adjacent to pubs and schools. Although all available evidence suggests that this will not be so serious so as to jeopardise the viability of the scheme. However, given the high level of theft of ordinary pedal cycles in the Capital, theft could still be an issue in London.
4.2.3 Safety concerns

242. There are concerns that the introduction of a cycle hire scheme in central London would cause an increase in the accident rate for cyclists. The introduction of schemes elsewhere has not had this effect. In Lyon, for example, while cycling levels have more than doubled, the number of recorded accidents has increased only marginally. This corresponds to a significant reduction in the accident rate.

243. Early figures from Paris also indicate that the accident rate for cyclists has reduced since the introduction of Vélib’. This is demonstrated in the following charts:

244. Chart 4.2.1 shows that the accident rate in Paris has reduced by approximately 18 per cent since the introduction of Vélib’. This is broken down further in Chart 4.2.2, which shows how the number of accidents of different types has varied. It shows that the vast majority of the increase in accidents is made up of slight injuries.

245. Chart 4.2.1 also shows that accident rates for cyclists are 28 per cent higher for central London than they are for Paris (pre Vélib’). For this reason it is possible to assume that cycling is statistically more dangerous in central London than in Paris. All evidence suggests, however, that by increasing the number of cyclists on London’s streets the accident rate will go down (critical mass effect). An examination of the trend in accident rates in London over the last five years shows that as the number of cycling trips has increased the accident rate has decreased.

246. There has been a rise in cycle usage of 86 per cent between 2001 and 2006 (screen line counts). Despite this, collisions resulting in injury to cyclists fell by 38 per cent between 1986 and 2006 (London Road Safety Unit). The casualty rate has therefore reduced significantly. Trends in reported accidents in the Congestion Charge zone showed an even greater decline (Congestion Charging Impacts Monitoring Annual Report Monitoring Report August 2008). Experience in Paris and Lyon suggests that the introduction of a cycle hire scheme has the potential to further lower the accident rate for cyclists. This can be explained by the fact that driver awareness of cyclists increases and hence driver behaviour towards cyclists improves.

247. However, not all collisions involving cyclists can be blamed on poor driver behaviour. They can also be caused by cyclist error or poor highway design. In order to minimise the incidence of accidents, various complimentary measures should be introduced in the run up to, and during, the introduction of a potential cycle hire scheme.
4.2.4 Political buy-in – land contribution / planning permission

248. As discussed in the demand section, the scheme would not work if implemented as a small-scale trial. Therefore, it is essential to get political buy-in from all the major landowners in central London. This will include the London boroughs, TfL, the Royal Parks, Network Rail and private land owners. This feasibility study will provide the evidence required for these key players to decide whether or not they want to progress the scheme.

249. There are also a number of practical considerations that could, if not managed properly, jeopardise the successful delivery of a cycle hire scheme in central London. Issues such as planning permission and conflicts with underground statutory utilities need due consideration.

4.2.5 Conflict with pedestrians

250. There is a tendency in some parts of central London for cyclists to ride through red lights and to cycle on footways instead of on the carriageway. Although this has not proved to have a significant impact on safety, it is illegal and considered undesirable and antisocial, especially by pedestrians. Its causes are likely to be a mixture of poor cyclist behaviour and poor conditions for cyclists. The poor conditions may be either perceived or actual concerns (usually around safety, access or the rider finding it hard to determine which route to take).

251. The introduction of a cycle hire scheme is likely to increase the number of traffic offences committed by cyclists. This would cause an increase in the risk of collisions between cyclists and pedestrians, and for this reason is undesirable. It could also cause the image of the scheme to suffer. In order to mitigate this risk it is necessary to treat the likely causes: poor cyclist behaviour and poor conditions in the carriageway. The former can be reduced by providing the correct information to the user i.e. at the hire terminal, on the website or through the post. The latter can be reduced by introducing traffic calming measures, or by providing more road space for cyclists in the form of cycle lanes. Alongside these measures problem areas can also be targeted for enhanced enforcement in order that cyclists realise that this behaviour is not acceptable.

4.2.6 Excessive re-distribution of bicycles

252. As discussed in the demand section, it is essential that bicycles be distributed as naturally as possible. This can be achieved in London by focusing the scheme on central London rather than Inner London as it contains the greatest density of origins and destinations. By providing 6,000 bicycles throughout central London it is envisaged that they will be cycled to a diverse number of destinations. Work related trips would take place in the morning peak, followed by students a little later. It is assumed (as it has been observed in other cities) that a proportion of the market, namely tourists, will then be able to use the bicycles for their trips throughout the day, thereby helping to re-distribute the bicycles across the central area.

253. This is obviously a crude assessment of predicted trip patterns. A more detailed assessment should take place during the implementation of the scheme. This will inform key decisions about the precise location and size of individual stations.

