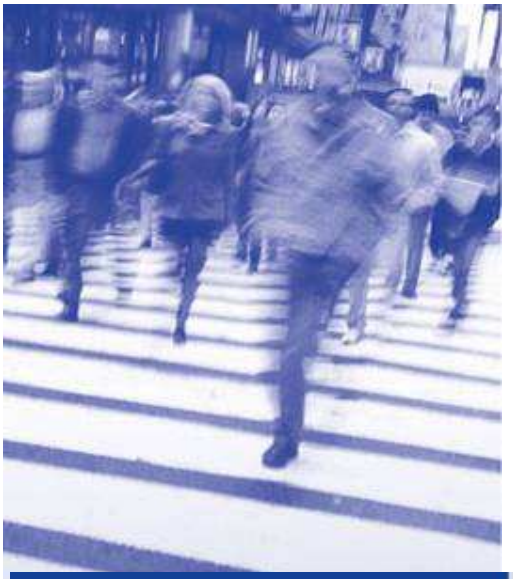

CiViTAS
Cleaner and better transport in cities

ARCHIMEDES
AALBORG • BRIGHTON & HOVE • DONOSTIA - SAN SEBASTIÁN • IAŞI • MONZA • ÚSTÍ NAD LABEM

Brighton & Hove

R. 45.1 – Study of ‘Bikeoff’ anti-theft programme in Brighton

Brighton & Hove

July 2010

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1. Introduction

1.1 Background CIVITAS

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.

CIVITAS I started in early 2002 (within the 5th Framework Research Programme);
CIVITAS II started in early 2005 (within the 6th Framework Research Programme) and
CIVITAS PLUS started in late 2008 (within the 7th Framework Research Programme).

The objective of CIVITAS-Plus is to test and increase the understanding of the frameworks, processes and packaging required to successfully introduce bold, integrated and innovative strategies for clean and sustainable urban transport that address concerns related to energy-efficiency, transport policy and road safety, alternative fuels and the environment.

Within CIVITAS I (2002-2006) there were 19 cities clustered in 4 demonstration projects, within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects, whilst within CIVITAS PLUS (2008-2012) 25 cities in 5 demonstration projects are taking part. These demonstration cities all over Europe are funded by the European Commission.

Objectives:

- to promote and implement sustainable, clean and (energy) efficient urban transport measures
- to implement integrated packages of technology and policy measures in the field of energy and transport in 8 categories of measures
- to build up critical mass and markets for innovation

Horizontal projects support the CIVITAS demonstration projects & cities by:

- Cross-site evaluation and Europe wide dissemination in co-operation with the demonstration projects
- The organisation of the annual meeting of CIVITAS Forum members
- Providing the Secretariat for the Political Advisory Committee (PAC)
- Development of policy recommendations for a long-term multiplier effect of CIVITAS

Key elements of CIVITAS:

- CIVITAS is co-ordinated by cities: it is a programme “of cities for cities”
- Cities are in the heart of local public private partnerships
- Political commitment is a basic requirement
- Cities are living ‘Laboratories' for learning and evaluating

1.2 Background ARCHIMEDES

ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas.

The objective of ARCHIMEDES is to introduce innovative, integrated and ambitious strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in the policy fields of energy, transport, and environmental sustainability. An ambitious blend of policy tools and measures will increase energy-efficiency in transport, provide safer and more convenient travel for all, using a higher share of clean engine technology and fuels, resulting in an enhanced urban environment (including reduced noise and air pollution). Visible and measurable impacts will result from significantly sized measures in specific innovation areas. Demonstrations of innovative transport technologies, policy measures and partnership working, combined with targeted research, will verify the best frameworks, processes and packaging required to successfully transfer the strategies to other cities.

1.3 Participant Cities

The ARCHIMEDES project focuses on activities in specific innovation areas of each city, known as the ARCHIMEDES corridor or zone (depending on shape and geography). These innovation areas extend to the peri-urban fringe and the administrative boundaries of regional authorities and neighbouring administrations.

The two Learning cities, to which experience and best-practice will be transferred, are Monza (Italy) and Ústí nad Labem (Czech Republic). The strategy for the project is to ensure that the tools and measures developed have the widest application throughout Europe, tested via the Learning Cities' activities and interaction with the Lead City partners.

1.3.1 Leading City Innovation Areas

The four Leading cities in the ARCHIMEDES project are:

- Aalborg (Denmark);
- Brighton & Hove (UK);
- Donostia-San Sebastián (Spain); and
- Iasi (Romania).

Together the Lead Cities in ARCHIMEDES cover different geographic parts of Europe. They have the full support of the relevant political representatives for the project, and are well able to implement the innovative range of demonstration activities.

The Lead Cities are joined in their local projects by a small number of key partners that show a high level of commitment to the project objectives of energy-efficient urban transportation. In all cases the public transport company features as a partner in the proposed project.

2. Brighton & Hove

Brighton & Hove is an historic city, in the southeast of England, known internationally for its abundant Regency and Victorian architecture. It is also a seaside tourist destination, with over 11km of seafront attracting eight million visitors a year.

In addition, it is a leading European Conference destination; home to two leading universities, a major regional shopping centre, and home to some of the area's major employers. All of this, especially when set against the background of continuing economic growth, major developments across the city and a growing population, has led the city council to adopt a vision for the city as a place with a co-ordinated transport system that balances the needs of all users and minimises damage to the environment.

The sustainable transport strategy that will help deliver this vision has been developed within the framework of a Local Transport Plan, following national UK guidelines. The ARCHIMEDES measures also support the vision, which enables the city to propose innovative tools and approaches to increase the energy-efficiency and reduce the environmental impact of urban transport.

3. Background to the Deliverable

Brighton and Hove City Council seeks to encourage cycling as part of its Sustainable Transport Strategy through the delivery of the Brighton and Hove City Council Cycling Strategy.

The Cycling Strategy sets out a range of objectives, targets and policies relating to the provision of appropriate cycling infrastructure, public education and awareness programmes and transport integration with the aim of increasing safe and secure cycle use.

Based on the actions developed for cycling, the city council has been recognized with a number of national awards including, in 2005, the award of Cycling Demonstration Town status.

Within the UK cycle theft is acknowledged to be a significant deterrent to cycle use. Department of Transport research shows that 19% of cyclists in the UK experience cycle theft during their lifetime. Of these victims, 24% stop cycling and 66% cycle less often as a consequence. It is a specific undertaking of the Brighton and Hove City Council Cycling Strategy to reduce cycle theft in Brighton and Hove.

In 2006 Brighton and Hove Crime and Disorder Reduction Partnership (CDRP) held a special meeting of the Community Safety Officers Working Group to address the issue of cycle theft. This meeting brought together multiple agencies including Council departments involved with Sustainable Transport and Environmental Improvement, the Police and the Community Safety Team. Reduction of cycle theft was found to be a significant objective to multiple agencies. Cycle theft was one of the crime types against which CDRP performance was measured. Cycle theft was also considered to be significant to delivery of the Brighton and Hove City Council Cycling Strategy and Cycling Demonstration Town objectives.

Between 2006 and 2008, the Crime & Disorder Reduction Partnership's Cycle Theft Steering Group worked with the Bikeoff Research Initiative at the Design Against Crime Research Centre of Central St. Martins College of Art and Design, London to deliver a cycle theft reduction strategy in the cycle theft 'hotspot' area of North Laine in Brighton & Hove. This work has delivered research into the cycle theft problem at key hotspots and has been used to make recommendation for theft reduction design interventions. Where the recommended interventions have been implemented Bikeoff have evaluated the effectiveness of the measures and found them to be effective in improving the security of cyclists parking behaviours.

As cycle theft can be a deterrent to cycle use, a continued investment in reducing cycle theft through communicative and infrastructural interventions is necessary to achieve continued growth in cycle use.

Working within the CIVITAS partnership has enabled us to review best practice as regards to cycle parking provision in Europe with a view to inform implementation activities in Brighton and Hove. Also to extend both the innovative nature and geographical scope of cycle security measures (including cycle parking provision and community communication/engagement) implemented and tested within the city.

3.1 Summary Description of the Task

Brighton & Hove suffers from a high number of cycle thefts and initial research shows that cyclists who experience cycle theft are less likely to cycle than those that do not. The *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4) is a demonstration project described as follows:

"To decrease the rate of stolen bicycles in the city, the project seeks to communicate good cycle locking practice to existing and new cyclists and implement secure cycle parking to facilitate good cycle locking practice. Innovative cycle parking measures in conjunction with a high profile publicity and awareness campaign will be introduced at 10 high-risk sites. The high-risk sites are to be identified."

This task, *'Bikeoff' anti-theft programme* (CIVITAS Task No. 11.5.1) aims to undertake research to support the development and implementation of the demonstration project described above.

The research includes:

1. A review of best practice across Europe in relation to cycle parking. This research is to guide, where appropriate/relevant, the cycle parking provision element of the demonstration project to follow, as well as benefit other CIVITAS cities looking to implement secure cycle parking; and
2. The development of a robust monitoring and evaluation plan by which to evaluate the impact of the innovative measures implemented within the demonstration project.

4. 'Bikeoff' Anti-Theft Programme in Brighton and Hove

4.1 Description of the Work Done

The work has been delivered in three work packages:

1. Review of best practice across Europe and the UK in relation to cycle parking provision;
2. Local research to understand local context as regards cycle parking and cycle security and inform the design of the innovative measures to be implemented in the *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).
3. The development of a robust monitoring and evaluation plan by which to evaluate the impact of these measures.

4.1.1 Review of best practice across Europe and the UK in relation to cycle parking provision

For the purpose of the research 'best practice' in relation to cycle parking provision is defined as cycle parking provision that is *either:*

- 'Innovative' in its designed address to issues of ease and efficiency of use by cyclists and resistance to abuse and theft of parked cycles, *or*
- 'Exemplary' in its proven success and efficacy as a cycle parking provision as demonstrated by user uptake, or both.

Efficacy, including security, of cycle parking is dependent on the context of its provision and use.

The majority of bicycles are stolen when left unattended, 'parked' or stored inside or outside the home.

In cities such as London, Brighton & Hove, Amsterdam and Barcelona the majority of thefts occur away from the home. Outside of cities, the highest incidence of cycle theft is from houses, sheds and garages. This may be linked to the type of cycle use associated with a geographical location. For example, in cities high numbers of 'utility' cycle users, such as commuters, may lead to more thefts away from the home. In less densely populated areas, where cycle use is more often linked to leisure activity, there is a higher incidence of domestic cycle thefts.

Factors that contribute to a 'context' of cycle parking include:

- Behaviours of users and abusers of cycles and cycle parking (including locking practices and theft techniques)
- Type of cycles used
- Type of locks used
- Type of parking furniture provided; and
- Wider parking environment.

The term 'wider parking environment' describes the features and characteristics surrounding the cycle parking furniture provided, including: location; scale of provision;

length of stay; access; layout; spacing; lighting, surveillance and guardianship; maintenance and servicing; signage and communication.
Secure cycle parking provisions may include alterations or adaptations to any of these features of the wider parking environment. Many of these factors are interdependent. For example, a well guarded and surveyed parking environment may require less robust locks to be used to maintain security or a staffed facility that offers valet parking may allow for greater density of parking stands as fewer users are required to negotiate the parking area.

Designed parking facilities typically have the opportunity to control the parking environment as necessary, according to the security risks and intervention opportunities associated with a given site. By considering each of the factors above, cycle parking can be made convenient, safe and secure for cyclists but difficult and risky for cycle thieves.

Given the diverse contexts of cycle parking provision and the vast number of permutations that contextual factors generate it was decided that a comparative review of sixty five cycle parking facility case studies, thirty four in the UK and thirty one from across Europe, serving diverse contexts of use, would best illustrate 'best practice' according to context.

The high number of UK facilities covered is a consequence of the geographical location of the lead researchers who are located in the Bikeoff research Initiative, at the Design Against Crime Research Centre, London. Efforts have been made to ensure that the UK exemplars are demonstrable of the sorts of practices delivered elsewhere in Europe so few approaches are left undocumented.

4.1.2 Local research

This local research seeks to understand the problem of cycle theft, and identify the specific issues affecting the security of parked cycles within the CIVITAS area. The research is to inform the design of measures to increase the security of parked cycles, reduce cycle theft and increase cycle use within the CIVITAS area. Also, to assist in the design of a robust methodology by which to monitor and evaluate these measures.

The research includes secondary and primary research. Secondary research draws upon precedent research into cycle theft, delivered by the Bikeoff Research Initiative between 2006 and 2008 in the North Laine area of Brighton and Hove, and analysis of Sussex Police cycle theft data.

Primary research delivered includes qualitative scoping observations and consultation and collaboration with stakeholders; including police, council officers, councillors, cycling advocates and community safety agencies.

Local research, particularly the qualitative scoping observations, has been delivered concurrently and iteratively with the development of a robust monitoring and evaluation plan. The tools used to gather local primary data on cycle parking behaviours being iteratively evolved within the local research for use within the monitoring and evaluation activity to follow.

The local research identifies which factors relating to the security of parked cycles in Brighton and Hove that are within the scope of intervention granted by this project, are likely to offer greatest returns as regards reductions in cycle theft and increases in cycle use within the CIVITAS area.

The local research guides the design of the measures to be delivered linked to the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).

4.1.3 Development of a robust monitoring and evaluation plan

This work concerns the planning and design of monitoring and evaluation activities that relate to the implementation of the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4). The monitoring and evaluation of the measures is intrinsically linked to the design of the measures themselves.

The research delivers a methodology for comparative analysis of twenty cycle parking 'corridors' within the CIVITAS area before and after implementation of innovative measures to increase the security of parked cycles, reduce cycle theft and increase cycle use.

The methodology structures a robust evaluation of the impact of the measures to be implemented within the demonstration *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4) against defined and appropriate performance indicators relevant to the security of parked bicycles within the study corridors.

Evaluation of the measures will identify whether or not they are effective in increasing the security of parked cycles, reducing the incidence of cycle theft and increasing cycle use.

4.2 Summary of Activities Undertaken

4.2.1 Activities undertaken in the review of best practice across Europe *and* the UK

The methodology used to identify and illustrate best practice as regards cycle parking provision across Europe and the UK included the following staged activities:

- Definition of 'best practice'
- Establishment of a typology of cycle parking provision
- Creation of a review framework for cycle parking provision
- Identification/location of cycle parking provision exemplars
- Selection of cycle parking provision exemplars
- Creation of exemplar case studies
- Comparison of case studies and summary of findings

Definition of best practice

As described above, what constitutes best practice as regards cycle parking provision is dependent on the context in which the cycle parking is to be used. This research reviews a range of cycle parking facilities that serve different contexts of use. This approach seeks to document a diverse range of approaches and solutions and identify what constitutes best practice according to context of use. In doing so the research hopes to be of greatest use to practitioners who are likely to be faced with diverse operational contexts as regards cycle parking provision. After consultation with those responsible for cycle parking provision in Brighton and Hove and CIVITAS partners it was agreed that for the purposes of this research exemplary practice was to be defined according to the innovation displayed in the design and implementation of the cycle parking and/or its fitness for purpose as demonstrated by user uptake.

Establishment of a typology of cycle parking provision

To help deal with the issue of multiple contexts of use/provision in the selection and review of cycle parking exemplars a typology of cycle parking provision was created. The typology enables researchers to ensure that the exemplars selected are diverse and representational of cycle parking across Europe. In doing so the research seeks to be of greatest use to those referring to the research for insight into what constitutes best practice across a number of different contexts, and therefore of use to them in whatever context of use they may be required to address in their practice.

The typology devised draws upon precedent research into cycle parking provision delivered by the Bikeoff Research Initiative complimented by new primary research delivered via consultation with a network of cycle parking and infrastructure experts across the UK and Europe (see Appendix 1).

The typology categorises cycle parking provision according to:

- The type of destination served by the provision; and
- Key design characteristics of the provision.

All cycle parking facilities reviewed in the study are categorised according to this typology.

Table 1. Cycle Parking Provision Typology

Typology of Cycle Parking Provision				
Destination served			**Key characteristics**	
Cycle Centres			On-Street	
Educational			Off-Street	
Workplace			Covered	
Public Realm			Uncovered	
Private Realm	Residential		Overground	
	Commercial		Underground	
			Controlled Access	
			Open Access	
			Manual	
			Automatic	
			Pay-to-Park	
			Free parking	

Creation of a review framework for cycle parking provision

The review of cycle parking facilities is conducted so as to capture information regarding the relevant factors of the parking environment in a way that is consistent across all facilities irrespective of context. This consistency of research data simplifies the review process and makes it easier for those using the research to find information relating to specific features of the parking environment.

Precedent research of the Bikeoff Research Initiative has reviewed international parking guidance and conducted observational research into parking facilities. Drawing on this research and via consultation with a network of cycle parking and infrastructure experts across the UK and Europe, a review framework was created that enabled researchers to identify and record those features of the parking environment that impact on their security and fitness for purpose.

This framework is used to create a review template and a guidance document giving instructions to researchers on how to complete a review of a cycle parking facility. All sixty five cycle parking facilities reviewed in this study are reviewed in accordance with this template and guidance.

Identification/location of cycle parking provision exemplars

Cycle parking provision exemplars have been identified using secondary data sources and primary research.

Identification/location of UK exemplars

Initially UK research focused on the seventeen UK cycling demonstration towns (CDT's), of which Brighton and Hove is one. Also, Bristol (Cycling England's Cycling City), Oxford and London where cycle use is actively promoted and provided for.

Cycling officers in each of the CDT's were contacted. In some instances cycling officers and colleagues were able to propose local exemplars, but in many instances the CDT's were in the early stages of their cycling provision and where better able to refer researchers to exemplars that they themselves where using for inspiration.

This activity was complemented by consultation with cycling advocacy groups including Cycle Touring Club of Great Britain (CTC), London Cycle Campaign (LCC), Transport For London's Cycle Centre for Excellence (TFL/CCE), Sustrans, and Cycling England.

Online research was also conducted to identify further examples of innovation and excellence in cycle parking provision within the UK. A list of over 50 potential sites was drawn up from which the case studies herein were selected.

Identification/location of European exemplars

Potential European exemplars were identified through a combination of existing Bikeoff experience; desk, web based and literature research and consultation with a pan-European network of cycling advocates and researchers known to the Bikeoff Research Initiative. This network of researchers was able to recommend facilities near or well known to them. Effort was made to ensure that case study recommendations were representative of diverse cultural and geographic contexts across Europe.

Groups consulted included representatives from the European Cycling Federation (ECF/ EU), Velo-City (EU), European Union Cyclist's Group (EUCG/ EU), O2 Network for Sustainable Design (EU), Velo:consult (CH), Enviu (NL), Hembrow Cycling (NL), Ecomove (NL), Celis Consult (DK), Copenhagenize Consulting (DK), Timenco (BE), Mobiel 21 (BE), FUBicy (F), Rupprecht Consult (D), Bicicleta Club de Catalunya (BACC/ ESP), ConBici (ESP), Instituto para la Diversificación y Ahorro de la Energia (IDAE/ ESP. In addition to representatives of the organisations named above, consultation was conducted with approximately twenty five individual cycling or sustainable transport advocates known to Bikeoff, from across Europe and further afield.

Table 2 shows those facilities selected for inclusion in the final set of case studies (EU1). Table 3 (EU2) shows additional facilities considered for inclusion prior to defining the final set. Both tables show those consulted in each case.

Table 2. Final set of cycle parking facilities selected for EU case studies (EU1).

EU FACILITIES SELECTED FOR CASE STUDIES:	CITY	COUNTRY	BIKEOFF COLLABORATOR(S)	TYPOLOGY Destination Served
1 CarGo Bike Car	Copenhagen	Denmark	Mikael Colville-Andersen	Public Realm
2 Cykelkaelder, Kongens Nytorv metro parking	Copenhagen	Denmark	Mikael Colville-Andersen/ Alex Trench	Transport Interchange
3 Fisketorvet Shoppingcenter	Copenhagen	Denmark	Henrik Bjoerner Soee / Alex Trench	Private Sphere / Commercial
4 Københavns Cykler	Copenhagen	Denmark	Seif Alhasani	Cycle Centre
5 Rack-less parking zones	Copenhagen	Denmark	Mikael Colville-Andersen/ Alex Trench	Public Realm
6 L'îlot Vélos, Neuilly-Plaisance (RER Metro)	Paris	France	Pierre Chauveau	Transport Interchange / Public Realm
7 Parking Vélo de La Gare	Strasbourg	France	Pierre Chauveau	Cycle Centre
8 Vèloparcs	Strasbourg	France	Pierre Chauveau	Transport Interchange / Public Realm
9 Mobile	Freiburg im Breisgau	Germany	Ursula Lehner-Lierz / Jon Rodriguez	Cycle Centre
11 Radstation Münster Station Parking	Münster	Germany	Ursula Lehner-Lierz	Cycle Centre
10 Radstation Unna	Unna	Germany	Ursula Lehner-Lierz	Cycle Centre
12 Fietsflat (Bicycle Flat)	Amsterdam	Netherlands	Francis Mason / Peter Perras	Transport Interchange
13 Locker Secure Bicycle Shed, Zuid Station	Amsterdam	Netherlands	Francis Mason / Peter Perras	Transport Interchange
14 Residential Cycle Parking	Amsterdam	Netherlands	Francis Mason / Peter Perras	Private Realm / Residential
15 Assen station	Assen	Netherlands	David Hembrow	Transport Interchange
16 CSVVG Assesn, School Parking	Assen	Netherlands	David Hembrow	Educational
17 Hotel parking.	Assen	Netherlands	David Hembrow	Private Realm / Commercial
18 Groningen railway station	Groningen	Netherlands	David Hembrow	Cycle Centre
19 Fietsmolen (Bicycle Windmill) & Nieuw Vennep Railway Station Parking	Nieuw Vennep	Netherlands	David Hembrow	Transport Interchange
20 Underground Bicycle Park	Zutphen	Netherlands	David Hembrow	Transport Interchange
21 Biceberg (and 'Bigloo')	Barcelona	Spain	Eva Sterbova / Alex Trench	Public Realm
22 Bicinova	Barcelona	Spain	Eva Sterbova / Alex Trench	Workplace & Residential
23 B:SM Car and Cycle Parking	Barcelona	Spain	Eva Sterbova / Alex Trench	Workplace / Public-Private Realm
24 FGC station parking	Barcelona	Spain	Eva Sterbova / Alex Trench	Transport Interchange
25 'Key' cycle hoops	Barcelona	Spain	Toni Lladó / Gabriele Schiavon / Alex Trench	Public Realm
26 My Beautiful Parking	Barcelona	Spain	Eva Sterbova / Alex Trench	Workplace & Residential (Cycle Centre)
27 BUS+BICI parking	Seville	Spain	Haritz Ferrando / Alex Trench	Transport Interchange
28 Bike Barge, Malmo station	Malmo	Sweden	Seif Alhasani	Transport Interchange
29 Lundahoj, Lund, Sweden	Lund	Sweden	Seif Alhasani	Cycle Centre / Public Realm
30 Veloparking Centralbahnplatzel, Basel SBB (main railway station)	Basel	Switzerland	Ursula Lehner-Lierz	Cycle Centre / Transport Interchange
31 Velostation Milchgässli	Bern	Switzerland	Ursula Lehner-Lierz	Cycle Centre / Transport Interchange

Table 3. Cycle parking facilities within Europe considered for case studies but not selected (EU 2)

FURTHER EU FACILITIES EXPLORED/CONSIDERED, PRIOR TO DEFINING FINAL SET (ABOVE):	CITY	COUNTRY	RECCOMENDING NETWORK or COLLABORATOR(S)	TYPOLOGY Destination Served
32 Bicycle Point, Antwerp central station	Antwerp	Belgium	Mobiel 21 / Timenco	Cycle Centre
33 Bicycle parking facilities in Ghent historic centre	Gent	Belgium	Mobiel 21 / Timenco	Public Realm / Commercial
34 Bicycle parking facilities in student areas	Gent	Belgium	Mobiel 21 / Timenco	Educational
35 Leuven Bicycle parking point	Leuven	Belgium	Mobiel 21 / Timenco	Cycle Centre
36 In-house bicycle parking for University of Leuven employees	Leuven	Belgium	Mobiel 21 / Timenco	Workplace
37 Onstreet parking, Odense, Cycle City	Odense	Denmark	Pablo Celis / Troels Andersen	Public Realm
38 Onstreet parking, Næstved	Zealand	Denmark	Pablo Celis / Anders Gedde Petersen	Public Realm
39 Biketree	Paris	France	Ecomove / Pierre Chauveau	Workplace
40 Vinci PARK	Paris	France	Pierre Chauveau	Public Realm
41 SAEMES car and bicycle parks	Paris	France	Pierre Chauveau	Private Realm
42 On-Street parking sites, Berlin	Berlin	Germany	Ben Fouassier / Magda Willi / Jon Rodriguez	Public Realm
43 Radstations / DB Station Parking	Bremen, Cologne, Frankfurt, Kohln, Munich.	Germany	Rupprecht Consult / Sebastian Buehrmann / Rafael Urbanczyk / Enviu / Chinmay Yedurkar / Josine Janssen /Satish Beella	Transport Interchange / Cycle Centres
44 Josta Parking, Brescia	Brescia	Italy	Simone Antonello	Transport Interchange
45 Monza Parking proposals	Monza	Italy	Vincenzo di Maria	Public Realm
46 Rome On-Street Paring and Public Bicycle Sharing	Rome	Italy	Vincenzo di Maria	Public Realm
47 Car-Space parking racks	Turin	Italy	Simone Antonello	Public Realm
48 ASM Venezia Cycle Park	Venice	Italy	Vincenzo di Maria	Transport Interchange
49 Free City Cycle Park Network	Apeldoorn	Netherlands	Velo Consult / Jonas Piet / Oriol Pascual /Enviu	Cycle Centre
50 Houten Cycling City Cycle Parking Measures	Houten	Netherlands	Satish Beella - TuDelft / Enviu	Public Realm
51 FAT, Scheveningen, Northern Boulevard Parking	Scheveningen, The Hague	Netherlands	Velo Consult / Jonas Piet / Oriol Pascual /Enviu	Cycle Centre
52 FietsHangar ('Bike Hanger')	Rotterdam and other locations	Netherlands	Jon Rodriguez	Public Realm
53 Rotterdam Station Parking	Rotterdam	Netherlands	Jon Rodriguez	Transport Interchange
54 Cycle and Car parking - Municipal Parking Company	Utrecht	Netherlands	Velo Consult	Public Realm
55 On-Street and Courtyard parking	Barcelona (Rubi)	Spain	Modular Bike	Public Realm
56 On-Street parking	Murcia	Spain	BACC	Public Realm
57 Bicipoda DAE On-Street parking	Valencia	Spain	BACC	Public Realm
58 Trameinsa On-Street and Courtyard parking	Vizcaya	Spain	BACC	Public Realm
59 Future Bicycle Parking plans for Malmo	Malmo	Sweden	Seif Alhasani / Vincenzo di Maria	Public Realm
60 Chur, small station Parking	Chur	Switzerland	Velo Consult	Transport Interchange
61 Biketree	Geneva	Switzerland	Velo Consult	Workplace Parking
62 VD003 Car-Space Parking	Oulens-sous-Echallens	Switzerland	Adrien Rovero	Public Realm

Selection of cycle parking provision exemplars

The final set of sixty five exemplars, thirty four from the UK and thirty one from across Europe have been selected via an iterative research process in consultation with the pan-European network of cycling advocates and researchers.

The selection criteria for case studies considers the following:

- Exemplary and/or innovative provision
- Geographic area
- Stage of cycle cultural development
- Typological spread
- Scale of facility (inclusion of small, medium and larger provisions)

Exemplary and/or innovative provision

The requirement for case studies to be exemplary as regards fitness for purpose, demonstrated by user uptake, and innovative as regards address to ease of use and resistance to abuse by cycle thieves, was paramount to the selection process.

Geographic area

The case studies are from different geographic areas of Europe to enable review of cycle parking practices in both northern and southern climates and cultures. Whilst the geographical spread achieved is acceptable it is acknowledged that to capture the most innovative and exemplary case studies there may be uneven distribution of case studies over the geographical area of Europe.

Similarly, it was decided that research should not be limited by political EU boundaries so as to include specifically relevant examples located within the wider geographical reach of 'Europe' (for example, some studies are included from Switzerland). The focus of the research is on urban areas. This may be a consequence of geographical patterns of investment in cycle parking provision. Greatest investment in cycle parking occurs in areas of greatest cycle density and cycle use where there is greatest demand for cycle parking.

The case study locations are shown in Figure 1. Case study locations can be seen in more detail Bikeoff Google maps:

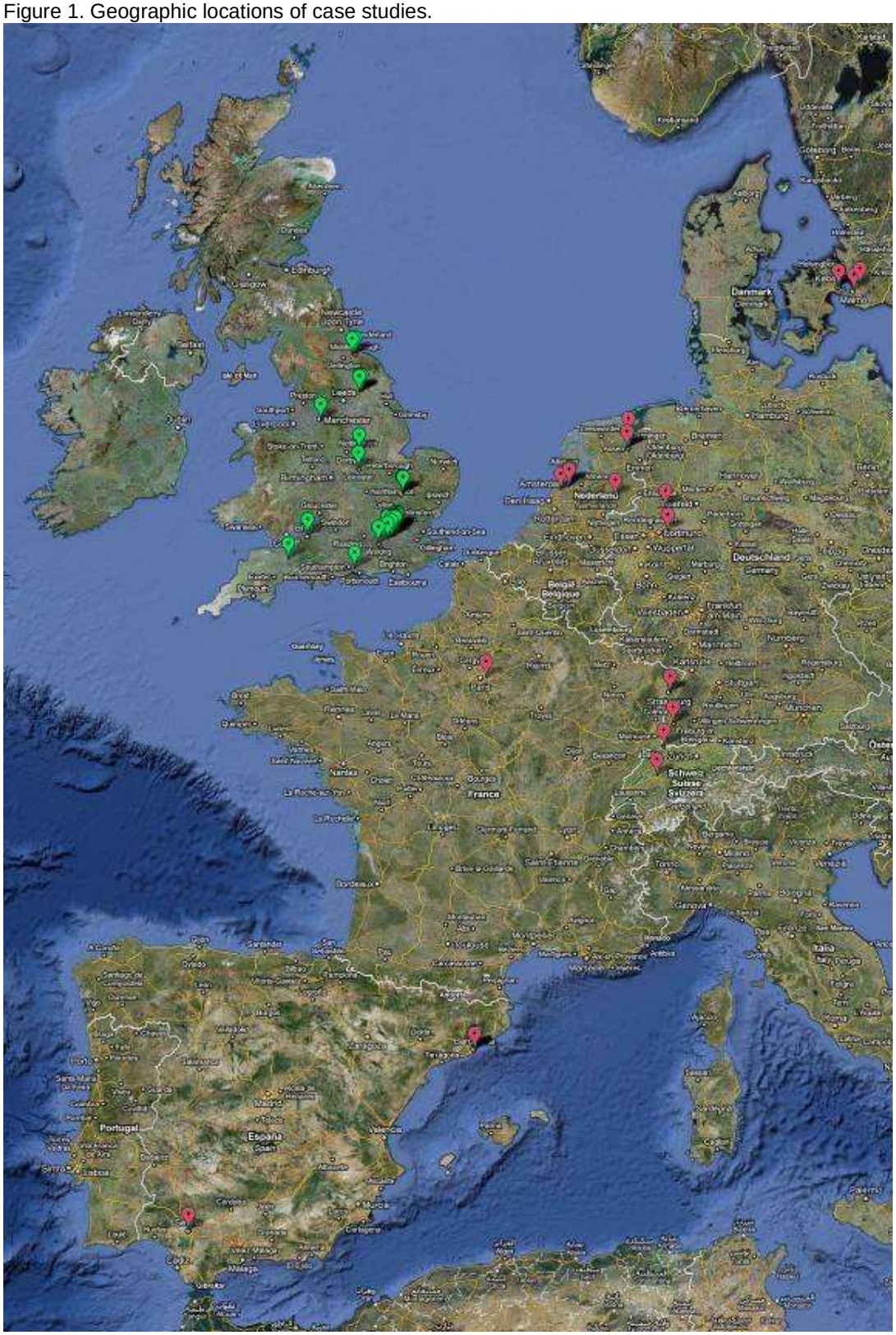
Location of European case studies can be viewed at:

http://maps.google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=110410114309743330154.000483cb49326a45c5dde&ll=46.528635,3.515625&spn=24.346851,56.90918&t=h&z=5

Location of UK case studies can be viewed at:

http://maps.google.co.uk/maps/ms?hl=en&ie=UTF8&msa=0&msid=110410114309743330154.000483cb62f5263be08c0&t=h&z=7

Figure 1. Geographic locations of case studies.



Stage of cycle cultural development

Research seeks to include case studies from regions of different cycle cultural development, including mature cycle cultures such as those present in Amsterdam and Copenhagen, emergent cycle cultures such as those of London and Barcelona and nascent cycle cultures, including certain towns and cities from Italy, France and Eastern Europe. Additionally, a number of CIVITAS project towns and cities (see http://www.CIVITAS-initiative.org/projects.phtml?id=350) were consulted. Some were found to host relevant exemplars of cycle parking provision included in the study, while others did not yet present such opportunities. Nascent cycle cultures were largely found to host less exemplary facilities and less innovative parking measures than mature and emergent cultures, viewed from a pan-European perspective. This may be linked to the commitment of resources made to cycle parking provision or it may be linked to lack of access to knowledge regarding best practice – a situation that this research seeks to address.

Typological spread

The research seeks to give representation to diverse types of cycle parking provision. The case studies selected offer exemplars for each context identified within the research typology described above, from modest on street parking provision to cycle centres at transport interchanges able to accommodate thousands of cycles at one time.

Despite best efforts it is recognised that to review the most innovative and exemplary facilities there may be uneven distribution of case studies across the typologies, geographical area and stages of cycle cultural development. This is a result of the fact that innovation and exemplary provision is often most apparent in those contexts, cultures and countries where cycling is well resourced. This finding seems to suggest that investment in cycling generates innovation and exemplary practice in relation to cycle parking.

Scale of facility

Efforts were made to ensure coverage of different scales of facility, in terms of their capacity to park fewer or greater numbers of cycles. Accordingly representations of smaller, medium and larger facilities were chosen for study, especially where there were multiples for any given Typological category (destination served).

Creation of exemplar case studies

Those exemplars selected via the iterative process of research, consultation and review using the selection criteria described above have been visited and documented as detailed case studies.

The UK case studies have been delivered by researchers located within the Bikeoff Research Initiative located in the Design Against Crime Research Centre, London. The European case studies have been delivered by a pan-European network of researchers with local knowledge of the facilities chosen for review.

The review of the facilities has been conducted according to the review framework developed earlier in the project and with guidance from the Bikeoff researchers. The written guidance explains the categories used within the case study template and includes instruction as to what sort of features to look for and key questions to consider in the review. It also describes the requirements for pictorial records of features of the cycle

parking environment.

In addition to the observation and recording of the facilities researchers are required to conduct primary and secondary research relating to the facility to gain further information. This includes interviewing users and the facility provider where possible to gain further insights into the efficacy and strengths and weaknesses of the facilities.

The framework and guidance assists researchers in capturing data relating to key cycle parking use and security considerations and ensures the consistency and quality of the research delivered.

Comparison of case studies and summary of findings

The case studies in Appendix 2 are summarised below according to destination served to identify different approaches and summarise best practice as illustrated by the case studies. To some extent these summaries may be viewed as cycle parking provision guidance according to destination served. However, the importance of context and the interrelationship between factors of the parking environment suggest that the case studies in their entirety will better describe best practice than the summary alone.

Destination served: CYCLE CENTRES

General Description

A cycle centre is typically a secure indoor cycle park that offers additional amenities and services to users such as those listed below:

- On site staffing/guardianship
- CCTV
- Showers and toilet facilities
- Changing rooms
- Café and/or refreshments
- Storage lockers (not bikes)
- Shoe cleaning facilities

- Bicycle Shop (parts and accessories)
- Bicycle servicing and maintenance (on site mechanic)
- Bicycle marking/engraving (with security codes)
- Bicycle rental/loan

- Bicycle cleaning facilities
- Disposal and re-cycling of used bicycles and batteries
- Battery charging for electric bikes
- Tool loan
- Air pump

- Cycle tourism and route information
- Multi-modal transport information and ticket sales
- Cycle proficiency and/or maintenance training
- Guided bicycle tours

Provider

Cycle centres are typically provided by local governmental, often in association with public transport agencies, cycling advocacy groups and environmental non-governmental organisations. If private sector partners are involved they are typically engaged in the ongoing management and staffing of the facility.

Designer/Architect

The specification of services and user requirements are defined by the provider of the facility. In those instances where a new building is required to house the centre architects are employed. Typically, when cycle centres are accommodated within existing buildings the facilities are realised without assistance from architects, although professional design input appears to improve provision.

Cost of provision (per bike parking space in Euros)

	Average:	Range:
Cost/space:	2626	350 - 7375
Maintenance/space:	115	12.5 - 290

The cost per space of cycle parking is greatly dependent on whether the parking provision is housed within an existing structure or a purpose built facility. Purpose built facilities are often realised within larger schemes or masterplans, created to meet combined urban environment, transport and/or sustainability agendas.

Cycle centres typically leverage funding from multiple sources linked to the organisations involved in the provision and/or the scheme or masterplan being implemented.

It is important to consider the additional costs associated with the ongoing maintenance and management of the facility so as to ensure that these costs can be met and that the facility will operate efficiently. The wide range in maintenance and management costs is linked to the range of services offered and the degree of staffing they require (see ‘Maintenance and Management’ below).

Location

Typically cycle centres are located in sites of high cycle parking demand such as transport interchanges and/or urban centres in close proximity to multiple destinations served.

Scale

Scale of provision varies according to demand. The case studies presented here accommodate between 20 and 3000 bicycles. It is important to consider the increased demand that is likely to result from a secure and convenient cycle parking provision and plan for expansion. It is typical to provide parking for 30% more bicycles than are observed at the busiest times. Underground facilities may offer less opportunity for lateral expansion owing to the fixed nature of their perimeter. In such instances it may be worth planning for vertical expansion.

Length of stay

Cycle centres typically accommodate short (< 2hrs), medium (2-8 hrs) and long stay (overnight and 24 Hours +) parking. Such flexible provision requires management so as to ensure that abandoned or un-used bicycles do not deny access to active users.

Charges (to user) in Euros

		Average:	Range:
Charges:	Day	1.114166667	0 - 2.36
	Month	13.0625	0 - 29.5
	Year	108.25	0 - 236

Typically, cycle centres provide both free parking and pay to park facilities. Pay to park facilities offer greater security to users via restricted access, surveillance and guardianship. Restricted access is often linked to membership/subscription. Free parking is typically provided for shorter stays.

Access

Cycle centres offer pedestrian and cycle access and egress often via multiple entry points. Cycle access is typically granted directly from cycle routes, lanes, or networks. Pedestrian access is typically granted directly from the street or destination served i.e. station concourse.

Entry to cycle centres is cycle friendly and avoids conflict with other users of the space such as pedestrians and vehicular traffic. Where topography dictates, safe and convenient cycle access is provided via features such as gently sloping cycle ramps, steps with a cycle channel, travelators or lifts. There are different access arrangements for different areas and amenities within the cycle centre.

Typically, long stay parking areas have controlled access whilst short stay parking areas are open access. Other amenities such as shops and changing facilities are accessible only at times when the facility is staffed. Typically, access is controlled via swipe card or pin code. The user is required to enter the code or car to release a turnstile, door or gate (often automated and sliding). Turnstiles and automated barriers are favoured for cycle access as they reduce the opportunity for people other than the registered user to enter the facility on the heels of a registered user. Facilities with more robust access control are more likely to be accessible to users outside of staffed hours.

Parking furniture provided within areas of controlled access may justifiably be of less secure design (e.g. provision of multiple locking points) than those that are openly accessible.

Parking within cycle centres is either self-service or staff assisted. Whilst parking furniture is designed to be used by people of all abilities some stands/storage such as; unarticulated two-tier, articulated two-tier, vertical or wall mounted solutions may require staff assistance. These solutions often offer greater density of cycle parking as does valet parking.

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle centre.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.

Visual iconography is typically more conspicuous and universally comprehensible than text.

Parking Furniture

Typical parking furniture designs provided in cycle centres can include: one-wheel ('butterfly' type) stands; U-type stands (such as 'M' stands or 'Sheffield' stands); wall-mounted bicycle hangers; rack-mounted vertical bicycle hangers; non-articulated two-tier racks; articulated two-tier racks and automated multi-tier systems.

Furniture within open-access areas of cycle centres is typically more robust, and offers a greater level of security and bicycle locking opportunities, than furniture located within controlled-access areas. It is common for a single facility to offer several different types of parking furniture so as to maximise the number of parking spaces and the diversity of users and cycle designs accommodated. Diverse furniture provision often balances convenience and security. Within controlled access areas, short stay stands are most convenient to use yet offer fewer opportunities to park and lock bikes securely. Longer-stay furniture is justifiably more demanding in use but more secure, owing to a combination of physical design, proximity to guardianship and location within facility premises.

Layout and Spacing

Cycle Centres, as with many other types of parking facility, require between 0.6 – 0.9m^2 floor area per bike space to be accommodated (this excludes space for access lanes, pedestrian and service areas). Larger dimensions need to be permitted for specific bicycle types such as recumbent or cargo bikes and cycles with trailers.

Floor mounted non-articulated furniture is typically arranged in rows with 700-1000mm between centres of two cycles parked side by side on adjacent stands.

Offset layouts of parking furniture – i.e. high/low or fore/aft configurations - allow denser spacing of cycles, with typically a minimum 300mm between centres of two cycles parked side by side. Non-offset layouts can typically permit a minimum of spacing 500mm between two cycles.

Automated cycle parking solutions can typically be more tightly spaced, according to the design of each system.

Where more than one row of furniture is provided at larger scale Cycle Centres, access lanes within facilities commonly require a minimum of 2.0m width between rows of cycle furniture, to park and manoeuvre cycles, increasing to 5.0m or more, for two-directional flows of cyclists.

Surveillance/ Guardianship/Lighting

Cycle centres are brightly and evenly lit at all times. Use of natural light is maximised within the space and 'daylight' bulbs are used in preference to fluorescent. Most centres are covered by CCTV which is monitored by security personnel on or near the site.
Centres are typically staffed for the majority of the time. Often several staff members are present during the busiest times of the day and night.

Centres are designed so as to maintain clear site lines where possible. Staff rooms, workshops and/or shops are located in clear sight of the points of entrance and egress points to/from the centre. Premium priced parking bays are typically located closest to staffed locations.

Several centres provide panic buttons for use by members of the public, particularly within changing areas.

Maintenance and Management

Where Cycle Centres involve private sector partners with specialist cycle parking expertise, they are typically engaged in the ongoing management and staffing of the facility. Alternatively, Cycle Centres are managed by the local government- or public transport related agencies involved in their provision. Personnel with specialist cycling and cycle parking knowledge are typically employed to ensure suitable experience is available in the day-to-day running of Cycle Centre parking sites.

On-site staff usually possess sufficient technical proficiency to conduct simple maintenance tasks of the installed cycle parking furniture and simple electronic access and surveillance checking. In some cases this helps permit Cycle Centre parking installations to be specified to a more advanced level than unattended sites, for example. More advanced periodic servicing is conducted by specialist technicians, either employed as part of the Cycle Centre management structure (these may be 'roaming technicians' where several centres are managed by one agency, for example), or contracted from the equipment suppliers.

Destination served: EDUCATIONAL

General Description

Educational cycle parking facilities principally describe those cycle parking facilities that serve schools, colleges and universities. They are typically designed for the exclusive use of staff, students and in some cases, visitors. Educational cycle parking facilities are expected to offer greater levels of security and convenience than afforded by on-street Public Realm provisions as they are typically expected to accommodate long stay users that will leave their bicycle unattended for the duration of the work/school day. Services offered by Educational cycle parking facilities to cyclists vary with each location but the range includes:

- Free secure cycle parking within 50m of destination
- Controlled access indoor or outdoor covered or enclosed parking
- Timetabled access, allowing restricted or no entry 'out of hours'

- On-site security/guardianship, shared with main educational building(s), in some cases offering advice on locking practice to students
- Air pump
- CCTV monitoring

Most Educational campuses also make available the following services to all their students/staff, not exclusive to those arriving by bicycle:

- Lockers for personal belongings
- Toilets
- Showers
- Changing rooms

Provider

Educational parking facilities are most commonly provided directly by the institution at which the cycle parking is located. However, some institutions succeed in partnering with Safer Towns/Cities Partnerships and equivalent Police or local authority initiatives, to help share costs, expertise and responsibilities.