4.2.7 Poor uptake of the scheme leading to a damaged image of cycling and even the credibility of TfL and the partners

255. If the scheme is under utilised then there is a risk that it will not provide good value for money and that there will be a lot of cycle hire docking stations which effectively become redundant space instead of being used for other street management needs, such as parking. Such areas could become a target for crime in the form of theft and vandalism. The demand study findings suggest that the scheme would be well utilised. This might not be the case, however, if the scheme is poorly designed or implemented incorrectly. Potential causes of poor scheme uptake could include the following:

- Poorly maintained bicycles
- A complicated and time consuming pick-up / docking system
- Docking stations in the wrong locations
- High tariffs

256. The likelihood of the issues occurring can be kept to a minimum by conducting a thorough scheme definition process that fully engages all the relevant stakeholders in order to ensure all the details are considered.

4.3 Recommended additional measures

257. The following additional measures are recommended in order to further enhance the success of a potential cycle hire scheme in central London:

- **Engineering measures** (conversion of one way streets to two way, alterations to road layout, etc.): This would have benefits for all cyclists in Central London. It would improve way-finding and safety.
- **Additional cycle parking** (Sheffield stands): In certain parts of central London there is an acute shortage of cycle parking spaces for privately-owned bicycles. The implementation of a cycle hire scheme may allow the opportunity to install additional cycle parking alongside new cycle hire docking stations. This is likely to be more cost effective than installing them under separate programmes. There are also additional benefits in terms of security. This is of course subject to available space, which is in acute shortage in part of central London. It should be noted, however, that in many central London locations the provision of docking stations will make it more difficult to find space for on street cycle parking.
Marketing and communications campaign: It is suggested that the scheme is launched with sufficient publicity in order to ensure that the public are aware of it. Anecdotal evidence from other schemes suggests that they generated positive coverage in the press and that the use of the scheme increased as a result. For this reason it is also essential that the launch of the scheme is highly successful and that every effort is made to ensure that there are sufficient well maintained bicycles available. It may be necessary to employ additional staff in the early stages to ensure that everything runs smoothly

Safety campaign: Every effort must be made to ensure users are aware of the risks that they face when cycling in central London, as well as what is required of them in terms of adhering to the rules of the road. This can be done by sending starter packs to subscribers who reside in the UK and making promotional material / information available to overseas visitors who use the scheme. Cycle training should also be offered to all those who register for the scheme

Way-finding: Information should be made available to users about routes which are encouraged / discouraged for cyclists to use. This could be facilitated through the provision of maps on a website, leaflets at newsagents, or on screen at the hire terminals

Training for operational staff and awareness for other users of the road network: This would allow extended awareness of the system not only to cycle hire users but also to other road users. In the case of TfL, awareness or a training campaign to existing staff would be highly beneficial especially for bus and taxi drivers as they share the road with cyclists. TfL has ways to extend this beyond its staff and possibly cover other drivers as well, especially those in the freight and servicing industry

Cyclist behaviour: A cycle hire scheme would generate a significant increase in the number of cyclists on central London’s roads. This could potentially create an additional requirement for enforcement, particularly of cyclists encroaching onto pedestrian space

Traffic Calming: In terms of cyclist safety, it would be extremely beneficial if traffic calming could be implemented

Integration with other TfL policies: The cycle hire scheme should be integrated with existing transport policies and measures. This could be, for instance, through adding details of cycle hire stations to the Legible London way-finding maps or perhaps linking to other cycling initiatives or travel demand management measures. Such proposals would be defined in more detail during the scheme definition phase

4.4 Opportunities

258. The implementation of a cycle hire scheme in central London brings with it additional opportunities as described below:

- To involve Londoners in developing the scheme characteristics in order to ensure that the Capital’s unique requirements are met. This could involve working with landowners who have signed up to the scheme, as well as cycling groups and residents. In this way, any potential issues over the management and design of the scheme can be addressed or mitigated
- Integrate society, for example, young offenders and existing operators. This has been done with great success in Stuttgart. Young offenders have been given placements where they are required to carry out bicycle repairs and maintenance.