Designer/Architect

Educational bike parking facilities usually require involvement of design consultants to best specify and locate the provision, and architects are required where the installation of the facility is integral to the build of the premises.
In some instances the suppliers of the parking equipment is able to offer some help, to assist in finalising specification details and regarding the facility installation.

Cost of provision (per bike parking space, in Euros)

Educational Parking	Average:	Range:
Cost/space:	933.86	100 – 1630

The variations in cost per space of Educational cycle parking solutions is greatly dependent on whether the parking provision is housed within an existing structure or a purpose built facility, and the extent of any installation works required.
As indicated above, some local 'Safer Partnerships' and equivalent initiatives, plus some sustainable mobility or health schemes, may help access additional or matched funds, if the facility can show to meet objectives related to the respective initiative.
It is important to consider additional costs associated with the ongoing maintenance and management of the facility - including mechanical components, plus any electronic access control, surveillance systems, etc. - so as to ensure that these costs can be met and that the facility will operate efficiently and to ensure it can be staffed appropriately (see 'Maintenance and Management' below).

Location

Educational cycle parking is consistently located within the grounds of the campus or centre it serves. The best practice examples are located within less that 50m of the main points of access and egress. This may be interior, exterior ideally covered or in a bicycle parking 'room', located within an access corridor, courtyard, or campus car park, for example.

Scale

The Educational cycle parking provisions studied typically provide parking spaces for between 100 and 700 bicycles. Clearly in each case, the scale of cycle parking provision needs to be adequate to the scale and occupancy of the Educational centre or campus being served.
The combined Educational cycle parking recommendations identified by the Bikeoff Parking Guideline Consultation[i], specify 1 bike parking space per 200-500m^2 served, or 1 bike parking space per 3 students, or per 5-10 students and staff. This practice is largely consistent with examples located in the Bikeoff CIVITAS case studies.

Length of stay

The length of stay most typically required among parking facilities serving Educational centres is 5-10 hours (medium term).
Some junior schools require a greater balance of shorter-term parking, for visitors and parents collecting children by bike. By contrast, a proportion of cycling students and staff at many university campuses require the option to allow them to park their bikes for 24 hours or longer (long term).

Charges (to user) in Euros

Educational cycle parking is typically free of charge to its users, not least because students have little or no access to expendable income.
However some facilities with electronic access systems require a returnable deposit to be paid for the electronic key, fob or card. This is in the region of 0 - 25 Euros.

Access

Macro: Best practice cycle parking facilities at Educational destinations, are served by well-designed public cycle networks, which carry the cyclists either directly to the parking area, for smaller sites, or to the on-campus network of cycle routes, which in turn link them to the cycle parking, at larger sites.

Meso: Most Educational cycle parking provides some degree of controlled access. This may be via a combination of manual or remotely controlled gates or doors (to access the wider premises) and on-site guardians, who check user identities as they enter the facilities. Best practice secure Educational cycle parking facilities that are not directly overlooked by on-site guardians are typically enclosed to control access and require an electronic swipe card, fob, or equivalent to gain access to the cycle parking ‘room’, via a gate, closable canopy, or automatic door. Access into facility enclosures is typically provided at street-level, without the need for ramps, wheel gulleys or lifts.

Micro: The majority of Educational cycle parking provisions allow cycles to be parked horizontally using the installed parking furniture and the user’s own locks, to secure both wheels and the frame.

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle parking facility.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.

Visual iconography is typically more conspicuous and universally comprehensible than text. Where the details regarding Educational cycle parking can be communicated through the educational organisation, site signage required tends to be less than at cycle parking facilities open to the public domain, for example. At smaller educational sites (occupancy of less than 1,000 students and staff, for example.), wayfinding and placemaking and informational signage is not usually required, since students and staff are informed through the institution about the facility's existence and conditions of use.
On larger campuses, wayfinding, placemarking and informational signage can prove useful, since other channels of communication often include fewer opportunities for personal contact. Instructional signage, particularly to show the most secure methods to lock bikes to the provided parking furniture, is advantageous in every instance.

Parking Furniture

Furniture designs provided at Educational destinations most typically include U-type stands (such as 'M' stands or 'Sheffield' stands) and in some cases, other variations, including 'handlebar racks', which may be appropriate in lower crime risk areas (see CSVVG, Assen case study 2.2.1, for example). Best practice examples of are located in enclosed, controlled access areas, directly covered by on-site guardians and still allow for both wheels and the frame to be locked easily.

Parking furniture and their respective enclosure structures are regularly finished in galvanised steel to resist extremes in weather and keep maintenance costs to a minimum.

Layout and spacing

Parking furniture at Educational centres is most typically laid out in rows of stands arranged in parallel, allowing between 0.6 – 0.9m^2 floor area per bike. U-type stands require with between 700-1000mm between centres of two cycles parked on adjacent stands. Where rows of parking furniture are repeated in parallel, between 2.0-3.0m separation is permitted, to access, park and manoeuvre cycles. Where stands are installed in close proximity to walls, best practice examples leave at least 50cm between the closest edge of the parking furniture and the wall, to leave space for wheels

Surveillance/ Guardianship/Lighting

Best practice lighting for cycle parking serving Educational destinations provides bright and even light at all times. The specific lighting specification required will differ according to the scale and location of the provision, including factors such as whether the facility is interior, exterior, surrounded by solid walls, open fencing or a cage, for example. However, the use of natural light is maximised within all spaces of best practice facilities. Some facilities dispose of ambient electric lighting that is reactive to levels of daylight in the cycle parking area, to help maximise efficient use of resources. These can be complimented inexpensively, by timed light switches, activated by users of the facility.

Most Educational centres benefit from the guardianship of staff during working hours, in addition to on-site security and/or estates or facilities managers, who are allocated the responsibility of monitoring the cycle parking in person and remotely, where CCTV is available. Many higher and further education campuses deploy security staff 24 hours per day. Some Educational installations provide a panic button within the cycle parking area, which also connects to the on-site guardians, to add reassurance for the users.
Best practice facilities typically locate the cycle parking to be visible and 'naturally surveyed' by a number of different responsible guardians, using semi-transparent or semi-open panels for parking enclosures, so that activity can be monitored more easily.

Maintenance and Management

Specification of cycle parking at Educational locations typically requires robust installations that are straightforward to manage and simple to maintain, to keep ongoing costs to a minimum, where no income is generated from the cycle parking or additional support. Cost-effective and resilient designs leaving room to service and clean easily, and use of materials such as galvanised steel structures and polycarbonate or mesh panels, can help in this process.

Access points, locking systems (manual or electronic) and articulated parking furniture solutions require periodic checking and occasional servicing. Simple checks and maintenance are typically conducted by the on-site facilities staff at Educational sites, while more advanced servicing of access control, surveillance and similar systems, usually require assistance from the equipment providers or authorised technicians. In some cases the cycle parking furniture or equipment suppliers to Educational institutions will provide a service or maintenance agreement following installation.

Destination served: PUBLIC REALM

General Description

A cycle parking facility serving a Public Realm destination is typically designed to provide publicly accessible and convenient parking, close to a diversity of locations in the surrounding area. Many are found in on-street locations, while some offer greater-levels of security off-street, with different measures of access-control. Accordingly services offered at these provisions vary.

Open-access Public Realm facilities may offer:

- Designated on-street parking spaces
- Locking opportunities for bicycle frame and both wheels
- Single or double-tier furniture.
- Site signage and locking information
- Locations useable for cycling events, such as security tagging of bicycles

Controlled-access Public Realm facilities may offer:

- On-street or off-street parking spaces
- Covered parking
- Staffed facilities
- CCTV
- Site signage and locking information
- Luggage / accessories storage
- Repair service
- Toilets

Provider

Public realm cycle parking is typically provided by local authorities. Some installations are provided with input from private partners, or in collaboration with local community partnerships, business district, improvement district organisations, in which cases they are typically engaged in the ongoing management and staffing of the facility.

Designer/Architect

Design professionals with cycle parking design experience, as well as cycle parking equipment suppliers, are usually consulted to identify most appropriate context specific solutions.

Cost of provision (per bike parking space, in Euros)

Public Realm	Range:
Cost/space (inc. installation):	60 - 1630
Maintenance/space:	n/a

The cost per cycle parking place typically varies according to whether access is open, or controlled to some extent. An underground automated controlled access facility such as Biceberg (Barcelona) clearly costs considerably more per bike space than a simple on-street stand, although such a solution simultaneously provides far greater cycle security and offers potential to recover some costs through charges to users parking their bikes.

Off-street facilities such as Park Street (Cambridge) or Bernard Street car parks, can provide economies of scale where the cycle parking can be installed in an existing building or structure.

Location

Open-access facilities are commonly located ‘on-street’ in urban centres or built-up areas. This may be: on the pavements, plazas, or street corners outside of direct pedestrian flows; on central reservations of roadways; or in bays otherwise allocated to car-parking spaces. These latter two locations offer good options to keep cycle parking from adding to ‘sidewalk clutter’, that can in some cases threaten to restrict pedestrian movements and sightlines.

Controlled access Public realm cycle parking locations commonly include sections within or next to existing car parking areas. Some are at ground level, while others may be underground or above ground.

Scale

Scale of provision varies according to demand for the given location.
Public realm installations that group rows of open access parking furniture typically provide for a minimum of 8 cycles per grouping. Off-street and controlled access Public realm facilities more commonly group parking together to maximise on space available, with provision for between 25 and 300 bicycles per facility.

Length of stay

On-street open access provisions are typically designed to accommodate short (< 2hrs) to a maximum of medium stay (2-8 hrs) cycle parking. Provisions with manual staffed (e.g. Bernard Street Car Park) or automatic electronic (e.g. Biceberg) access control are more suitable for medium and Long stay (full days, overnight or 24+ hours) parking. Some facilities manned by staff offer a reduced service overnight.

Charges (to user) in Euros

Public Realm		Range:
Charges:	Day	0 – 1.77
	Month	0 – 35.40

Open access Public Realm cycle provisions provide parking free of charge. Restricted access is often linked to hourly, daily, monthly or other periodic charges. Some facilities provide the parking free and make charges for use off additional services, such as luggage lockers. Electronic access cards are typically issued in exchange for a deposit.

Access

Macro: Best practice Public Realm cycle parking facilities are connected by well-designed cycle route networks. At times consistency regarding macro-level access is presents challenges to achieve owing to diverse variations for each destination. However, Public Realm provisions are typically used by mixed user bases, patterns and frequency of use and they are required to be easy to find, identify and get to. For these reasons much open access cycle parking serving Public Realm destinations is located and accessed either directly from the road-way, such as reclaimed car-space parking (e.g. Rackless Parking Bays, Copenhagen) and central reservation parking (e.g. Kensington High Street, London), or on the outside (road-) edge of pavements and street corners (e.g. Holborn Gateway and Cyclehoops London; and Key, Barcelona), each being fully visible from the street. On-street cycle parking in central reservation areas has the benefit that it leaves busy pavements without added obstacles and also that it requires a specific conspicuous crossing to access and park or retrieve bikes, making less comfortable circumstances for potential thieves.

Controlled access Public cycle parks may be more involved in the approach to using the facility, in that at least some part of the provision is located off-street, in car parks (e.g. Bernard Street, London and Park Street, Cambridge) or underground (e.g. Biceberg, Barcelona).

Meso: On-street open access facilities have no intermediate elements of access, by nature of their requirement to be openly reachable and usable. Entering or exiting off-street Public Realm facilities is typically via wide, cycle friendly entrances, with cycle ramps and lifts where appropriate. These access points can be closed outside of staffed hours or accessed via electronic ‘swipe card’ (RFID) or ‘chip and pin’ type systems, or similar. Facilities where bikes are stored off-street and concealed entirely out of public reach, such as Biceberg, importantly provide distinctly visible on-street access points, as the user-interfaces, provided to enable the automated parking and retrieval of bikes.

Micro: Cycles are typically parked at open access parking installations by simply leaning the bike against the parking furniture and locking with the user's own locks. In the case of double-tier on street parking, bikes are manually rolled on to the lower or articulated-upper channels prior to being secured with the cyclist's locks.

Manual controlled access facilities commonly employ the same procedures, with the additional possibility of parking bikes either within a compound or cycle locker, or a member of staff may 'valet' park the bicycle.
Automated controlled access systems are usually activated for parking or retrieval of a specific bike once the user operates the swipe card or chip and pin device. This will primarily open sliding barriers, gates or turnstiles. In the case of concealed bicycle storage areas, the automated system will then collect the bike from the user, typically via a capsule or rack and remove it to its storage location, which is underground in the case of Biceberg.

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle centre.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.
Visual iconography is typically more conspicuous and universally comprehensible than text.

For open access Public realm cycle parking provisions bold, clear and communicative *placemarking* and *instruction* are both essential, so that people can find the facility, understand its purpose and operation, without either the graphics or hardware presenting as unnecessary street-clutter.
For controlled access installations, the above plus clearly presented facility specific *information*, are important to be visualised, so that people can quickly understand hours of operation, services available and any particular conditions of use.

Parking Furniture

Typical parking furniture designs provided for Public Realm destinations can include: rackless on-street provision defined only by communication graphics (for low-threat-of-theft contexts, e.g. Copenhagen); locking furniture fixed to pre-existing street furniture (e.g. Cyclehoops, London); U-type stands and variants (such as Holborn Gateway 'M' stands, London, 'Key' stands, Barcelona, or 'Geo' stands, Kensington High Street); articulated two-tier racks (e.g. The Peacock Centre, Woking), cycle lockers (e.g. Park Street, Cambridge), automated bolt-locking racks (e.g. Bernard Street, London) and automated multi-tier systems (e.g. Biceberg, Barcelona). Best-practice on-street installations avoid blocking lines of sight or causing physical obstacles.

Furniture within open-access and on-street areas is required to be robust and offer greater bicycle locking opportunities (frame and both wheels) than furniture located within controlled-access areas.

On-street user access points of automated parking systems must be equally robust, simple in use but resilient to vandalism or other abuse. Use of laminated glass or polycarbonate for enclosures helps maintain transparency and visibility for all street users.

Layout and spacing

Manual parking furniture installations, where configured in parallel rows are spaced with 60-100 cm between stands and are located at least 60cm away from any wall. When in on-street locations they are typically configured to be closer to carriage ways, clear from pedestrian footways. As indicated above, best practice on-street cycle parking provisions can be installed: on road-sides of pavements or street corners; edges of plazas, away from pedestrian flows; in bays otherwise allocated to car-parking spaces, or central reservations of roadways. 'Two-dimensional' parking furniture may be oriented either in parallel with curbsides, perpendicular, or diagonally, so long as both sides can be easily accessed for parking. Stands located on roadsides, in perpendicular proximity to pavement curbs need to be spaced with sufficient distance from curbs, so as that cycles do not obstruct drainage flows or pavement access.

In all cases, cyclists require a minimum of 1.2m safe width, per direction of travel, in lanes approaching parking furniture, in order to manoeuvre and park cycles. Automated cycle parking solutions may be more tightly spaced according to the design of each system. An automated bolt-locking rack, such as from Sekura Byk (e.g. Bernard Street Car Park), spaces bicycles in parallel rows, at 50cm apart. A horizontal carousel such as from MA-Systems (e.g. Biceberg), spaces 23 bikes radially, per level, within a 7.5m diameter circle.

Surveillance/ Guardianship/Lighting

Best practice on-street open access provisions are located to be well-lit by surrounding ambient street lighting and in visibly prominent locations that afford good natural surveillance from passing pedestrians and from windows of surrounding buildings, offices, homes, shops, etc. The installations should not obstruct lines of sight and in the case of kiosks or on-street access points being required, transparent or semi-transparent materials are preferable for this reason.

Typically there are no formal guardians for on-street installations, though some providers establish agreements with those who monitor CCTV that covers a specific site, to ensure the cycle parking is monitored, such as in the case of Holborn gateway parking.
Controlled access Public cycle parking facilities are typically afforded more targeted guardianship, involving on-site staff and remote surveillance.
Off-street covered facilities, such as those located in car parks, are typically lit by fluorescent lighting, although benefit greatly when they are also located close to sources of natural light.

Maintenance and Management

Most Public Realm facilities are managed either directly by local authorities, or by a contracted private partner. On street open access provisions necessitate absolute minimum maintenance and servicing requirements, owing to their permanent exposure to

weathering, wear and tear and potential tampering or misuse. Controlled access facilities are typically maintained by the assigned local partner.

Destination served: PRIVATE REALM [COMMERCIAL / RESIDENTIAL]

General Description

Cycle parking facilities serving the Private Realm are discussed here in two categories, Residential and Commercial.

Residential cycle parking facilities typically serve the communal areas within or near multiple-household domestic buildings.

Commercial cycle parking facilities most typically serve business or leisure premises that are visited by customers. These include shopping facilities, eating and drinking outlets, sports and leisure centres, libraries, museums and exhibition venues, cinemas and theatres. Some best practice in such contexts may also be applicable to facilities at other light industry sites, conference centres, places of worship, and other semi-public locations, according to scale, location, access and other factors.

Residential and Commercial cycle parking facilities are both ordinarily expected to offer greater levels of security and convenience than is afforded by on-street Public Realm provisions. Services available to cyclists vary with each location but the range of provisions offered by Private Realm facilities can include:

- Free cycle parking within 25m of destination
- Outdoor, open or semi-open access parking, for shorter stays
- Indoor or covered, controlled access secure parking, for longer stays
- Shared facilities located in public or semi-public locations.
- Cycle ramps or gulleys for ease of access and egress
- Air pump
- CCTV monitoring

Features which may be specific to Residential Parking:

- Individual bicycle lockers
- 24 hour access, for e.g. via swipe-card
- Bright and low-energy-consumption lighting
- Hooks, shelves or additional lockers for accessories/clothing

Features which may be specific to Commercial Parking:

- On-site bicycle shop or parts and repair service
- ‘Valet’ parking
- Left luggage lockers
- Charging for electric bicycles
- Hire bikes available to customers
- Toilets

Provider

Residential cycle parking can either be provided as integral to the build of the domestic property, or as a retro-fit solution installed at any point after the building is established. In the case of the parking being integrated at the time of building, cycle parking facilities are

commonly provided by the construction developers. In the case of retro-fit installations, the facilities can be provided by any combination of management agents, housing associations, local authorities, resident's groups, cycling or sustainable action advocacy groups, as well as other private contributors.

Commercial cycle parking facilities are usually provided wholly by the destination being served, which may be one business (for e.g. in the case of Hotel Assen), or the managing agent of a consortium of businesses represented (such as in the cases of a shopping centre, mall or leisure complex).

Designer/Architect

Residential and Commercial Private Realm bike parking facilities usually require involvement of professional architects, where the installation of the facility is integral to the build of the premises.
Where the installation is retro-installed, professional designers are commonly consulted, or in some small-scale instances the suppliers of the parking equipment may be able to offer some help regarding installation.

Cost of provision (per bike parking space in Euros)

Residential Parking		Range:
Cost/space:		179 - 527

The cost per space of all Private Realm cycle parking is greatly dependent on whether the parking provision is housed within an existing structure or a purpose built facility, and the extent of any installation works required. A greater installation investment may indeed be worthwhile, where for example; it permits use or conversion of a pre-existing space or structure to a suitable specification, which under other circumstances may be unusable, helping avoid costs sometimes associated with a new-build facility.

Some residential provisions leverage financial support from grants or related help available from authorities and advocacy bodies, especially those with agendas linked to sustainable mobility or environmental development.

Wherever possible, it is important to consider the additional costs associated with the ongoing maintenance and management of the facility so as to ensure that these costs can be met and that the facility will operate efficiently. The wide range in maintenance and management costs is linked to the range of services offered and any staffing they require (see 'Maintenance and Management' below).

Location

Private Realm cycle parking is typically located directly within or immediately next to the destination served. Most commonly, it is required accessible within a radius of less than 25m, and a maximum of 50m for some larger Commercial destinations. This close proximity helps establish a greater mutual sense of care between the cyclists and the Private realm destination, and as a consequence, can also promote a greater uptake of cycling to and from the venue.

Scale

Scale of provision varies according to the scale of the facility being served. The case studies of facilities serving the Private Realm presented here, accommodate from less than 10 to over 600 bicycles. Residential parking facilities are typically grouped in smaller clusters, serving between 4 and 75 bikes per installation. Commercial premises commonly require larger scale provision for cycle parking, ranging from 50 to 600 parking places per installation. Many cycle parking design publications available give guidance on the recommended proportion of cycle parking spaces to the floor area or number of occupants, for specific land-uses (see for e.g. http://bikeoff.org/consultation/weblog/?p=26).

It is important to consider the increased demand that is likely to result from a secure and convenient cycle parking provision and plan for expansion. It is typical to provide parking for 30% more bicycles than are observed at the busiest times. Underground facilities may offer less opportunity for lateral expansion, owing to the fixed nature of their perimeter, though these may permit best use of available space and avoid encroaching on valuable floor area elsewhere. In such instances, where possible it may also be worth planning for vertical expansion.

Length of stay

Residential cycle parking facilities typically provide for long stay secure storage of bicycles, overnight or 24+ hours. However residential provisions are often also required for repeated shorter stay (< 2hrs) parking, while residents go about their business during the daytime.

Commercial cycle parking facilities can accommodate short (< 2hrs), medium (2-8 hrs) or long stay (overnight and 24 hours+) parking, according to their destination served. In the case of Grand Fisketorvet shopping centre (Copenhagen), for example, most visitors only require short to medium stay cycle parking, while the cycle park at Grand Arcade shopping mall (Cambridge) typically hosts medium to long stay day parking, owing partly to its location and proximity to other destinations. At Hotel Assen (Assen), some visitors require open access parking to park between short, daytime journeys, while those who bring their own bikes, also require long-stay overnight parking, which is provided in a separate unit.

Charges (to user) in Euros

Typically, Private Realm cycle parking provisions offer at least a part of the facility with free to use or low cost cycle parking. Some residential provisions, such as Frampton Park Estate (Hackney), Amsterdam Residential Bike Parking and Cargo BikeCar (Copenhagen), will charge users a periodic (e.g. annual) membership or usage fee, typically ranging from 5 Euros up to 35 Euros per year, plus a key deposit.

Commercial destinations offering different levels cycle parking service, such as Grand Arcade (Cambridge), typically offer an area of free parking and separated areas of paid parking, which may offer a ‘valet’ service and greater controlled-access security for medium and longer term parking. In such cases costs range from 0 - 1.75 Euros per hour, 2.00 – 9.50 Euros per week and 12 – 24 Euros per month.

For some Commercial parking and consistently for Residential parking, users also need to have paid to access the destination served (for e.g. paying rent or subscribing to gym membership), as a condition for being able to use the associated bicycle parking provision. This is not usually the case in open-access venues such as shopping centres,

though visitors using the bicycle parking provided, may justifiably be expected to spend money at the commercial destination they have travelled to.

Access

Macro: Clearly, well-designed cycle route networks are preferable to carry cyclists to Private Realm parking facilities. However, in practice there is little consistency regarding macro-level access, since each destination is different and how they are approached cannot be predicted. In some cases at larger Commercial destinations the business group(s) represented make a contribution toward improving cycling infrastructure to reach the location more easily by bike.

Meso: Facilities where the parking is located at a level other than street level, typically provide cycle ramps or steps with a bike gulley to approach the bike parking.
Access into Private Realm cycle parking facilities is determined by the level of access control that is specified for the given destination. Open-access commercial centres, such as Fiskotorvet and the free-parking section of Grand Arcade, allow free access to cycle parking via two large openings in its building, to the dedicated cycle parking area within the section of its car park closest to the pedestrian entrance, and rely on strong wayfinding and information-graphics to direct flows of cyclist, pedestrian and motor traffic. These openings may be closed after business hours.

Commercial venues with more controlled access, such as Assen Hotel and Grand Arcade valet cycle parking service, use on-site personnel to control which bikes are parked and collected, while others implement electronic entrance card control systems, in order to help monitor and restrict usage of their cycle parking facilities.

Access to Residential cycle parking provisions is commonly determined by whether they are located within part of a main residential building premises, or in an external structure located in a more open-access context. Those Residential cycle parks located within shared areas inside domestic premises, most commonly rely on existing building access controls, such as the locked main front door or gate and often a secondary lockable door or gate (sometimes sliding) to access the cycle facilities. Secure cycle parking rooms, such as seen in the Amsterdam Residential Cycle Parking study, use electronic swipe cards, to control access to the secondary door. Residential cycle parks located in structures external to the domestic buildings, located in public on-street or semi-public off-street locations, or with their only entrance directly accessible from a public street, typically require greater target hardening[1] to control access and resist against potential abuse, such as is afforded by the CarGo Bike Car shell (GM Technology) or the Frampton Park Lockers (Bikeaway). Manual or electronic keys and/or swipe card entrance systems are common access systems in these instances. Materials of the structure should also be robust enough to resist potential abuse in the specific context.

Micro: Many Residential cycle parking facilities, be they integrated cycle rooms or external provisions such as lockers, require users to hang their bicycles vertically or on the wall, to help maximise on the space available. Some newer residential facilities and some commercial facilities offer double-tier articulated furniture to park bicycles on, whilst in some cases Commercial destinations offer cyclists to park bicycles on one-wheel stands or with simple parking furniture, whose security is increased thanks to guardian surveillance and controlled access compounds.

[1] See http://www.inthebag.org.uk/?page_id=299

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle parking facility.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.

Visual iconography is typically more conspicuous and universally comprehensible than text.

For Commercial cycle parking provisions, all of these communications are important, yet for Residential cycle parking installations, the wayfinding and placemarking do not always prove essential to the cycle facility, since residents are far less transitory than commercial customers.

Residential parking provisions located in public on-street or semi-public off-street locations, often benefit from carefully considered use of bold colour and information graphics to help define their purpose and promote good cycling practice to in the surrounding area.

Parking Furniture

Typical parking furniture designs provided at Private realm destinations can include: one-wheel ('butterfly' type) stands; U-type stands (such as 'M' stands or 'Sheffield' stands); wall-mounted mounted bicycle hangers; wall-mounted and hydraulically assisted bicycle hangers; articulated and non-articulated two-tier racks, cycle lockers and custom bike-canopy solutions (such as Cargo BikeCar and other variants such as Fietshangar[2]).
Furniture within open-access areas of Private Realm parking facilities is typically required to be more robust, and offer a greater level of security and bicycle locking opportunities, than furniture located within controlled-access areas.

Some facilities offer different types of parking furniture so as to maximise the number of parking spaces and the diversity of users and cycle designs accommodated. The disadvantage of non-articulated or non-hydraulically assisted parking furniture that is vertically mounted or located on an upper-tier, to save space in Private parking facilities, is that the cyclist is required to lift the weight of the cycle in order to park their bike, with possible risks of straining.

Diverse furniture provision often seeks a compromise between convenience and security. Within controlled access areas, short stay stands are most convenient to use yet offer

[2] Not covered as case study. See http://www.hwva.nl/fietshangar/bookcms/cms/cms_module/index.php?obj_id=750 and http://www.bakfiets-en-meer.nl/2009/12/17/de-fietshangar-bike-hangar/comment-page-1

fewer opportunities to park and lock bikes securely, although this is less of an issue where parked bikes are adequately protected by the presence of guardians or with restricted access systems. Longer-stay furniture can be justifiably more demanding in use but more secure, owing to a combination of physical design, proximity to guardianship and location within facility premises, such as cycle parking rooms, compounds or lockers.

Layout and spacing

Private realm cycle parking seeks to be as efficient as possible with space available, to maximise density of cycles parked and to afford a greater capacity in the given location.
Residential parking located within domestic premises, is commonly fitted with vertical or wall hanging parking furniture, which helps achieve efficient use of each site, though can be problematic where users have to lift the bicycle's weight, as discussed above.

Commercial cycle parking typically provides either double-tier or space-efficient ground level parking.

Cycle parking provisions for most private realm destinations typically require between 0.6 – 0.9m^2 floor area per bike space to be accommodated (this excludes space for access lanes, pedestrian and service areas), with larger dimensions permitted for specific bicycle types such as recumbent or cargo bikes and cycles with trailers.

The required scale of parking provision for the destination served has an impact on the configuration most appropriate within the facility. Smaller Residential bicycle parks that experience less 'traffic' at any one time, can justifiably use one entrance-exit point, using one system of flow and usually arrange parking within one or two defined areas for cyclists to manoeuvre. Commercial destinations typically experience higher turnover of incoming and outgoing cyclists, so often require space within their cycle parking facilities to be arranged for multiple flows of cyclists to manoeuvre, as well as accommodating the parking furniture accessibly.

Access lanes within facilities commonly require a minimum of 2.0m width between rows of cycle furniture, increasing up to 5m+ for two-directional flows of cyclists.
Offset layouts of parking furniture – i.e. high/low or fore/aft configurations - allow denser spacing of cycles, with typically a minimum 300mm between centres of two cycles parked side by side. Non-offset layouts can typically permit a minimum of spacing 500mm between two cycles.

Surveillance/ Guardianship/Lighting

Lighting for Private Realm parking facilities will require different specification according to the scale and location of the provision. However the best examples are brightly and evenly lit at all times. Use of natural light is maximised within the space, even possible for covered and some underground installations, and 'daylight' bulbs are used in preference to fluorescent. Some Residential and some Commercial facilities are covered by CCTV, particularly where resources are available for the surveillance to be monitored by security personnel on or near the site (or else accurately recorded, logged and frequently checked).

Private parking is rarely afforded the benefit of full time on-site guardianship. However, best practice among Residential cycle parking locates the facility, or at least its access points within areas of ample natural surveillance, often overlooked by neighbours, plus some have the advantage of an on-site concierge, or frequent visits from a building

management representative, who also overlook activities within the cycle parking site and monitor the supporting CCTV system.

Commercial cycle parking provisions are designed so as to maintain clear site lines wherever possible. Smaller commercial venues typically locate their cycle parking within good natural surveillance from the main point(s) of business activity, so that customers and staff can overlook the facility. Staff rooms, shops and offices are located in clear sight of the points of entrance and egress points to/from the parking facility. Larger venues or consortiums of smaller businesses are also able benefit from 'roaming' security staff, whose job it is to visit and monitor whole premises, including cycle parking areas on a regular basis each day.

Maintenance and Management

Cycle parking facilities that serve Private realm destinations are designed to require minimum ongoing maintenance. Inevitably access points, locking systems (manual or electronic) and some articulated parking furniture solutions require periodic checking and occasional servicing.

Maintenance of Residential cycle parking provisions is typically handled either by the contracted buildings manager, or by residents' groups, who may for example, request a contracted buildings cleaner, who can report any further issues, or to organise a rota to clean premises between residents, or share costs and elect a representative to handle any larger servicing requirements.

Commercial cycle parking facilities are typically managed and serviced by the agency responsible for the destination being served, though in some cases where the destination serves a consortium of commercial venues a representative business may be selected, such as an on-site cycle shop, to assist with management of the facility.

Destination served: TRANSPORT INTERCHANGE

General Description

A transport interchange facility is typically an off street, covered cycle park located in or near a transport interchange hub where several modes of public transport converge. Transport Interchange facilities typically serve commuters and other multi-modal transport users. Often the aim of the cycle park is to 'join up' cycling with other modes of public transportation such as overground and underground train services, buses and trams. Unlike 'Cycle Centres' transport interchange facilities do not offer a wide range of services and amenities to cyclists in addition to the provision of cycle parking.

Provider

Transport Interchange facilities are typically provided by local government and/or transport agencies such as train or bus companies. Often these organisations work together to fund the installation, management and staffing of the facility.

Designer/Architect

The specifications of the cycle parking and user requirements are defined by the providers of the facility. In those instances where a new building is required to house the cycle parking either architects are employed by the provider or structural engineers within the provider organisation are called upon to design the facility. Typically, when cycle parking is accommodated within existing buildings the facilities are realised without assistance from architects, although it is usual to seek advice from a number of other

stakeholders including cycling advocates, furniture providers and the police. Professional design input appears to improve provision (certainly the aesthetics and enjoyment of use!).

Cost of provision (per bike parking space in Euros)

	Average:	Range:
Cost/space:	1132	30 - 3000

The cost per space of cycle parking is greatly dependent on whether the parking provision is housed within an existing structure or a purpose built facility.

Purpose built facilities are often realised within larger schemes created to meet combined multi-modal transport and/or sustainability agendas. Within such facilities the cost per space is between E1000 and E3000. The cost per bike within those facilities housed in existing structures is between E30 and E350.

Transport interchange facilities typically leverage funding from local government and transport companies involved in the transport interchange served by the cycle parking.
It is important to consider the additional costs associated with the ongoing maintenance and management of the facility so as to ensure that these costs can be met and that the facility will operate efficiently (see 'Maintenance and Management' below).

Location

Typically cycle parking at transport interchanges is located either within the transport interchange itself or adjacent to the entrances to the transport hubs served by the cycle parking. Parking within the transport interchange is often located beyond the ticket barriers 'on platform' or within indoor space made available for the purpose of cycle parking. Parking located adjacent is often purpose built.

Scale

Scale of provision varies according to likely demand as indicated by the volume of passengers using the interchange and their intermodal habits. The case studies presented here accommodate between 20 and 3000 bicycles. It is important to consider the increased demand that is likely to result from a secure and convenient cycle parking provision and plan for expansion. It is typical to provide parking for 30% more bicycles than are observed at the busiest times. Underground facilities may offer less opportunity for lateral expansion owing to the fixed nature of their perimeter. In such instances it may be worth planning for vertical expansion.

Length of stay

Transport interchange facilities typically accommodate short (< 2hrs), medium (2-8 hrs) and long stay (overnight and 24 Hours +) parking, though the majority of facilities report the typical length of stay as being the duration of the working day (commuters). Opening hours vary. Whilst several facilities discourage overnight parking others are open 24 hours or between 05.30 and 01.30. It is important to consider the usage patterns of your intended users. For example if many use their bicycles for the home to transport interchange leg of their multi-modal journey then expect typical use during the working day. For those who use their bicycle for the transport interchange to workplace leg of their multi-modal journey overnight use may reasonably be expected. Flexible provision

that accommodates short and long term, daytime and overnight parking requires management so as to ensure that abandoned or un-used bicycles do not deny access to active users. Typically bikes left unattended for over two weeks are considered abandoned and removed.

Charges (to user) in Euros

Typically, transport interchange facilities are 'free to park', those that charge set a tariff of between E0.5 and E1 for 24 hrs. Some facilities provide both free parking and pay to park options. Free parking provision is not always covered and typically open access. Pay to park facilities are typically undercover and offer greater security to users via restricted access, surveillance and guardianship. Restricted access is often linked to membership/subscription.

Access

Macro: Transport interchange facilities offer pedestrian and cycle access and egress often via multiple entry points. Cycle access is typically granted directly from cycle routes, lanes, or networks. In several instances efforts have been made to ensure that cyclists can access the facility on bike without having to dismount. Cycle access avoids conflict with other users of the space such as pedestrians and vehicular traffic. Where topography dictates, safe and convenient cycle access is provided via features such as gently sloping cycle ramps, steps with a cycle channel, travelators or lifts. Pedestrian access is typically granted directly from the street or destination served i.e. station concourse.

Meso: Many transport interchange facilities have controlled access, probably because the users of the facility are likely to be commuters who will be leaving their bicycles unattended for long periods. Short stay parking areas are typically open access. In those instances where access is controlled; swipe cards, proximity cards or pin codes are deployed, users are required to enter their code or card to release a turnstile, door or gate (often automated and sliding) and gain access to the parking area. Turnstiles and automated barriers are favoured for cycle access as they reduce the opportunity for people other than the registered user to enter the facility on the heels of a registered user ('tailgating'). Another common approach to access control is placement of cycle parking on station platforms, beyond the ticket barriers so that the cycle parking is only accessible to those with a valid ticket to travel. This approach appears to promote the intention to provide cycle parking to promote multi-modal travel.

Micro: Access to parking furniture and unhindered circulation is often promoted using floor markings to indicate circulation aisles. Furniture is placed so as to minimise congestion at busy times and make it as easy as possible for users to place their bicycle alongside or into/onto the parking furniture

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle parking.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.

Visual iconography is typically more conspicuous and universally comprehensible than text.

Parking Furniture

Typical parking furniture designs provided in Transport Interchange hubs can include: one-wheel ('butterfly' type) stands; U-type stands and variants (such as 'M' stands or 'Sheffield' stands); wall-mounted bicycle hangers; rack-mounted vertical bicycle hangers; non-articulated two-tier racks; articulated two-tier racks, automated bolt-locking stands and automated multi-tier or circular rotary systems.

While one-wheel only racks are installed in some cases, they do not facilitate secure locking practice and even in controlled access facilities U-type or M-stands and variants, represent better practice among non-articulated and non-automated installations, since they can allow more secure parking of bicycles.

It is common for larger Transport Interchange facilities to offer several different types of parking furniture so as to maximise the number of parking spaces and the diversity of users and cycle designs accommodated. Diverse furniture provision often balances convenience and security.

Controlled-access cycle parking solutions permit more advanced furniture installations, in terms of capacity, use of articulated furniture and automation, as well as greater overall levels of protection offered to the bicycles. Short stay stands are most convenient to use yet offer fewer opportunities to park and lock bikes securely. Longer-stay furniture is justifiably more demanding in use but more secure, owing to a combination of physical design, proximity to guardianship and location within facility premises.
Furniture within open-access areas at transport destinations is typically more robust, since it may be located outside or inside and is required to offer a greater level of security via increased bicycle locking opportunities, than furniture located within controlled-access areas.

Layout and Spacing

The configuration of cycle parking at Transport Interchange hubs varies greatly according to the space available and scale of each facility.

Some facilities, such as Zupthen (Amsterdam), Cyckelkaeder (Denmark), Fietsmolen (Netherlands), Groningen (Netherlands) and FGC Gràcia (Spain), innovate ways to use underground/covered space to provide secure cycle parking, without reducing the amount of ground- or station-level space available to other transport users.

In terms of spacing, each parking space to be accommodated typically requires between 0.6 – 0.9m^2 floor area, excluding space for access lanes, pedestrian and service areas. Larger dimensions need to be permitted for specific bicycle types such as recumbent or cargo bikes and cycles with trailers.

Parking furniture is typically arranged in parallel rows or occasionally, circular configurations, with 600-1000mm between centres of two cycles parked side by side.
Offset layouts of parking furniture – i.e. high/low or fore/aft configurations - allow denser spacing of cycles, with typically a minimum 300mm between centres of two cycles parked side by side. Non-offset layouts can typically permit a minimum of spacing 500mm between two cycles.

Two-tier parking racks typically can be off-set on each tier and require a total clearance height of 2.8m.

Automated cycle parking solutions can typically be more tightly spaced, according to the design of each system.

Where more than one row of cycle parking furniture is provided in parallel at larger scale transport hubs, access lanes within facilities commonly require a minimum of 2.0m width between rows of cycle furniture, to park and manoeuvre cycles, with this dimension increasing for two-directional flows of cyclists.

Surveillance/ Guardianship/Lighting

Best practice Transport Interchange cycle parking facilities are brightly and evenly lit at all times. Use of natural light is maximised within the space and 'daylight' bulbs may be used in preference to fluorescent. The specific lighting specification required will differ according to the scale and location of the provision, including factors such as whether the facility is interior, exterior, surrounded by solid walls, open fencing or a cage, for example. However, within best practice sites, the use of natural light is maximised, then complimented where necessary by artificial ambient lighting, to maintain clear visibility, and spot lighting so that signage is noticed and where cyclists need to operate their locks, for example.

Controlled-access cycle parking at Transport Interchange sites is typically staffed for the majority of the time. At larger sites (with capacity of more than 200 bikes, for example), several staff members are often present at facilities during the busiest times of the day and night, commonly linked to the intensity of other forms of transport accessible via that location.

Open-access facilities are not so commonly staffed directly, but are consistently monitored, periodically in-person and remotely, by transport staff.

Most cycle parking at transport stations is covered by CCTV, which is monitored by security personnel on or near the site, usually 24h per day.

Best practice facilities are designed so as to maintain clear site lines where possible. Staffed rooms or staffed station kiosks, are located in clear sight of the points of entrance and egress points to/from the cycle parking facility. Premium priced parking bays are typically located closest to staffed locations.

Some Transport Interchange cycle parking sites provide panic buttons, for use by members of the public, to add peace of mind.

Maintenance and Management

Management of Transport Interchange facilities is usually shared between the partners involved in providing the cycle parking.

Typically, a local government department would be involved in strategic management, linked to a facility's installation and development, and most commonly, one of the transport agencies for the destination being served, would co-manage at strategic level and also be responsible for day-to-day management and staffing of the on-site bicycle parking provisions.

Open-access manual (non-automated) Transport Interchange provisions do not typically require facility-specific staff and are usually monitored and maintained (at least to a basic level) by the transport station staff. Accordingly, the parking furniture and associated site installations need to be resistant to weathering and potential tampering and simple to service and clean.

Well-specified yet simple and resilient cycle parking designs help keep ongoing maintenance costs down. Leaving room to service and clean easily, and use of materials such as galvanised steel structures and polycarbonate or mesh panels, can help in this process.

Where the parking facility involves specialist equipment or automated cycle parking installations, access systems or surveillance equipment, such as at controlled-access Transport Interchange sites, a team of trained on-site staff is commonly recruited to manage and maintain most aspects of the facility.

More advanced periodic servicing is conducted by specialist technicians, either employed as part of the transport interchange site management structure (these may be 'roaming technicians' where several stations are managed by one agency, for example), or contracted from the equipment suppliers.

Charges made to users of the parking facilities can help fund site management and maintenance costs, although these costs are often subsidised from the outset, to be off-set across multi-year business plans, since the individual usage fees need to be set a prices that will attract cyclists and these do not necessarily cover all the costs for advanced facilities.

Destination served: WORKPLACE

General Description

Cycle parking provisions serving Workplace destinations can typically be defined either as on-site facilities specific to a particular business premises, or off-site as publicly accessible facilities that are suitably located for use by local commuters to park their bikes during working hours. The latter of these are commonly used by workers whose workplace cannot provide secure cycle parking on-site, owing to lack of available space, for example.

Services available vary with each location but the range of provisions offered by Workplace facilities can include:

On-site cycle parking

- Indoor or outdoor covered secure cycle parking
- Controlled or open access
- On-site guardians (often shared for whole building)
- CCTV monitoring

- Air pump
- Lockers
- Toilets
- Changing rooms
- Showers
- Hair dryer
- Drying cabinet and iron for clothes
- Water cooler
- Café (shared for whole building)

Off-site cycle parking

- Secure indoor / covered cycle parking
- Controlled access
- On-site guardians
- CCTV monitoring
- Cycle repairs and servicing
- Bicycle rental
- Insurance against bicycle thefts
- Alarm

Provider

On-site Workplace facilities are provided by either directly by the business or by the buildings management for the business(es) served at the site.

Off-site facilities serving Workplaces are typically provided by private companies, either as part of a car park, cycle centre or as a specific cycle park.

Designer/Architect

On-site workplace parking facilities usually require involvement of professional designers and architects, where the installation of the facility is integral to the build of the premises, or a conversion of a pre-existing space.

Off-site facilities serving Workplaces, usually consult professional designers, or in some small-scale instances parking equipment suppliers offer some help regarding retro-fit installations.

Cost of provision (per bike parking space in Euros)

Workplace Parking (Purpose-built On-site facilities)	Average:	Range:
Cost/space:	952.50	437 - 2159

The cost per space of all Workplace cycle parking is greatly dependent on whether the parking provision is housed within an existing structure or a purpose built facility, and the extent of any installation works required. A greater installation spend may indeed be worthwhile, where for example, it permits use or conversion of a pre-existing space or structure to a suitable specification, which under other circumstances may be unusable, helping avoid costs sometimes associated with a new-build facility.