The scheme has resulted in a reduction in bicycle theft as the previous culprits are reformed and more respectful to people’s ownership of a bicycle. There is also an opportunity to involve existing small private operators with the maintenance, repair and re-distribution requirements

Potential transferability to London 2012 Olympic and Paralympic Games and Outer London town centres. A partly permanent, partly temporary scheme could be implemented for the 2012 Games. There is also potential to introduce cycle hire in other parts of London, possibly in town centres. It is essential that any future expansion is made interoperable with any existing scheme. A separate feasibility study will be required in order to investigate the likely success and key requirements of any additional locations

- Expand cycle hubs and docking stations into economically disadvantaged communities. In the future, the scheme could also be extended into economically disadvantaged communities. This would provide an improved level of accessibility for residents in the area. A separate feasibility study is required before extending the scheme away from central London

- Link to section 106 / Planning applications through the London Plan and Local Development Frameworks: If the scheme is progressed beyond feasibility it is essential that all funding and implementation avenues are explored fully. This could include incorporating docking stations in new developments and also integration to section 106 opportunities that might exist

Integration with Oyster. There is potential to link the scheme to the existing Oyster ticketing system which operates on London’s public transport network. This would allow full integration of a cycle hire scheme with other public transport modes

Implement ‘cycle points’: The introduction of a cycle hire scheme gives the opportunity for central London to improve cycle parking conditions for existing cyclists. Alongside each cycle hire docking station additional cycle parking could be installed. In addition, these cycle points could provide a high level of security through surveillance and improved lighting. This solution is attractive because it links private cycling to the hire scheme. Due to space constraints and the need to accommodate other street management needs, this may not be possible at every docking station.
4.5 Conclusions of this section

259. The following main benefits arising from a potential cycle hire scheme in London have been identified:
- Provide a new individual transport mode
- Increase levels of cycling by reducing barriers to cycling
- Help create a more walking and cycling focused city with less motorised traffic
- Health benefits associated with increased levels of walking and cycling
- Journey time and journey time reliability benefits associated with cycling when compared to other modes in central London
- Reduction in overcrowding on buses and Underground in central London
- Promote tourism
- The main risks and potential mitigation measures which have been identified as part of the study are shown in the following table

Table 4.5.1
Main risks and potential mitigation measures

<table>
<thead>
<tr>
<th>Risk</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>7. Poor uptake of the scheme</td>
<td>Good design, maintenance, pricing and marketing and communications</td>
</tr>
</tbody>
</table>

260. The following additional measures have been suggested as part of the implementation of a cycle hire scheme:
- Engineering measures (conversion of one way streets to two way, alterations to road layout, etc.) to improve safety and way-finding
- Additional cycle parking (Sheffield stands) adjacent to cycle hire docking stations where possible and desirable
- Marketing and communications campaigns
- Safety campaign aimed at cycle hire users
- Measures to improve way-finding for users of a cycle hire scheme
- Training for operational staff and awareness for other users of the road network
- Enforcement and traffic calming
- Integration with other TfL policies

261. The following has been identified as part of the possible implementation of a cycle hire scheme:
- To involve Londoners in developing the scheme characteristics in order to ensure that the Capital’s unique requirements are met
- Integrate society – eg young offenders
- Potential transferability to London 2012 Olympic and Paralympic Games and Outer London town centres
- Expand cycle hubs and docking stations into economically disadvantaged communities
- Link to section 106 / Planning applications
- Integration with Oyster
- Implement secure cycle points with additional cycle parking, maps, and improved urban realm at specific locations
Section 5
Main findings and recommendations

262. From a technical perspective, a cycle hire scheme in London is feasible and a bespoke system for London could be implemented.

263. There appears to be a substantial market for a central London cycle hire scheme with around 55,000 potential daily trips by cycle hire based on existing information. There is an element of risk, however, in forecasting of this nature based on stated preference surveys and the exact demand is difficult to estimate.

264. It is recommended that a minimum of 10,200 docking points with 6,000 bicycles would be required. These would be located at anything between 300 and 400 docking stations. A minimum density of eight stations per km² would be recommended.

265. There appears to be significant demand from after rail commuters. However, sufficient space to cater for the full demand is unlikely to be available. Hence, it not recommended to cater for this market initially.

266. The scale of any scheme is critical to its likely success. Cycle hire stations would need to be located at frequent intervals and placed at strategic locations. Any scheme should be implemented in phases in order to target demand.

267. A pilot should not be used to estimate demand.

268. The current situation in London is identified as suitable for a cycle hire scheme. The recent pronounced increase in cycling, the reduction in cycling accidents (especially in the central London area), coupled with increased spending on cycling facilities and the perceived financial and health benefits are serving to encourage more people to take to their bicycles.

269. Other schemes show that cycle hire has helped to increase bicycle modal share and encouraged more people to cycle on private bicycles.

270. There is a wide range of compatible scheme types, management systems and technologies, from which to choose from.

271. A fixed docking station solution is more efficient for larger schemes.

272. Access to the bicycles must be easy and fast. A period of free use may be an attractive option.

273. Levels of theft and vandalism in the existing schemes that have been reviewed have generally not been as severe as predicted. It should be noted, however, that London has high levels of bicycle theft, a deposit mechanism by users of the system is essential.