Maintenance and management costs vary widely according to the range of services provided and any staffing they require (see 'Maintenance and Management' below). In the case of on-site facilities, maintenance and management costs are typically linked to the overall buildings management operations and the associated costs for the destination served, to allow the parking to be operated most cost-effectively. In the case of off-site facilities, the maintenance and management costs have to be built into to the business plan of the facility and its charging structure.

Location

Workplace cycle parking specific to a particular business premises (on-site) is typically located directly within, or immediately next to, the destination served, whereas independently cycle parking serving workplaces (off-site) may serve businesses within up to a 100m radius. However a radius of less than 50m is preferable and the most regular paying commuters using off-site facilities may work less than this distance from the cycle parking provision.

Workplace cycle parking facilities are consistently located off-street though they may be located in interior or covered exterior locations, such as within business car parks.

Scale

The capacity of Workplace cycle parking provisions observed typically serves between 25 and 125 bicycles. Clearly in each case, the scale of cycle parking provision needs to be adequate to the scale and occupancy of the site being served. Workplace and Business cycle parking recommendations identified by the Bikeoff Parking Guideline Consultation[ii], specify 1 bike parking space per 100m^2 served, or 15% of automobile parking provision + 2 spaces. This practice is largely consistent with examples located in the Bikeoff CIVITAS case studies.

Length of stay

The most typical length of stay among parking facilities serving Workplaces is 6-10 hours (medium term). However a percentage Workplace cyclists using the facilities also preferred to have the option to leave their cycles parked during longer-term periods, either overnight, or during several days or weeks, if the weather is bad for example.

Charges (to user) in Euros

On-site Workplace cycle parking is consistently free of charge (FOC), while off-site independently run facilities have to charge users since they are run as business enterprises in their own right. Typical off-site costs to park are indicated below:

Off-site Parking serving Workplace destinations		Average:	Range:
Charges (Euros):	Hour	1.2	0 - 1.80
	Month	18.73	13.19 - 23.20
	Year	176.09	120 - 250

Access

Macro: Clearly, well-designed cycle networks are preferable to carry cyclists to Workplace cycle parking facilities. However, in practice, consistency regarding macro-level access can be hard to ensure, given that the parking is commonly a private provision and cycle networks are public or semi-pubic. In some cases, such as on-site facilities serving new-build business premises or off-site facilities offered for example by vehicle parking providers, the build of the site can be designed to incorporate safe and simple access from carriageways.

Meso: Workplace cycle parking facilities, where the parking is located at a level other than street level, typically provide ramps to approach the bike parking. Best practice secure Workplace parking facilities that are not directly overlooked by on-site guardians are typically enclosed to control access and require an electronic swipe card, fob, or equivalent to gain access to the cycle parking 'room', via a gate or automatic door.

Micro: Most Workplace cycle parking facilities, be they integrated on-site cycle rooms or independent off-site provisions, require users to park their bikes at ground level, either horizontally or vertically, using their own locks to secure to the provided parking furniture.

Signage and Communication

Signage is required for purposes of wayfinding, placemarking, information and instruction.

Wayfinding: Directions from surrounding cycle networks and streets to the cycle parking facility.

Placemarking: Clear graphic definition of the facility and its purpose so that it is easily identified by first time and casual users.

Information: On site signage communicates site opening hours, services and security and gives 24-hour contact information.

Instruction: Direction as to how to navigate within the facility and how to use the parking furniture and other services appropriately and effectively.

Visual iconography is typically more conspicuous and universally comprehensible than text.

On-site provisions serving specific business locations typically require significantly less signage than those off-site provisions serving multiple business and residential destinations, since on-site provisions can usually benefit from personal instruction and information provided directly by the business or buildings management.

Off-site provisions, being commercial in their nature, need to provide clear placemarking and informational signage. The requirement for instructional signage varies according to whether personnel are available to assist with relevant details.

Parking Furniture

Parking furniture designs provided at facilities serving Workplace destinations can include: one-wheel wall mounted stands; U-type stands (such as 'M' stands or 'Sheffield' stands); wall-mounted mounted bicycle hangers, vertical cycle stands (such as Cyclepod

or Wallpod) and self-contained cycle lockers. Double tier cycle parking furniture is not common among the Workplace facilities observed.

While one-wheel only stands are installed in some cases, they do not facilitate secure locking practice and even in controlled access facilities U-type or M-stands are preferable and more common practice, since they can allow more secure parking for the bicycles.

Vertical or wall parking alternatives may be appropriate for some workplace destinations, where floor space available needs to be maximised, though best practice examples are directly covered by on-site guardians and still allow for both wheels and the frame to be locked easily.

Layout and spacing

Most cycle parking provisions serving cyclists to park near workplace destinations require between 0.6 – 0.9m^2 floor area per bike to be accommodated. Furniture is typically arranged in rows with between 700-1000mm between centres of two cycles parked side by side on adjacent stands.

Where more than one row of stands is provided at larger scale Workplace facilities, Access lanes within facilities commonly require a minimum of 2.0m width between rows of cycle furniture.

Vertical parking arranged at off-set heights can permit the distance between two cycles to be as low as 30cm. Vertical parking arranged in a circular configuration (such as Cyclepod, Fareham) requires approximately 2.0m around the whole circumference to permit easy parking and retrieval of cycles.

Surveillance/ Guardianship/ Lighting

Best practice lighting for cycle parking serving Workplace destinations provides bright and even light at all times. The specific lighting specification required will differ according to the scale and location of the provision, including factors such as whether the facility is interior, exterior, surrounded by solid walls, open fencing or a cage, for example. The use of natural light is maximised within all spaces of best practice facilities. This is possible for covered and some underground installations, and ‘daylight’ bulbs can be used in preference to fluorescent.

Off-site parking facilities serving Workplace destinations are typically directly overlooked by guardians, at least during ‘open hours’ and may also be served by CCTV surveillance, monitored by the same staff.

On-site Workplace cycle parking is consistently covered by CCTV surveillance and either directly overlooked or else remotely monitored with the guardianship of buildings staff, who visit the site periodically during each shift.

Workplace cycle parking is rarely open to ‘public’ natural surveillance for security reasons, though may be overlooked by business employees, where the cycle parking is appropriately located within controlled environments such as car parks or courtyards.

Maintenance and Management

The Management of on-site Workplace parking is typically handled by facilities or buildings managers designated for the whole premises, as served by the cycle parking.

Maintenance of on-site Workplace cycle parking provisions may be undertaken by designated facilities or buildings managers or shared with contracted cleaners and technicians. More specialist periodic maintenance of parking furniture, electronic access or surveillance systems, is undertaken by the equipment providers, or otherwise outsourced.

Off-site cycle parking, serving commuters to and from places of work, is typically managed and maintained by the providers of each respective facility.

4.2.2 Activities undertaken in the local research

This section summarises the research undertaken into the problem of cycle theft and the specific issues affecting cycle security within the CIVITAS area.

These research activities include:

- Stakeholder mapping and consultation
- Secondary research into cycle theft within the CIVITAS area and environs
- Secondary research into cycle parking demand within the CIVITAS area
- Scoping observations within the CIVITAS area

Stakeholder mapping and consultation

Much local knowledge of an issue resides with those that have a stake in the issue in question or a duty to address it. We refer to these groups as stakeholders and dutyholders.

These groups are invaluable to the local research. Consultation and collaboration with them provides many benefits including:

- Sharing and exchange of knowledge and experience
- Access to data sources
- Pooling of resources
- Co-ordination of activities
- Ensuring relevance and efficacy of research to those that it aims to serve

The project team utilised local government and community networks to identify those groups concerned with the issue of cycle theft and cycle use in Brighton and Hove. Those identified where predominantly involved in community safety, community regeneration and cycling advocacy and promotion, including local governmental and non-governmental agencies and community groups. Many of the groups had been brought together previously by the Partnership Community Safety Team to co-ordinate cycle theft prevention activity in Brighton and Hove between 2006 and 2008 as the Cycle Theft Steering Group (CTSG). The CTSG was reformed to consult on the local research and assist in its delivery.

Table 4. Brighton and Hove Stakeholders and Dutyholders/CTSG members

Contact	Organisation
Abby Hone	B&HCC, Sustainable Transport
Adam Pride	Brighton Cycle Forum
Adam Thorpe	Bikeoff
Angie Greany	BHCC community officer
Allison Baldasare	PTP
Ben Sherratt	Bike It Sustrans
Claire Morgan	BHCC PTP
Cllr Tony Janio	Cycle Champion
Deni Hamilton-Harris	British Transport Police
Jerry Isterling	
Inspector David Derrick	Sussex Police (Central)
Debbie Reed	BHCC CIVITAS
Duncan Blinkhorn	CVSO
Mark Strong	Transport Initiatives
Matt Easteal	Environmental Improvement Team
PSCO Ann Watson	Sussex Police (East)
PCSO Freya Carter	Sussex Police (Hove)
PCSO Cat Pearce	Sussex Police (Hove)
PCSO Jennifer Pietersen	Sussex Police (East)
PCSO Jayne Whitfield	Sussex Police
Jess Sharp	BHCC
Kath Travis	BHCC Journeyon
Lisa Mytton	BHCC community officer
Ruth Condon	Partnership Community Safety Team
Stephen Kelly	School Travel and Work Travel Planning
Eleanor Togut	
Terry Nye	Bikeability
Tracy Davison	B&HCC, Sustainable Transport
Veronika Moore	B&HCC

Secondary research into cycle theft within the CIVITAS area and environs

Secondary research centers on the analysis of Sussex Police data supplied by Crime and Disorder Reduction Partnership analyst Caroline Palmer in response to a detailed request from the research team. The dataset used for the analysis is the Crime And Disorder Data Information Exchange (CADDIE) dataset for bicycle theft in Brighton and hove between the 1st June 2008 and 31st May 2009.

The analysis examines cycle theft within the CIVITAS boundary (see Figure 2) and aims to identify areas within this boundary that are ‘hotspots’ for cycle theft. The analysis also gives insight into the seasonality, timing, location type (e.g. on street, in garden) of cycle theft and whether cycles were left ‘secure’ or ‘insecure’ when stolen.

Figure 2. CIVITAS study area in Brighton and Hove

Cycle theft 'Hotspots'

Within the research 'Hotspots' refers to geographic areas that experience the highest incidence of cycle theft. Figure 3 shows the 'hotspot' areas for cycle theft in the whole of Brighton & Hove. A large section of the primary 'hotspot' falls within the CIVITAS area boundary, as well as a large proportion of those areas where there are medium/ high numbers of cycle theft.

Figure 3. 'Hotspot' map of cycle theft in Brighton & Hove June 08 – May 09

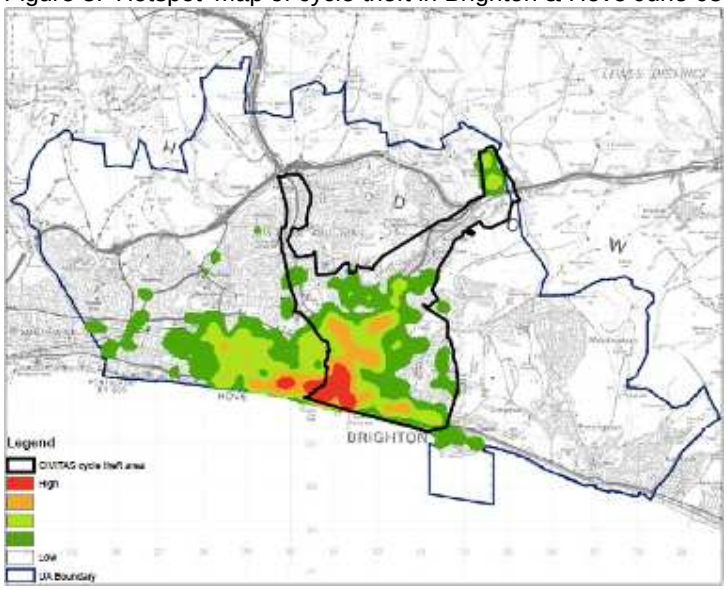


Figure 4 shows that the 'hotspot' is located near to the south-western boundary of the CIVITAS area, in the city centre. A more detailed point map showing the locations of cycle thefts across the CIVITAS area can is shown in Figure 5. The primary 'hotspot' within the CIVITAS area covers most of the North Laines, as far north as Gloucester Road, the Pavilion area and Old Steine, and two areas between North Road / Western Road and the seafront.

Figure 4. 'Hotspot' map of the CIVITAS area. June 08 – May 09

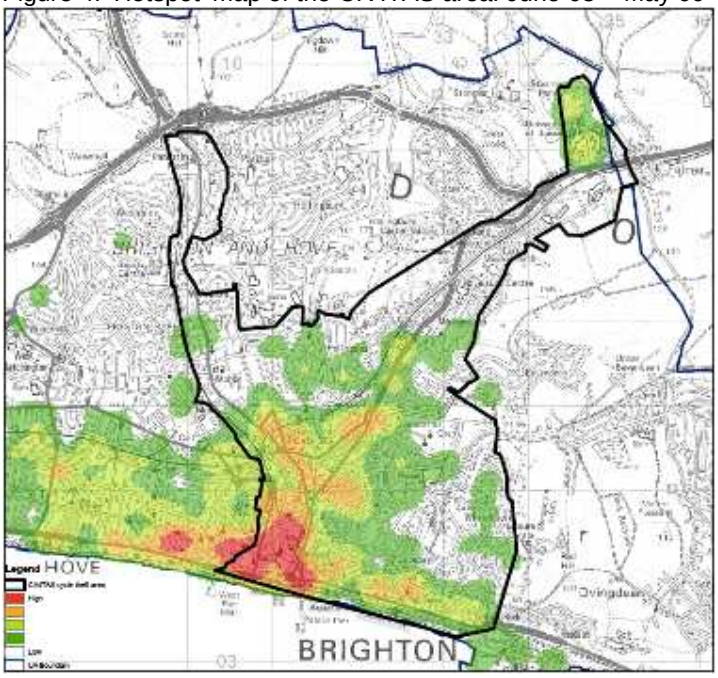


Figure 5. Point map of cycle thefts within the CIVITAS boundary June 08 – May 09

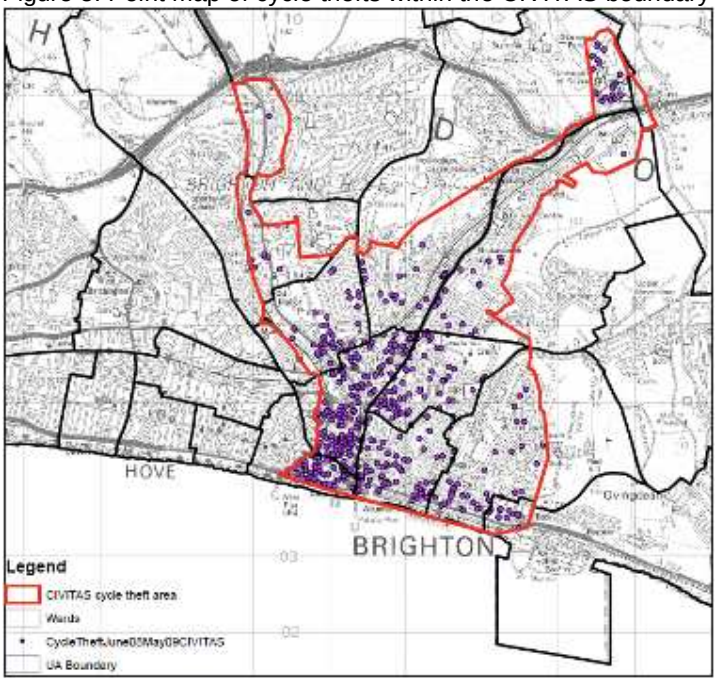


Table 5 shows a breakdown of the twenty streets within the CIVITAS area with the highest number of cycle thefts. Nine of these 'top twenty' streets are totally or partially within the CIVITAS hotspot area. Lewes Road features as the street in the CIVITAS area with the highest number of cycle thefts predominantly due to its length, and there is no section of Lewes Road where offences are clustered. Offences in St James's Street are clustered nearest to Old Steine, which also features with a high number of offences.

Table 5. Twenty streets within the CIVITAS area with the highest number of cycle thefts.

Street	Total recorded cycle thefts
Lewes Road	19
North Road	17
West Street	13
Old Steine	11
St James's St	10
Kings Road	9
North Street	9
Churchill Square	8
Coombe Road	8
Eastern Road	8
Gladstone Place	7
London Road	7
Queens Road	7
Southover Street	7
Madeira Drive	6
Preston Road	6
Ditchling Rise	5
Elm Grove	5
Stanford Avenue	5
Church Street	4
Grand Total	**171**

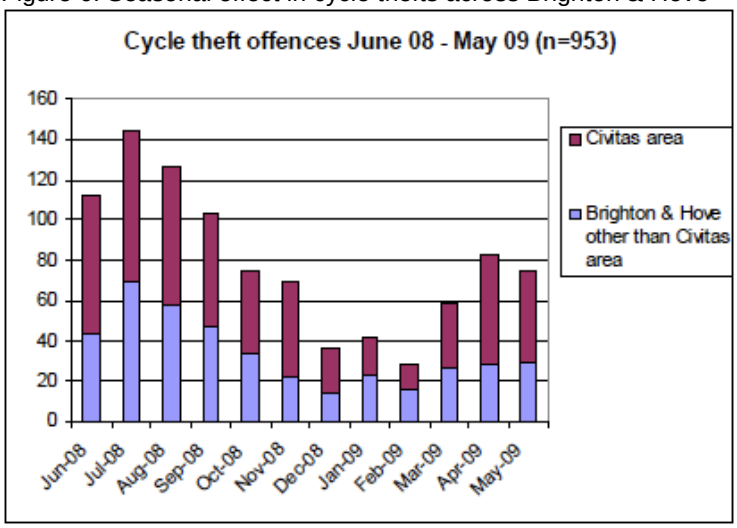
In a similar analysis conducted in 2006 to identify streets within the area with the highest number of cycle thefts, London Road was highlighted as the street with the most cycle thefts over a two-year period. However, between June 08 and May 09 there were seven offences recorded on London Road a reduction in thefts compared to the previous period. Pelham Street was also highlighted in 2006 as a 'hotspot' area. Offences here have also dropped, and just three offences were recorded between June 08 – May 09, significantly fewer than recorded for the previous period.

Both London Road and Pelham Street were the focus of cycle theft reduction measures implemented and tested during 2007 and 2008 by the Bikeoff Research Initiative. The reduction in thefts in these streets suggests that the measures implemented by Bikeoff were successful.

Seasonality of cycle thefts

CADDIE analysis shows a seasonal effect in cycle thefts across Brighton & Hove, with large increases in the number of thefts seen in the summer months. This pattern is also replicated within the CIVITAS area as shown in Figure 6. This pattern is likely to be due to increases in cycle use during summer months which increases the availability of cycles to thieves and therefore opportunities for theft.

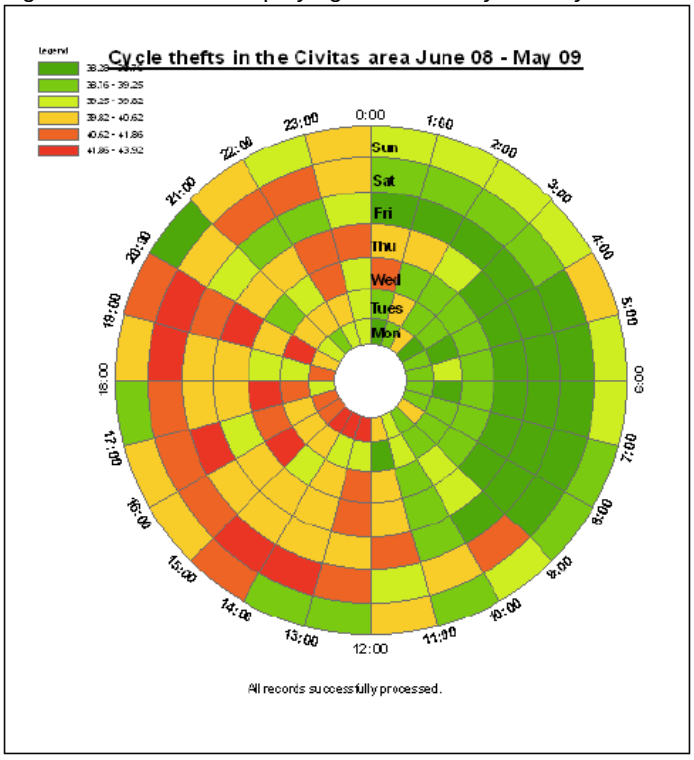
Figure 6. Seasonal effect in cycle thefts across Brighton & Hove



Aoristic analysis of cycle thefts

The data clock in Figure 7 shows the probability of offences occurring within the CIVITAS area across both days of the week and times of day. It shows that Saturday is the peak day of the week for cycle thefts, with peak times between 13.00hrs and 15.00hrs and 18.00hrs and 20.00hrs. Monday also shows a high level of offences in the early afternoon. Throughout the week, the peak times of cycle thefts vary, but largely occur in the afternoon and early evening.

Figure 7. Data clock displaying aoristic analysis of cycle thefts



Locational context of cycle thefts

The majority of cycle thefts within the CIVITAS area between June 08 and May 09 took place on the street (68%). 13% of cycle thefts in the area took place in a private garden. Most cycles were described as being left secure, whilst just 11% were left insecure by the owner. This suggests that increased publicity around good locking practice is needed. However, these statistics will not include those instances where a cycle has been reported to the police as having been secured for the purpose of insurance claims. Additionally, secondary research considered the findings of previous Bikeoff research into cycle theft conducted between 2006 and 2007 in the North Laines area of Brighton and Hove, which is within the CIVITAS area.

This precedent research included observation of cycle parking practices in cycle theft 'hotspot' areas. The research identified that:

- The majority of cyclists used cheap locks easily defeated by common know cycle theft techniques using readily available hand tools.
- The majority of cyclists were not aware of how to lock their cycle securely – or if they were chose not to do so.
- There was a lack of 'formal' cycle parking provision in the theft 'hotspot' corridors observed within the study.
- Some 'formal' parking provision within the corridors observed was found to be inappropriate in that it appeared to promote insecure locking practices by cyclists.
- Natural surveillance by passers by does not appear to deter or prevent cycle theft.
- There was evidence of 'environmental complicity' with cycle theft such as CCTV sightlines obstructed by street furniture, inappropriate or lacking signage and poorly maintained parking (abandoned locks and cycles) in the corridors reviewed.
- Few stolen cycles are recovered and returned to their owners.

The research concluded that cycle theft was attributable to opportunist acquisitive crime rather than joyriding or volume theft (there may also be a possible link to drug use – although more evidence would be needed to substantiate this initial observation). The findings of the precedent research assisted in identification of contextual factors relating to use and abuse that would inform both the measures designed for implementation within CIVITAS ARCHIMEDES Task 5.4 and the design of the monitoring and evaluation plan.

Secondary research into cycle parking demand within the CIVITAS area

Precedent research shows that cycles left secured to formal parking provision are less likely to be stolen than those left secured to street furniture not designed for the purpose of cycle parking, such as lampposts and railings. Consequently the demonstration task, *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4), includes within its measures, the provision of formal cycle parking as a means of reducing cycle theft and increasing cycle use. The location of these new cycle parking facilities within the CIVITAS area considers the demand for cycle parking as well as the incidence of cycle theft. The demand for cycle parking was assessed according to high levels of parked cycles in areas without formal cycle parking and requests for cycle parking provision from residents and cycling groups. A list of 'demand' sites was drawn up by Tracy Davison, Transport Planner - Walking & Cycling, Brighton & Hove City Council, as shown in Table 6.

Table 6. Sites of cycle parking demand

Site No.	Street/Area	Description	Within Civitas Area?	Reason PCPP needed	Location	Cycle Theft 5 = High 1 = Low
1	Kensington Place	Either South or North end (both areas in front of cafes)	Yes	Fly parking – good visibility by those walking to train station or within North Laine. Residential / shopping area	Outside the Inside /Out Café, Kensington Place	3
2	Duke Street (where Middle meets Ship)	North side of the road (in front of Fabrica)	Yes	Good Visibility and an area in desperate need for cycle parking. Shopping area	NA/	5
3	Kemp Street	South end	Yes	A street with very little pavement space and many fly parked cycles	South end of Kemp Street near the junction with Gloucester Road	4
4	Queens Gardens North Road		Yes	Listed as top Cycle Theft Target area. Residentail / shopping area	In the hatched area where Queens Gardens meets North Raod.	5
5	St. George's Road	Kemptown	Yes	Fly parking - sparse pavement space. Residential / shopping area	St Georges Street near the East junction with Bloomsbury Street	3
6	East Street	On street parking	Yes	Major shopping area	n/a	5
7	Marine Square	On street parking	Yes	Residential area	Near the exit of Marine Square and the junction with Marine Parade.	3
8	Palace Place (nr to RBS)	On street parking	Yes		N/A	5
9	Sussex Square	On street parking	Yes	Residential area	On Sussex Square and the western junction with Eastern Road.	3
10	Tidy Street	Onstreet parking	yes	Residential area		
11	Beaconsfield Road	On Street parking	Yes	Residential area	On London Road near the junction with Ditchling Rise	4
12	George Street	On Street Parking	Yes	Residential area & Shopping area	On George St near the junction with St james street.	4
13	Norfolk Sq.	On street Parking	No	Requested by resident with photos	Norfolk Square on southbound carridgeway	
14	Norfolk Road		No			
15	St. Margaret Place	Outside Sussex Heights	No	Residential area	St Magret Place outside residential buildings.	
16	Lansdowne Place	Area in Hove w/ insufficient provision pavement space is sparse	No	Serious fly parking problems	Southbound carridgeway on Lansdowne Place near the junction with Western Road.	Potential with next Tro Dec. Charles Field
17	Lansdowne Street		NO	Residential area		
18	Farm Road	Same as above	No	Serious fly parking problems in residential area	Farm Road near the junction with Western Road.	

Scoping observations within the CIVITAS area

To understand first hand the situation as regards security of parked cycles and demand for cycle parking within the CIVITAS area researchers conducted a series of on street observations. The geographic focus of the observations was streets within the CIVITAS area identified as 'hotspots' for cycle theft and/or sites of high demand for cycle parking within the local research described above.

Researchers used these observations to corroborate the findings of the secondary research and identify factors that may contribute to theft and vandalism of parked cycles within the CIVITAS area.

Additionally, these scoping observations provided valuable practical insights such as the time taken for observations and moving between sites, the volume of data to be gathered and the best methods for doing so. These activities also informed the development of observation tools for use in the monitoring and evaluation activities to follow.

The scoping observations identified the following:

- High incidence of insecure locking practices
- High incidence of use of poor quality locks

- Insufficient cycle parking provision to meet demand
- Evidence of theft and vandalism of parked cycles
- High incidence of parked cycles causing obstruction

High incidence of insecure locking practices

Precedent research conducted by the Bikeoff Research Initiative has identified the most common cycle theft perpetrator techniques as follows:

- Lifting
  Thieves lift the cycle and lock over the top of the post to which the cycle is secured. If it is a signpost, then the thieves may remove the sign to lift the cycle clear. Sometimes the post itself is not anchored securely and can be lifted clear of the cycle and the lock

- Levering
  Thieves will use the gap between the stand and the cycle left by a loosely fitted lock to insert tools such as jacks or bars to lever the lock apart. Thieves will even use the cycle frame itself as a lever by rotating it against the stand or other stationary object to which it is locked. Either the cycle or the lock will break. The thief doesn't mind which—after all, it's not their cycle!

- Striking
  If a cyclist locks a bicycle leaving the chain or lock touching the ground, thieves may use a hammer and chisel to split the securing chain or lock.

- Unbolting
  Thieves know how to undo bolts and quick-release mechanisms. If a cyclist locks a cycle by the wheel alone, then it may be all that is left when the cyclist returns. If a cyclist locks only the frame, then a thief may remove a wheel or wheels. In this case, if a cyclist leaves a wheel-less cycle with the intent of picking it up later, then the thief may return before the cyclist returns and remove the rest of the cycle.

- Cutting
  Thieves are known to use tin snips, bolt cutters, hacksaws, and angle grinders to cut their way through locks and chains to steal bicycles.

- Picking
  For locks requiring keys, thieves can insert tools into the keyhole itself and pick the lock open.

The same research identifies that there are one hundred and eighty different ways in which a cycle may be secured to street furniture or cycle parking using two locks. These locking practices display different levels of vulnerability to the common theft perpetrators techniques described above.

Considering these differing levels of vulnerability the Bikeoff Research Initiative has categorised the locking practices into a *typology of secure locking practice*. The typology rates the one hundred and eighty locking possibilities as 'bad', 'ok' or 'good', where good locking practice renders the cycle most resistant to theft and bad locking practice renders it most vulnerable.

Within this typology 'good' locking practice secures both wheels and frame to the parking furniture, 'ok' locking practice secures one wheel and the frame to the parking furniture, and 'bad' locking practice secures either one wheel or the frame (or neither) to the parking furniture. This locking typology is shown in Figure 8.

Figure 8. Typology of secure locking practice

The majority of cycles observed in the scoping observations were locked insecurely according to the typology described above.

High incidence of use of poor quality locks

Research shows that cycles locked using two locks of different type are most secure against theft. The use of two different types of lock, for example, a strong D-lock and a sturdy chain lock, means that a thief will need different tools to break each lock, making theft less likely. Typically coil or cable locks of less than diameter 15mm are the least secure.

These locks are easily defeated using basic hand tools such as pliers or wire cutters. Many of the cycles observed within the scoping study used only one lock. Often the lock used was of a cable lock type of small diameter as shown in Figure 9.

Figure 9. A cycle locked using a cable lock

Insufficient cycle parking provision to meet demand

In many of the streets observed there is no cycle parking provided. This results in cycles being locked to other types of street furniture as shown in Figure 10. In some streets where cycle parking is provided there is insufficient quantity to meet demand resulting in overcrowding and reduced opportunities for secure locking practices as shown in Figure 11.

Figure 10. Cycles locked to street furniture not designed for cycle parking

Figure 11. Overcrowded cycle parking

Evidence of theft and vandalism of parked cycles

Cycles with missing wheels and seats suggest evidence of component theft and vandalism. There were several cycles observed that appeared abandoned as a result of

component theft such as the one shown in Figure 12.

Figure 12. Cycle with rear wheel stolen

High incidence of parked cycles causing obstruction

Many of the streets observed are residential streets. The walkways of these streets are narrow, sometimes less than two metres wide. Cycles locked to street furniture in these streets can cause an obstruction to other users of the space as shown in Figure 13. Those streets used predominantly for retail attract a high number of cyclists. In the absence of cycle parking provision cyclists lock to street furniture, again causing obstruction to others as shown in Figure 14. These obstructions can lead to intentional or unintentional damage to parked cycles.

Figure 13. A parked cycle causing obstruction in a residential street

Figure 14. A parked cycle causing obstruction in a retail street

4.2.3 Activities undertaken in the development of a robust monitoring and evaluation plan

The task of developing of a robust monitoring and evaluation plan is intrinsically linked to both the local research and the design of the measures to be delivered within the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).

The activities undertaken to develop a robust monitoring and evaluation plan centre around analysing the local research to answer the following questions:

- Why are we monitoring and evaluating?
- What are we monitoring and evaluating?
- Where are we monitoring and evaluating?
- How are we monitoring and evaluating?
- When are we monitoring and evaluating?

Why are we monitoring and evaluating?

A robust monitoring and evaluation plan is necessary to enable a comparative analysis of the impact of measures implemented within the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).

The measures to be implemented within the demonstration project include:

- The provision of secure cycle parking
- The provision targeted and informative communication focusing on the issue of cycle theft via community engagement (previously referred to as a "*high profile publicity and awareness campaign"*).

The desired outcomes of the demonstration project are:

- Reductions in cycle theft within the CIVITAS area
- Increases in cycle use within the CIVITAS area

The hypothesis tested by the research is that *provision of formal cycle parking and*

targeted and informative communication focusing on the issue of cycle theft will achieve the desired outcomes described above.

The comparative analysis of the impact of measures will enable researchers to identify which of these measures, or combinations of measures, are most effective in achieving the desired outcomes.

What are we monitoring and evaluating?

The monitoring and evaluation activity seeks to measure the extent of change in factors that determine achievement of the desired outcomes. Desired outcomes are also referred to as 'ultimate outcomes'. Sometimes it is not possible to monitor and evaluate ultimate outcomes reliably. On these occasions it is useful to consider 'intermediate outcomes'. Intermediate outcomes are outcomes that impact upon the achievement or otherwise of the ultimate outcomes.

For example, in addition to monitoring and evaluating the impact of measures on the number of reported cycle thefts from a given location we seek to monitor and evaluate the impact of measures on the security of locking practices or other factors that are known to influence the opportunity and incidence of cycle thefts.

Reductions in cycle theft within the CIVITAS area – monitoring and evaluating an ultimate outcome

To determine the achievement or otherwise of the ultimate outcome of a reduction in recorded incidents of cycle theft the research compares the levels of recorded cycle theft before implementation of demonstration measures with the levels of recorded cycle theft after implementation of demonstration measures.

Levels of reported cycle theft are determined by analysis of Sussex Police CADDIE data.

To ensure that *before* and *after* data is comparable, both sets of data refer to a similar period (two years) and the same geographic area (streets) within the study area.

To ensure that any changes in recorded thefts are linked to the implementation of demonstration measures a set of streets within the CIVITAS area that do not receive any implementation of measures are also monitored and evaluated as a control group.

Comparison of theft data for streets receiving measures with streets receiving no measures before and after implementation of measures will enable changes in reported cycle theft attributable to implementation of measures to be identified. Comparison between theft data for streets receiving different measures will enable researchers to evaluate which measures have the greatest impact on reports of cycle theft.

Reductions in cycle theft within the CIVITAS area – monitoring and evaluating intermediate outcomes

There are circumstances in which the monitoring and evaluation of the ultimate outcome may be problematic (see 'Problems Identified' section). In such cases it is advisable to measure and evaluate 'intermediate outcomes' as well.

In the case of this research the intermediate outcomes relate to factors likely to contribute to increased opportunity for cycle theft and damage to parked cycles. The local research indicated that intermediate outcomes should include:

- Security of locking practices
- Incidence of parked cycles causing obstruction
- Incidence of cycles locked to street furniture not designed for cycle parking

Security of locking practices
Precedent and local research identifies that security of locking practices is linked to the number of locks used by cyclists to secure their parked cycles, the types of locks used and the way in which they are applied. The monitoring and evaluation plan seeks to record this data via *before* and *after* observations of parked cycles in the streets in which demonstration measures are applied and a group of control streets in which no demonstration measures are applied.

The data collected will be evaluated via statistical analysis to identify which demonstration measures deliver what impacts as regards to changes in the locking practices of cyclists within the CIVITAS area.

Incidence of parked cycles causing obstruction

Precedent and local research identifies that parked cycles that cause obstruction are more likely to be damaged or vandalised either as a consequence of accidental collision or intentional attack. The monitoring and evaluation plan seeks to record this data via *before* and *after* observations of parked cycles in the streets in which demonstration measures are applied and a group of control streets in which no demonstration measures are applied.

The data collected will be evaluated via statistical analysis to identify which demonstration measures deliver what impact as regards to changes in the number of parked cycles causing obstruction within the study area.

Incidence of cycles locked to street furniture not designed for cycle parking

Precedent research indicates that cycles left secured to formal parking provision are less likely to be stolen than those left secured to street furniture not designed for the purpose of cycle parking, such as lampposts and railings. The local research identified that many cycles in cycle theft 'hotspot' areas were left secured to street furniture not designed for the purpose of cycle parking. Using a *before* and *after* observation methodology similar to that described above the monitoring and evaluation plan seeks to record changes in the number of cycles left secured to street furniture not designed for the purpose of cycle parking.

The data collected will be evaluated via statistical analysis to identify which demonstration measures deliver what impact as regards to changes in the number of parked cycles left secured to street furniture not designed for cycle parking within the study area.

Increases in cycle use within the CIVITAS area – monitoring and evaluating an ultimate outcome

The monitoring and evaluation plan considered both secondary and primary research methods by which to measure increases in cycle use as a consequence of implementation of demonstration measures. Neither were considered robust.

Monitoring increases in cycle use via comparison of cycle count data for streets in which demonstration measures were introduced and those receiving no measures was considered too inaccurate because it is not possible to attribute cycles counted to a street

of origin, such as the streets in which measures were introduced. Thus, any increases in cycle use could not be attributed to the implementation of measures within the demonstration project.

Monitoring increases in cycle use via canvassing of residents about their cycle use was considered inaccurate as it is difficult to control the population surveyed and ensure accuracy of reporting.

Increases in cycle use within the CIVITAS area – monitoring and evaluating an intermediate outcome

The monitoring and evaluation plan will measure changes in the number of cycles parked within the streets in which measures are implemented and the control streets *before* and *after* implementation.

The data collected will be evaluated via statistical analysis to identify which demonstration measures deliver what impact as regards changes in the number of parked cycles within the streets under study. An increase in the number of parked cycles observed will be assumed to indicate increases in cycle use. A decrease in the number of parked cycles observed will be assumed to indicate a decrease in cycle use.

Where are we monitoring and evaluating?

The monitoring and evaluation focuses on the analysis of data collected via *before* and *after* observations made in the streets receiving demonstration measures and a group of streets that received no demonstration measures. The streets that received no demonstration measures were similar to those that did in every other way. The streets receiving no demonstration measures are referred to as the 'control' group.

The observation streets were selected according to the following criteria:

- Location within CIVITAS area
- Reported cycle theft activity (target theft hot-spots)
- Location within the Cycle Demonstration Town (CDT) implementation area*
- Requests and objections from residents and cyclists regarding cycle parking*
- Infrastructural/logistical considerations (i.e. potential for compatibility or conflict with existing or planned □on street□ interventions)*
- Comparability of study corridors
- Proximity (to each other) and accessibility to researchers
- Degree of community involvement

* Indicates requirements unique to streets in which cycle parking will be installed.

Location within CIVITAS area

All streets observed must be within the CIVITAS study area.

Reported cycle theft activity (target theft 'hotspots')

Where possible all streets observed must be in or near reported cycle theft 'hotspots'. This is to ensure that measures implemented have the greatest potential for cycle theft reduction. Also, to ensure the best opportunity for evaluation of demonstration measures using Sussex Police CADDIE data for cycle theft. Areas of low incidence of cycle theft will not offer sufficient data to enable evaluation.

*Location within the Cycle Demonstration Town (CDT) implementation area**

Installation of cycle parking provision is linked to CDT funding. To enable cycle parking provision measures to be implemented within the demonstration project the streets receiving these measures must be within the CDT area.

*Requests and objections from residents and cyclists regarding cycle parking**

Installation of on street cycle parking must consider the requirements of residents. To enable on street cycle parking to be implemented within the demonstration project requests for cycle parking and objections to cycle parking must be considered. Traffic Regulation Orders must be advertised for the proposed sites. Any unresolved objections to planned cycle parking installations must be deferred to a full Council committee meeting where a decision will be made to accept or reject the objection. Two proposed sites that qualified on all other criteria received objections from residents, as shown in Table 7.

Table 7. Objections to sites proposed for cycle parking implementation

Sites proposed for on street	Sites proposed for off street	Sites receiving objections
Kensington Place	Marlborough Place	Marine Square
Kemp Street	Pavilion Parade	Sussex Square
Queens Gardens / North Rd		
St Georges Rd		
Tidy Street		
Beaconsfield Road		
George Street		

*Infrastructural/logistical considerations (i.e. potential for compatibility or conflict with existing or planned on street interventions)**

To minimize the inconvenience to the public and maximize the efficient use of resources it was necessary to consider other planned interventions in the public realm.

Comparability of study corridors

In addition to the streets receiving intervention measures within the demonstration project an equal number of 'control sites', streets where no measures are implemented, were required. Control sites are observed alongside the intervention sites and the data collected analysed and compared. Comparison enables researchers to identify the extent and nature of the impact of demonstration measures.

The control streets selected were as similar as possible to the intervention streets in terms of:

- Size/length of corridor/street
- Walkway width
- Access (cul-de-sac/through roads etc)
- Land use (residential/retail/industrial etc)
- Street topography
- Street furniture
- Existing cycle parking provision

Proximity (to each other) and accessibility to researchers

To minimize the time and resources required for observations street selection considered the ease and speed with which researchers are able to move between observation streets. Observation of the streets selected can be completed by two people during the course of one full day.

Degree of community involvement

In addition to monitoring and evaluating the impact of implementation of secure cycle parking the demonstration project also seeks to monitor and evaluate the impact of provision of targeted and informative communication focusing on the issue of cycle theft via community engagement. To ensure the efficacy of research in this respect it was necessary to ensure that the implementation and control streets are comparable in terms of the degree of community involvement in the streets under study. Consultation with the Cycle Theft Steering Group (CTSG) members enabled researchers to identify streets that benefit from active Local Area Teams (LAT's) and Neighbourhood Watch groups (NW). Presence of these groups indicates high levels of community involvement. These groups provide a focus for the community engagement aspect of the demonstration project.

How are we monitoring and evaluating?

The impact of the measures implemented within the demonstration project is to be monitored and evaluated according to degree of achievement of the ultimate and intermediate outcomes described above. Achievement or otherwise of these outcomes will be evaluated via monitoring and evaluation of the following factors, the performance indicators:

- Changes in reported cycle thefts
- Changes in security of locking practices
- Changes in incidence of parked cycles causing obstruction
- Changes in incidence of cycles locked to street furniture not designed for cycle parking
- Changes in number of parked cycles

Monitoring

As described above, changes in reported cycle theft are monitored and evaluated via analysis of Sussex Police CADDIE data for cycle theft before and after implementation of demonstration project measures. All other indicators are monitored via on street observation of parked cycles within the study corridors before and after implementation of demonstration measures. The data collected before and after will be subjected to statistical analysis to identify any changes.

To enable rigorous comparative observation, typologies and tools were created that allowed researchers to record in detail those factors that relate to the performance indicators described above including:

- Number of parked cycles in a given street
- Location of parked cycles in a given street (and what they are locked to)
- Number of parked cycles in a given street causing obstruction to the walkway
- Type of cycle(s)
- Condition of cycle(s)
- Number of lock(s) used
- Type(s) of lock used
- How the lock(s) is applied

The tools created for this task included an observation sheet (one to be completed for each cycle observed) an example of which is shown in Figure 15, and a schematic map of each study corridor (street), as shown in Figure 16, on which the location of each parked cycle is recorded.

Figure 15. Observation sheet

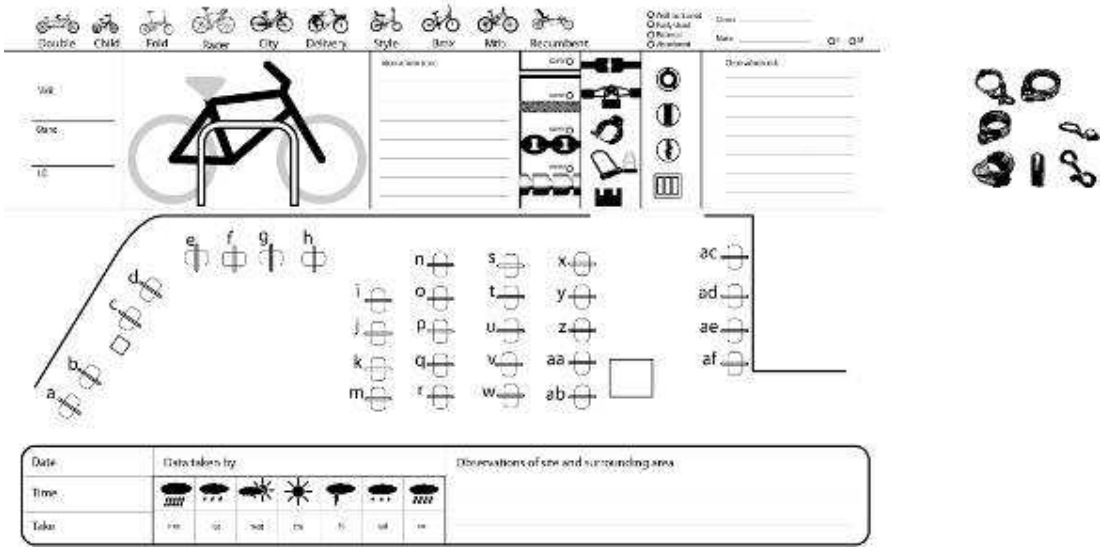
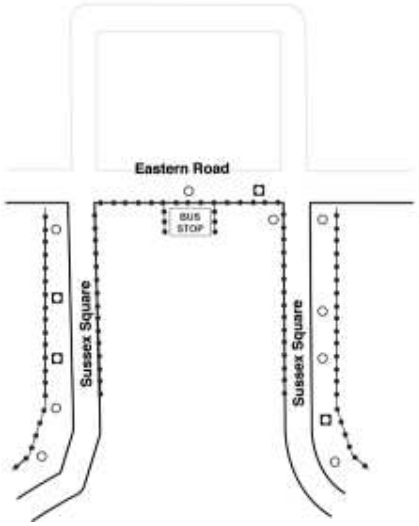


Figure 16. Schematic map example



Evaluation

Each of the variables recorded within the observation sheet above is included as a 'discrete variable' in a spreadsheet. The data collected for each parked cycle observed in each street is entered into the spreadsheet. The data within the spreadsheet can then be subjected to rigorous quantitative statistical analysis to establish interrelationships between variables and differences in the incidence of occurrence of these variables.
This analysis is repeated with data sets gathered before and after implementation of the

demonstration measures. Outcomes of the analysis inform the evaluation of the effectiveness of measures in achieving the desired ultimate and intermediate outcomes described above.