274. Political buy-in from major landowners and authorities in central London would be essential for implementation, including TfL, and the central London boroughs.

275. Land availability (competing demands on central London public realm) is one of the main issues facing successful implementation. Space is at a premium around key trip generators / attractors. The existing partnership (TfL and The Clear Zones Partnership) could provide a good base, which could attempt to resolve this issue.

276. It is not recommended to link a potential cycle hire scheme with an advertising contract to help finance the scheme, as this is not supported by the central London boroughs or TfL. It is recommended that other alternatives such as on bike sponsorship and discreet sponsor advertising are investigated.

277. Complementary measures to mitigate some risks have been suggested, potentially including a safety campaign, 20mph zones (where individual London borough policies allow), cycle training, and engineering measures and conversion of one way streets to two way streets for cyclists.

278. The potential for generating revenue is low if a free rental period is recommended (there is some revenue potential from registration fees to the scheme).

279. Integration of the systems to the wider public transport network would allow better accessibility and enhanced operation.
280. Some barriers and issues will still remain and need to be addressed properly. These include:

- Safety concerns
- Navigational issues (difficult to navigate in central London)
- Use of a bicycle by inexperienced users
- Allocation of resources to a cycle hire scheme could affect the delivery and implementation of other cycling measures

281. The lessons learnt from other European schemes suggest that a cycle hire scheme for central London should include the following:

- A deposit mechanism
- An annual subscription or registration process
- A strategic pricing structure
- A Smartcard system
- Innovative docking points to make the most use of available space
- Robust bicycles
- Minimum use of vans to redistribute bicycles
- Simple maintenance
- A visible and easily identifiable scheme
- Available for use by tourists

282. There seems to be enough ‘redundant’ space available that could be used (if appropriate) for the implementation of docking stations. It has not been determined, however, whether this space is located in areas where there is likely to be specific local demand. There is also potential for finding spaces in workplaces and private developments.

283. There are possible issues regarding the planning permission process that might be required to implement docking stations.

284. Even after implementation, the location and size of some of the stations would be subject to change as it is difficult to precisely determine demand on a local area basis. It is recommended to identify more spaces than originally required in order to mitigate this risk.

285. Flexibility is important to allow docking stations to be easily added or removed in times of fluctuating demand.

Appendices

Appendix A
Table of all known cycle hire schemes

Appendix B
Key sources

Appendix C
Key visitor attractions in Westminster, Camden, the City of London and the Royal Parks

Appendix D
Locations of possible and probable cycle hire docking stations
# Appendix A – table of all known cycle hire schemes

<table>
<thead>
<tr>
<th>Country</th>
<th>City / town</th>
<th>Start Year</th>
<th>Bike Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Melbourne</td>
<td>2008</td>
<td>n/a</td>
</tr>
<tr>
<td>Australia</td>
<td>Sydney</td>
<td>2008</td>
<td>n/a</td>
</tr>
<tr>
<td>Austria</td>
<td>Vienna</td>
<td>May-03</td>
<td>500</td>
</tr>
<tr>
<td>Austria</td>
<td>Neussedel (1)</td>
<td>Jul-07</td>
<td>Not available</td>
</tr>
<tr>
<td>Austria</td>
<td>Möncheng (1)</td>
<td>Aug-07</td>
<td>Not available</td>
</tr>
<tr>
<td>Austria</td>
<td>St. Andrä (1)</td>
<td>Aug-07</td>
<td>Not available</td>
</tr>
<tr>
<td>Austria</td>
<td>Eisenstadt (4)</td>
<td>Aug-07</td>
<td>Not available</td>
</tr>
<tr>
<td>Austria</td>
<td>T 30 Stadler</td>
<td>Pre 1990</td>
<td>Not available</td>
</tr>
<tr>
<td>Belgium</td>
<td>Brussels</td>
<td>Sep-06</td>
<td>250</td>
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<td>Canada</td>
<td>Montreal</td>
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<td></td>
</tr>
<tr>
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<td>2005</td>
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### Appendix A – table of all known cycle hire schemes

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### Appendix B – Key sources

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<tr>
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<td>London Travel Report</td>
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Appendix C

Key visitor attractions in Westminster, Camden, the City of London and The Royal Parks

Appendix D (i to iv)

Locations of possible and probable cycle hire docking stations in the City of London (i), Camden (ii) Westminster and the Royal Parks (iii) and the remaining areas of Westminster (iv). (No political commitment to these spaces).

Locations of possible and probable cycle hire docking stations in the City of London (i)
Locations of possible and probable cycle hire docking stations in Camden (ii)

Locations of possible and probable cycle hire docking stations in Westminster and The Royal Parks (iii)
Locations of possible and probable cycle hire docking stations in the remaining areas of Westminster (iv)