When are we monitoring and evaluating?

The issues to be considered is deciding *when* to conduct the monitoring include:

- Seasonality of cycle use
- Seasonality of cycle theft
- Aoristic patterns of cycle use
- Aoristic patterns of cycle theft
- Logistical and ethical consideration relating to timing of observations

Seasonality of cycle use

Local research identified that cycle use is at its highest in the summer months, between June and September and at its lowest during the winter months, between December and February. So as to monitor those activities that are most typical, and least influenced by extremities of use, monitoring should be conducted during between October and November or March and April.

Seasonality of cycle theft

Local research identified that patterns of cycle theft follow patterns of cycle use. Cycle theft is at its highest in the summer months, between June and September and at its lowest during the winter months, between December and February. So as to monitor those activities that are most typical, and least influenced by extremities of incidence of theft, monitoring should be conducted between October and November or March and April.

Aoristic patterns of cycle use

Some of the study corridors (streets) are predominantly residential streets whilst others are predominantly retail areas. These different locations experience different patterns of cycle use and cycle parking. Residential locations experience the highest number of parked cycles outside of working hours whilst retail areas experience the highest numbers of parked cycles during shop opening hours. Therefore monitoring activity had to be conducted across both retail and residential sites during both weekdays and weekends to create an aggregated data set with which on which to base evaluation.

Aoristic patterns of cycle theft

Local research identified that Saturday is the peak day of the week for cycle thefts, with peak times between 13.00hrs and 15.00hrs and 18.00hrs and 20.00hrs. Monday also shows a high level of offences in the early afternoon. Throughout the week, the peak times of cycle thefts vary, but largely occur in the afternoon and early evening. So as to avoid the presence of researchers influencing the likelihood of cycle thefts occurring, monitoring (observations) should be conducted outside the hours of peak theft.

Logistical and ethical considerations relating to timing of observations

The resources available to the project mean that each set of observations (all cycles in all study corridors observed and recorded) must be carried out during the course of one day. Between ten and twenty days of observation are required to collect sufficient data for robust evaluation. Researchers were not available to make observations on Sundays or after 18:00 hours.

4.3 Main Outcomes

4.3.1 Main outcomes of the review of best practice

The main outcome of the review of best practice as regards cycle parking provision across Europe is the portfolio of sixty five case studies of cycle parking exemplars included here in Appendix 2.

Additional outcomes linked to the creation of these case studies include:

- A robust typology of cycle parking provision
- A robust review framework for cycle parking provision
- Guidance on how to create a case study of a cycle parking provision

It is anticipated that these additional outcomes will enable other researchers, potentially linked to future CIVITAS Cities and projects, to add to the list of case studies in a manner that is consistent and will allow comparative analysis of the different practices and contexts of provision of cycle parking across Europe on an ongoing basis.

A further outcome of the review of best practice is the summary of best practice as regards cycle parking provision, according to the type of destination served. This summary is drawn from comparative analysis of the case studies herein.

4.3.2 Main outcomes of the local research

The main outcome of the local research is an in depth understanding of the incidence and context of cycle theft within the CIVITAS area, including the factors that contribute to its occurrence.

The local research has been used to inform the design of the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4) and the development of a robust monitoring and evaluation plan by which to assess the impact of the measures implemented within the demonstration project.

4.3.3 Main outcomes of the development of a robust monitoring and evaluation plan

The main outcomes of the development of a robust monitoring and evaluation plan are:

- A robust methodology for monitoring and evaluation of impact of cycle theft prevention measures implemented within the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).
- Tools and techniques to assist in the delivery of the monitoring and evaluation activities.
- Insights and understandings that inform the design of the measures to be implemented within the demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4) and the methodology for implementation of the measures which must be completed in a controlled manner to ensure the integrity of research.

The considerations that inform the design of the measures to be implemented within the demonstration project and the development of a robust methodology for monitoring and evaluation of impact of the measures are described in detail in 4.2.3 above. The implementation measures and the plan for their monitoring and evaluation is summarised.

Desired Outcome

The desired outcomes of the CIVITAS demonstration project 5.4 are:

- Reductions in cycle theft within the CIVITAS area
- Increases in cycle use within the CIVITAS area

Research hypothesis

The hypothesis tested by the research is that provision of formal cycle parking and targeted and informative communication focusing on the issue of cycle theft will achieve a reduction in cycle theft and increase in cycle use.

Measures to be implemented

The measures to be implemented within the CIVITAS demonstration project 5.4 include:

- The provision of secure cycle parking in ten streets within the CIVITAS area
- The provision of targeted and informative communication focusing on the issue of cycle theft via community engagement (previously referred to as a "*high profile publicity and awareness campaign"*) in ten streets within the CIVITAS area. This activity is to include the creation of *'bikewatch'* groups within the streets receiving this measure. These groups will provide a focus for the dissemination of cycle security information and activities.

These measures are described in greater detail in the Deliverable T45.1.

Study area

Twenty study corridors have been identified according to the criteria describe above. These sites are shown in Table 8.

Table 8. CIVITAS study corridors (streets)

Site Name
Kensington Place
Tidy Street
North Road
Marine Square
Beaconsfield Road
Marlborough Place
Kemp Street
St Georges Rd
Sussex Square
George Street
Edward Street
Over Street
St Georges Rd
Sussex Square East
Preston Road
Grand Parade
Church Street
Bloomsbury Place
Devonshire Place
Old Steine

Pre-intervention observation and evaluation

A total of 2,838 observations of cycle parking events were made across the twenty streets selected in the CIVITAS study area. These observations comprised sixteen site visits between October and December 2009 at which all parked cycles (both formally and informally parked) were recorded and relevant details logged.

The pre-intervention observations were analysed to assist in the allocation of demonstration measures to the twenty sites. The findings of this analysis are described below.

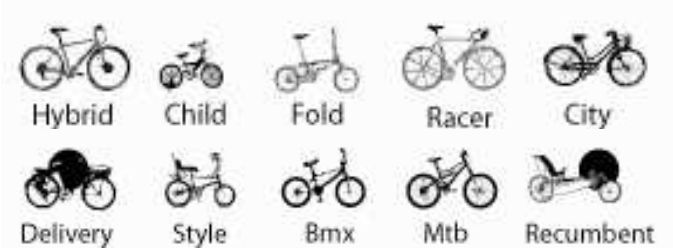
General patterns

Firstly, analysis provides some general statistics relating to the type of cycles and locks observed.

- **What is the most popular style of cycle?**

Each cycle observed was classified using the typology:

Figure 17. Cycle typology



Mountain bikes were the most frequently observed cycle type, accounting for 47% of all observations. City (22%) and Hybrid (12%) cycles were respectively the second and third most frequently observed.

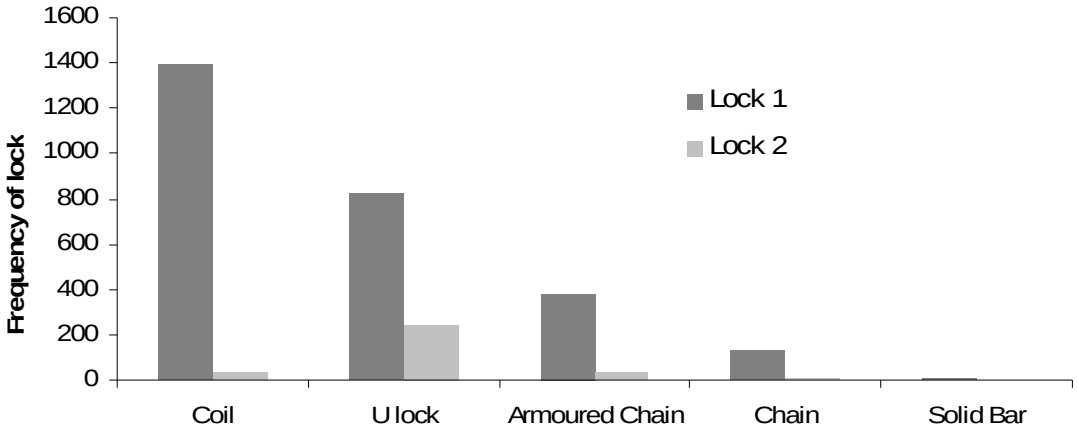
Table 9. Most popular style of cycle (n = 2,822)

Bike type	Frequency	Percentage
mtb	1327	46.8
city	624	22.0
hybrid	340	12.0
not recorded	202	7.1
racer	141	5.0
BMX	82	2.9
fold	80	2.8
style	22	0.8
child	2	0.1
delivery	2	0.1
Total	2,822	99.4

- **Type of locks used**

Figure 18 shows the types of locks used by cyclists in Brighton. First, it is clear that most cyclists used only one lock (n = 2,427, 86%). Just 12% (n = 326) used two locks. Second, the most popular lock is the coil lock. Forty-seven percent of all locks observed (first and second) were coil locks, and thirty five percent were U-locks. Interestingly, there were sixty four cases of cycle parking events where no locks were present.

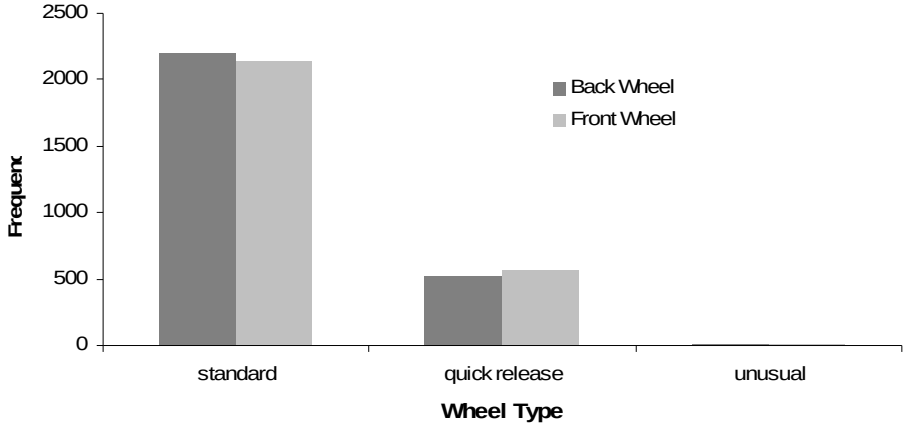
Figure 18. Frequency of Lock Type (n = 3,062)



- **Types of wheels**

In addition to the type of locks used, the types of nuts used to secure cycle wheels to the cycle frame can influence how securely a cycle is parked. There are at least three different types of nuts that can be used. First is the standard nut that can be loosened using an ordinary spanner or pliers. Second are quick release locks that can be undone quickly without tools (convenient for those with a puncture, and thieves). Finally, there has recently emerged a more secure and unusual type of wheel fixing that can only be removed using a special tool. These wheel fixings are referred to as 'secure skewers' Figure 19 shows the different wheel fixings present on the parked cycles observed. It indicates that for most cycles the wheels could be removed using either a spanner or a thumb. Very few cycles had wheels secured using secure skewers.

Figure 19. Types of wheel fixing used to secure wheels to the frame



- **Gender**

Of those recorded, 60% (1,680) of observations were of male framed cycles, 34% (962) female, and for 6% (178) the gender was not recorded.

Cycle Parking Patterns

Secondly, analysis considers cycle parking events, specifically the proportion of formal to informal parking and the locking profiles, for individual sites and across the entire sample of parked cycles observed.

- **Formal parking vs. Informal parking**

Informal parking refers to cycles secured to street furniture not intended for that purpose; examples include railings, lamp-posts, street signs and trees. High levels of informal parking are often an implicit sign of inadequate or insufficient bicycle parking provision. Cycles which are informally parked may be at greater risk of theft than those parked to furniture (typically Sheffield stands) designed, in part at least, with cycle parking and locking in mind. Across the twenty sites observed, over three quarters (79%, n=2,219) of the observed parking events were categorised as informal parking

Such high levels of informal parking may suggest that across the twenty sites as a whole demand for parking considerably outstrips current (formal) provision. However, the ratio of formal to informal parking varies by site. Many sites provided no (formal) cycle parking furniture, despite obvious demand. For example, there was an average of 19 cycles per site visit at Marine Square - a total of 310 over the 16 site visits – all of which were informally parked. For those sites that did provide formal parking opportunities, Preston Road had the highest ratio of informal- to formal-parking (informal-formal parking ratio = 4.97). Put differently, across the entire observation period, for every cycle parked to a Sheffield stand nearly five were parked to other street furniture.

Grand Parade (0.95) and Beaconsfield Road (0.10) show ratios in the opposite direction, indicating that more cycles were parked formally than informally. Statistical analysis confirmed that the inter-site differences were statistically significant (χ^2 = 1420.976, p < .0001) meaning that selection of sites for intervention needs to consider this fact.

- **Locking practice**

Our main focus here is on the locking practice of cyclists, specifically the security afforded by different locking behaviours. Research shows that many bicycles reported stolen were locked inadequately (Roe and Olivero 1993; Weijers 1995; Mercat and Heran 2003). Reducing opportunities for cycle theft through encouraging better (more secure) locking practices is therefore considered an important step in reducing cycle theft and as such is an desired intermediate outcome of CIVITAS Task 5.4. Consequently, a critical aspect of the observations conducted here concerned the way in which cycles were locked. For every locking event observed, the way in which the cycle was locked was rated as either:

- Good - *both* wheels *and* frame were locked to the furniture,
- Ok - one wheel *and* the frame were locked to the furniture, and
- Bad - either one wheel *or* the frame (or neither) were locked to the furniture

Figure 20 shows the fraction of observations for which cycles were locked in a ‘good’, ‘ok’ or ‘bad’ manner when informally parked or formally parked across all twenty sites. We used fractions of events rather than raw counts because the number of observations

differed by site and because there were many more incidents of informal parking than there were formal parking.

Figure 20. Locking practices for cycles parked formally and informally across all sites (n = 2,836)

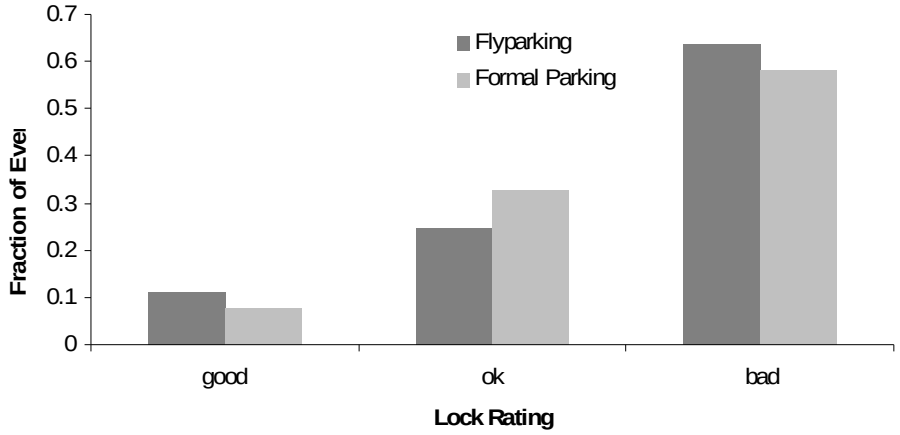
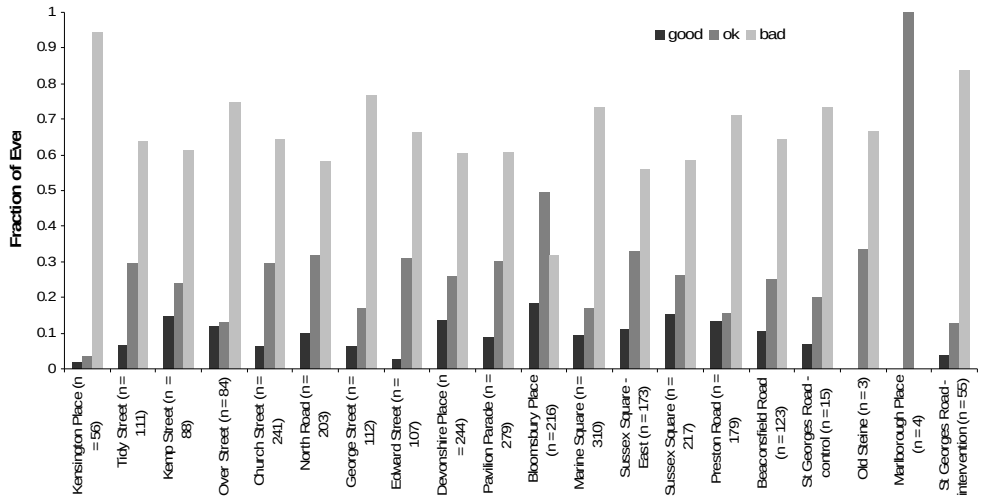


Figure 20 shows that irrespective of whether a cycle was formally or informally parked, the majority of cycles were found to be locked with only one wheel *or* the frame secured to a stand (or other street furniture); according to our typology of secure locking practice - bad locking practice. In addition, Figure 20 indicates that in our sample, the quality of locking practice does not appear to be determined by what the cycle is locked to. In other words, locking practice at furniture designed with cycle parking in mind (in this case Sheffield stands) is not markedly different from that observed amongst informally parked cycles

This implies that the current Sheffield Stand design does little more than other 'lockable' street furniture in terms of facilitation/promotion of more secure locking practices. This finding led to the use of M-stands being recommended but this recommendation was rejected as a result of unrelated concerns (see 'Problems identified' below).

Figure 21, shows the locking practice profile across the twenty sites. While expectedly there is variation across sites, it shows that across all but two of the twenty sites, the most frequently observed category was 'bad' locking practice. This is consistent with findings of the local research that indicates cyclists tend to lock their cycles in ways that, from a security perspective, are suboptimal.

Figure 21. Locking practices for bicycles parked at the 20 different sites (n = 2,820)



Allocation of demonstration measures to sites

To test the above hypotheses the following monitoring and evaluation design has been devised. The twenty sites are allocated to one of four conditions (demonstration measures) each receiving a different treatment configuration as shown in Table 10.

These are:

1. 5 sites will be control sites (no stands and no 'targeted communication' (TC) implemented)
2. 5 sites will be publicity sites (no stands installed but 'targeted communication' is implemented)
3. 5 sites will be stand sites (stands installed but no 'targeted communication' implemented)
4. 5 sites will be stand and publicity sites (both stands and 'targeted communication' implemented).

Table 10. Site allocation to demonstration measures

Site Number	Site Name	Communal	Install Stands	Community Engage
1I	Kensington Place*	X	X	
1I	Tidy Street*	X	X	
3I	North Road*		X	
2I	Kemp Street*	X	X	
10I	Edward Street		X	
9I	Marlborough Place		X	X
4I	St Georges Rd**	X	X	X
6I	Sussex Square***	X	X	X
8I	George Street		X	X
7I	Beaconsfield Road		X	X
5I	Marine Square			X
4C	St Georges Rd**	X		X
6C	Sussex Square East***	X		X
7C	Preston Road			X
10C	Grand Parade			X
3C	Church Street*			
2C	Over Street*	X		
8C	Devonshire Place			
9C	Old Steine			
5C	Bloomsbury Place			

* Linked by proximity and North Laine Runner
** Linked by proximity and Kemp Town Rag
*** Linked by proximity

The allocation of measures to the sites considered:

- Proximity of sites to each other
- Security of locking practices of cycles parked within the sites
- Ration of informal – formal cycle parking within the sites

Proximity of sites to each other

Streets were allocated to groups so as to ensure that those groups due to receive targeted communication were not in the local proximity of those groups that were not to receive targeted communication. This is so as to avoid migration of any effects created by the targeted communication to streets within the study that were not to receive targeted communication.

Degree of informal parking

Streets were allocated to groups so as to ensure that the degree of informal parking, prior to implementation of measures, was approximately equal across groups.

Security of locking practices

Streets were allocated to groups so as to ensure that the security of locking practices, prior to implementation of measures, was approximately equal across groups. To do this,

the twenty sites were ranked in descending order by the proportion of bad locking practice per site (Table 11). As the majority of cycles were observed to be locked in this manner then bad locking practice was considered the most logical variable on which to allocate sites. Next, in descending order each site was sequentially allocated to the four conditions. So the site with the highest proportion of bad locking practice compared to ok and good at the same site was assigned to condition one, the next highest site assigned to condition two and so on (as described above).

Table 11. Sites Ranked in Descending Order by Proportion of Bad Locking Practice

	good	ok	bad	Condition
Kensington Place (n = 56)	0.02	0.04	0.95	1
St Georges Road - intervention (n = 55)	0.04	0.13	0.84	2
George Street (n = 112)	0.06	0.17	0.77	3
Over Street (n = 84)	0.12	0.13	0.75	4
Marine Square (n = 310)	0.09	0.17	0.74	1
St Georges Road - control (n = 15)	0.07	0.20	0.73	2
Preston Road (n = 179)	0.13	0.16	0.71	3
Old Steine (n = 3)	0.00	0.33	0.67	4
Edward Street (n = 107)	0.03	0.31	0.66	1
Church Street (n = 241)	0.06	0.29	0.64	2
Beaconsfield Road (n = 123)	0.11	0.25	0.64	3
Tidy Street (n = 111)	0.06	0.30	0.64	4
Kemp Street (n = 88)	0.15	0.24	0.61	1
Pavilion Parade (n = 279)	0.09	0.30	0.61	2
Devonshire Place (n = 244)	0.14	0.26	0.61	3
Sussex Square (n = 217)	0.15	0.26	0.59	4
North Road (n = 203)	0.10	0.32	0.58	1
Sussex Square - East (n = 173)	0.11	0.33	0.56	2
Bloomsbury Place (n = 216)	0.19	0.50	0.32	3
Marlborough Place (n = 4)	0.00	1.00	0.00	4

The following four figures show the locking profile for each site within the four groups. The final figure compares the locking profile for each group as a whole. It can be seen that in terms of locking profiles the four groups display relatively similar patterns.

Figure 23. Group (Condition/Measure) 1

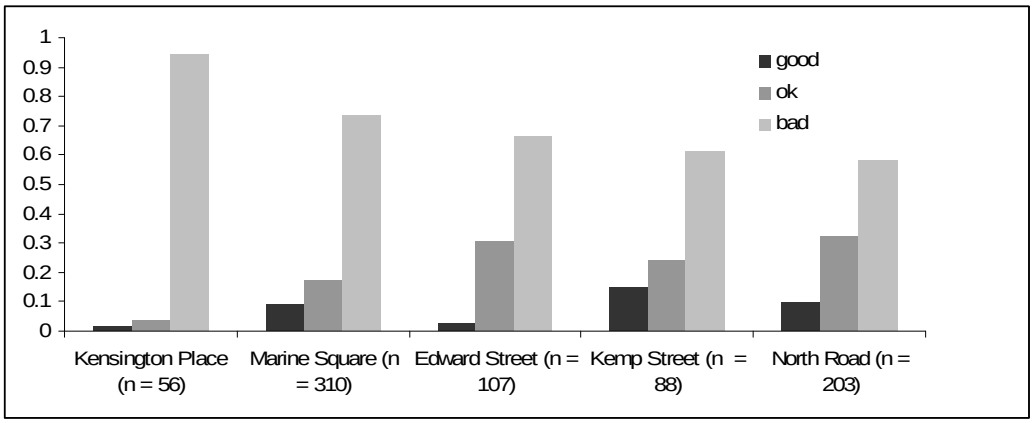


Figure 24. Group (Condition/Measure) 2

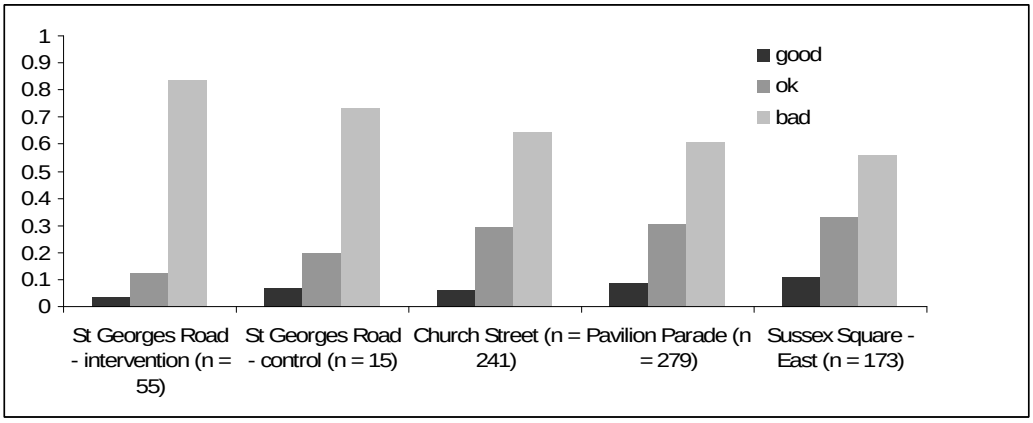


Figure 25. Group (Condition/Measure) 3

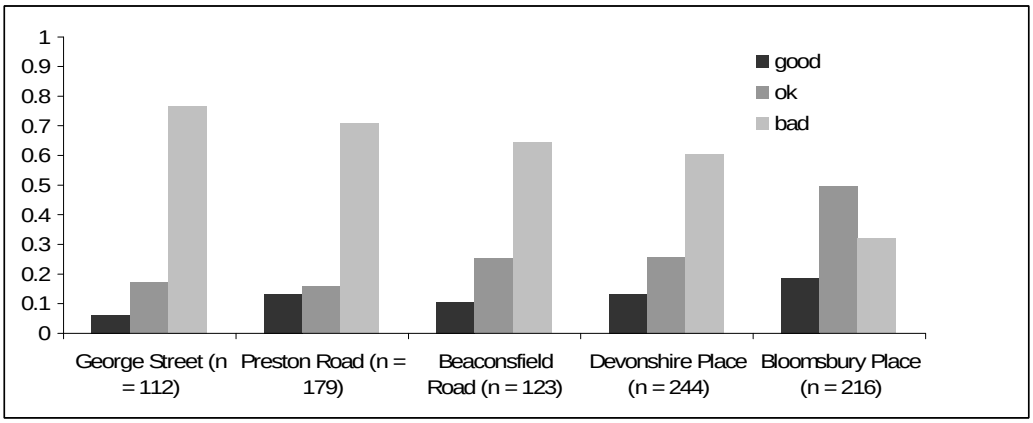


Figure 26. Group (Condition/Measure) 4

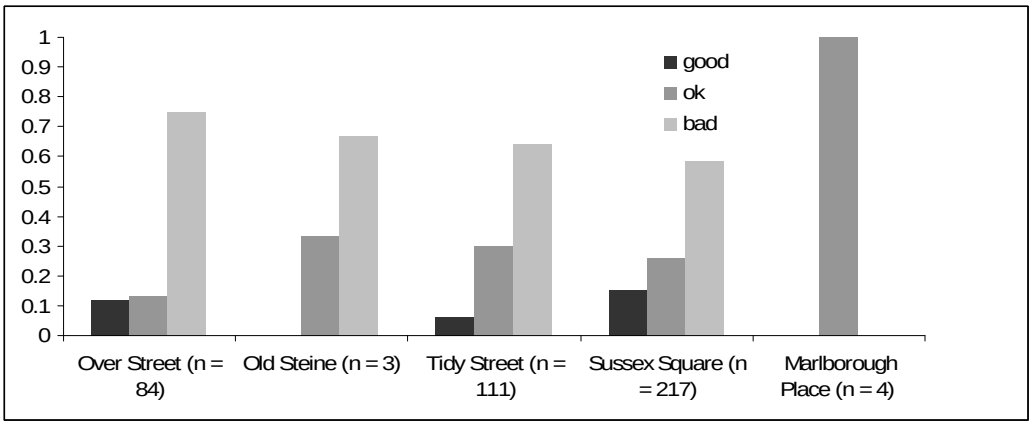
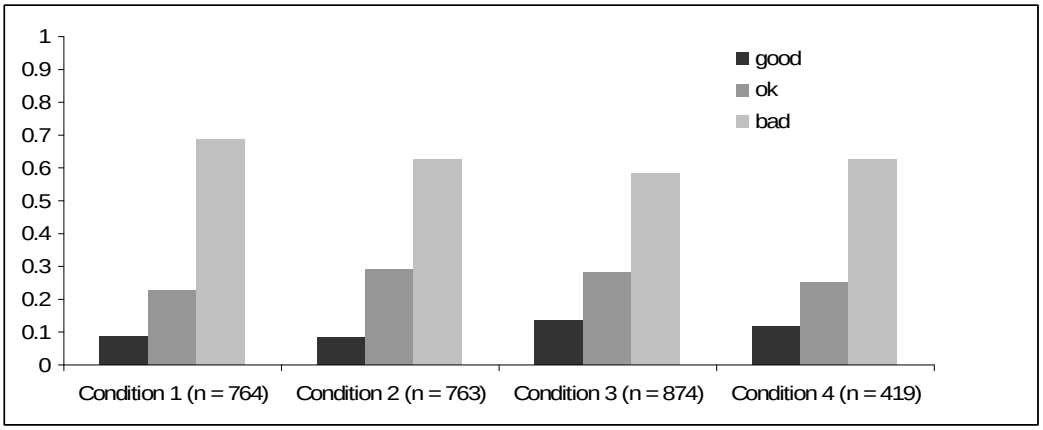


Figure 27. Comparison of Groups (Conditions/Measures) by locking practice



The above analysis identified the optimum site allocation according to locking practices. However, the final allocation of sites to measures was not able to match this allocation due to consideration of the other variables described above. The final allocation of sites to measures was an allocation of 'best fit' in relation to the three considerations described above.

Implementation of measures

The demonstration measures are to be implemented between January and June 2010 linked to delivery of CIVITAS Task 5.4. (see ARCHIMEDES deliverable T45.1 for details).

Post-intervention observation

Post-intervention observations will be carried out between October and December 2010. The same methodology and tools will be used as for the pre-intervention observations to ensure consistency and comparability of findings.

Post observation analysis

The post-intervention analysis will compare the statistical data between sites and between groups, before and after implementation of demonstration measures. This comparative analysis will evaluate the impact of demonstration measures on the intermediate outcomes, including:

- Security of locking practices
- Incidence of parked cycles causing obstruction
- Incidence of cycles locked to street furniture not designed for cycle parking

Comparative analysis of the ultimate outcome of a reduction in reported incidents of cycle theft will draw on Sussex Police CADDIE data for the period 1st June 2010 – 31st May 2011. This data will be compared to the CADDIE dataset 1st June 2008 – 31st May 2009 examined in the Local research.

4.4 Problems Identified

4.4.1 Problems identified in relation to the review of best practice

There were no major problems encountered during the review of best practice work. Minor challenges included:

- Concerns over the geographical distribution of the case studies
- Concerns over the typological spread of case studies (in relation to destination served)
- Concerns over the representation of nascent cycle cultures within the research
- Concerns over the representation of facilities serving lower population densities within the research
- Comparative access to stakeholders across all studies

4.4.2 Problems identified in relation to the local research

There were no problems in relation to the local research.

4.4.3 Problems identified in relation to the development of a robust monitoring and evaluation plan

Challenges encountered during the development of a robust monitoring and evaluation plan included:

- Concerns over reliability and quantity of data regarding cycle ultimate outcome of reduction in reported incidents of cycle theft
- Concerns that it was not possible ensure that all study corridors (streets) were within the highest hot spots for cycle theft within CIVITAS
- Concerns over the number of observations possible within the time granted by the project and therefore the size of the data set available for analysis
- Concerns about the presence of observers on theft attempts
- Concerns over the type of stands to be installed within the demonstration measures

4.5 Mitigating Activities

4.5.1 Mitigating activities in relation to the review of best practice

Despite best efforts it is recognised that to review the most innovative and exemplary facilities there may be uneven distribution of case studies across the typologies, geographical area and stages of cycle cultural development. This is a result of the fact that innovation and exemplary provision is often most apparent in those contexts, cultures and countries where cycling is well resourced. This finding seems to suggest that investment in cycling generates innovation and exemplary practice in relation to cycle parking.

Concerns over the geographical distribution of the case studies

The case studies herein have been selected from different geographic areas of Europe to enable review of cycle parking practices in both northern and southern climates and cultures. It was a concern of the project that the geographical spread of case studies may be unevenly distributed. This issue was addressed via iterative selection and review of proposed facilities, working with a network of European cycling researchers and advocates until a list was drawn up that covered both northern and southern regions of Europe.

Additionally, it was decided that research should not be limited by political EU boundaries so as to include specifically relevant examples located within the wider geographical reach of 'Europe' (for example, some studies are included from Switzerland).

Concerns over the typological spread of case studies (in relation to destination served)

Exemplary and innovative cycle parking provision is not evenly spread across the typologies of destination served. This is due in part to the fact that investment in cycle parking is highest in sites of greatest demand. Such sites are more often than not linked to multi-modal transport hubs and educational establishments where high concentrations of cycle use are evident. Despite this inequality in provision, the research seeks to give representation to diverse types of cycle parking provision. Iterative selection of case studies, again in collaboration with a network of advisors with specialist local knowledge across Europe, enabled exemplars for each type of 'destination served' to be reviewed to ensure complete, if not even, coverage of the typology.

Concerns over the representation of nascent cycle cultures within the research

Research seeks to include case studies from regions of different cycle cultural development, including mature cycle cultures such as those present in Amsterdam and Copenhagen, emergent cycle cultures such as those of London and Barcelona and nascent cycle cultures, including certain towns and cities from Italy, France and Eastern Europe. However, nascent cycle cultures were largely found to host less exemplary facilities and less innovative parking measures than mature and emergent cultures, viewed from a pan-European perspective. In an attempt to address this anomaly a number of CIVITAS project towns and cities (see http://www.CIVITAS-initiative.org/projects.phtml?id=350) were consulted. Some were found to host relevant exemplars of cycle parking provision that were subsequently included in the study, while others did not yet present such opportunities. This may be linked to the commitment of resources made to cycle parking provision or it may be linked to lack of access to knowledge regarding best practice – a situation that this research seeks to address.

Concerns over the representation of facilities serving lower population densities within the research

The focus of the research is predominantly on urban areas. This is due to the fact that the majority of exemplary and innovative cycle parking provision in Europe serves urban locations. This may be a consequence of geographical patterns of investment in cycle parking provision, with greatest investment in cycle parking evident in areas of greatest cycle density and cycle use, and consequently, greatest demand for cycle parking.

Comparative access to stakeholders across all studies

Some of the facilities featured as case studies have been established for several years. In these instances it has been more difficult to access the original providers and designers of the facility. To overcome this problem researchers have relied on secondary

as well as primary research, some details included in the case studies being located online and via review of published promotional materials.

4.5.2 Mitigating activities in relation to the local research

There were few challenges that needed mitigation within the local research.

4.5.3 Mitigating activities in relation to the development of a robust monitoring and evaluation plan

Concerns over reliability and quantity of data regarding cycle ultimate outcome of reduction in reported incidents of cycle theft

The monitoring and evaluation plan seeks to identify and quantify the impact of the demonstration measures on, amongst other things, incidence of reported cycle theft within the CIVITAS area. One way of doing this is via analysis of Sussex Police CADDIE data on cycle theft, comparing levels of reported theft for a defined period before implementation of demonstration measures with levels of reported cycle theft for a similar period after implementation of measures. There are a number of issues with this methodology that must be addressed. Firstly, some of the streets selected for study did not display great enough numbers of reported thefts for this to be a robust method of impact evaluation. Secondly, reporting of cycle theft is notoriously inaccurate, British Crime Survey estimates that only one in four cycle stolen are reported to police.

Whilst the research will still seek to evaluate the impact of measure using Sussex Police cycle theft data research also evaluates the impact of measures on the achievement of intermediate measures such as increased security of locking practices as described above. The research assumes that increases in the security of locking practices imply a reduced incidence of cycle theft.

Concerns that it was not possible to ensure that all study corridors (streets) were within the highest hot spots for cycle theft within the CIVITAS area

Study corridors (streets) were selected according to a diverse range of criteria, including:

- Location within CIVITAS area
- Reported cycle theft activity (target theft hot-spots)
- Location within the Cycle Demonstration Town (CDT) implementation area*
- Requests and objections from residents and cyclists regarding cycle parking*
- Infrastructural/logistical considerations (i.e. potential for compatibility or conflict with existing or planned □on street□ interventions)*
- Comparability of study corridors
- Proximity (to each other) and accessibility to researchers
- Degree of community involvement

As may be expected it was not always possible for all study corridors to meet all criteria.

It was particularly difficult to ensure that all the sites to receive demonstration measures were amongst those experiencing the very highest levels of cycle theft. The research settled for selection of sites that represented a ‘best fit’ with all the measures described above, prioritising those factors that could not be changed according to context, most notably which sites were able to receive cycle parking provision.

Concerns over the number of observations possible within the time granted by the project and therefore the size of the data set available for analysis

Initially, there were concerns amongst researchers as to the number of observations that would be possible within the resources and time allowed for the project and consequently the size of the data set gathered for evaluation. The research overcame this problem by increasing the observation period to run over three months between October and December and by conducting observations twice a week. The final data set gathered for evaluation includes over 2,800 parking events, giving good more power and credibility to the statistical analysis and evaluation of the intermediate outcomes measured within the project.

Concerns about the impact of the presence of observers on theft attempts

One important issue of internal validity, especially for the recorded theft measures, is any interference in the processes on the ground due to the presence of the observers themselves. If they were patrolling a particular street, say, on the day of the week/time of day that was a regular peak crime period for cycle theft, they might deter the offenders so making the picture of cause and effect fainter and any impact of the CIVITAS demonstration measures harder to distinguish. We therefore sought to avoid 'hot times' as indicated by the local research. These included Mondays (13.00-15.00, 18.00-20.00) and Saturdays (13.00-15.00, 18.00-20.00).

It was also necessary to understand the differences between weekday use and weekend use. In the end we decided to monitor both at weekends and weekdays sop as to be able to get an aggregated picture of cycle parking for the streets within the study corridors. The observers visited the sites on Thursdays and Saturdays (they did not work Sundays). Obviously, this was not ideal as it conflicted with one of the peak times of cycle theft. However, to minimise any interference by researchers, timing of observations avoided the period of peak theft in the evening (18.00 – 20.00) and also most of the peak theft period in the middle of the day (13.00- 15.00) - the researchers stopped for lunch at this time!

Concerns over the type of stands to be installed within the demonstration measures

The local research and analysis of the pre-intervention observation data indicated that, irrespective of whether a cycle was formally or informally parked, the majority of cycles were found to be locked with only one wheel *or* the frame secured to a stand (or other street furniture); 'bad' locking practice according to our typology of secure locking practice.

Additionally, the quality of locking practice does not appear to be determined by what the cycle is locked to. In other words, locking practice at furniture designed with cycle parking in mind (in this case Sheffield stands) is not markedly different from that observed amongst informally parked cycles. This implies that the current Sheffield Stand design does little more than other 'lockable' street furniture in terms of facilitation/promotion of more secure locking practices. This finding led to the recommendation of 'M-stands' as the cycle parking furniture of choice for implementation within the demonstration project 5.4 as they are proven to promote secure locking practices amongst users. This recommendation was not acted upon by Brighton and Hove City Council (BHCC) and Sheffield type stands have been installed instead. This was to ensure continuity of cycle parking furniture installed within the demonstration project with cycle parking furniture introduced elsewhere in Brighton and Hove (see ARCHIMEDES deliverable T45.1 for further details).

4.6 Future Plans

This research aims to inform the design and implementation of secure cycle parking.

The review of best practice in cycle parking provision is unique in its scale and scope and should be of great use to those responsible for provision of secure cycle parking within European cities.

Future plans include consultation and collaboration with CIVITAS to ensure dissemination of the research to this audience. It may also be necessary to deliver further work to ensure that this research is provided in the most accessible format for these audiences.

The robust research methodology developed for the monitoring and evaluation of measures implemented within CIVITAS Task 5.4 demonstrates best practice as regards impact evaluation of action research in this subject area and is of value to other researchers seeking to evaluate measures implemented to reduce cycle theft.

In the short term this research is significant to the successful implementation of the CIVITAS demonstration project *'Bikeoff' Cycle Anti-Theft Scheme in Brighton & Hove* (CIVITAS Task 5.4).

In the long term this research is significant to all those with an interest in understanding and reducing cycle theft and promoting cycle use.

APPENDIX 1. LIST OF CYCLE PARKING AND INFRASTRUCTURE EXPERTS CONSULTED

1. **UK Case Studies**

2. **European Case Studies**
   a. **Selected**
   b. **Explored/Considered**

1. UK Case Studies

	Case Study	Contact
1	Liverpool Street Station	Rose Ades – Transport For London (TfL)
2	On Your Bike, London Bridge	Rose Ades – Transport For London (TfL)
3	Finsbury Park Cycle Park	Rose Ades – Transport For London (TfL)
4	Walthamstow Underground Station	Gina Harkell – Waltham Forest Council
5	Leytonstone Underground Station	Gina Harkell – Waltham Forest Council
6	Leyton Underground Station	Gina Harkell – Waltham Forest Council
7	Wimbledon Train Station	Phil Dominey – Southwest Trains
		Suzanne Hilton – colleague of Rose Ades at TfL
8	Surbiton Train Station	Phil Dominey – Southwest Trains
		Paul Dearman – Kinston Council
9	York Train Station	Ian Cunningham – Safer York Partnership
		Jim Shanks – Safer York Partnership
10	Taunton Park and Ride	John Perrett – Somerset Council
11	Lloyd's Building *	Mr Bell – Head of Security at the Lloyd's building
12	Office of National Statistics, Fareham	Shirley Guy – manages facility at ONS
		Jan Robinson – Cyclepods
13	Nottinghamshire County Hall	Andrew Barnes – Nottinghamshire Council
14	Trent Bridge House, Nottinghamshire CC	Andrew Barnes – Nottinghamshire Council
15	Bermondsey Square	Caro Communications – management company of the premises
16	Frampton Park Estate	Trevor Parsons – LCC in Hackney
17	Gascoyne Estate *	Trevor Parsons – LCC in Hackney
18	City University	Facilities Manager at the University of London
19	University of York	Fiona Macy – manages facility at University of York
20	York College	Ian Cunningham – Safer York Partnership

		Jim Shanks – Safer York Partnership
21	University of Manchester	Diana Hampson – Estates Manager at the University
		Jim Dempsey – manages facility and carparks at the University
22	Percival House, Ealing Council	Joanne Mortensen – Ealing Council
23	Bernard Street Car Park	Sarah and Shireen Nagshineh – RCP Car Parks
24	Peacock Shopping Centre, Woking	Paul Fishwick – Surrey Council
		Lara Curran – Surrey Council
25	Cambridge Car Park	Simon Nuttall – Cyclestreets Cambridge
		David Earl – Cambridge Cycling Campaign
		James Woodburn – Cambridge Cycling Campaign
26	Cambridge Grand Arcade	Simon Nuttall – Cyclestreets Cambridge
		David Earl – Cambridge Cycling Campaign
		James Woodburn – Cambridge Cycling Campaign
27	Mud Dock *	Jerry – owner of Mud Dock
28	Leicester Bike Park	George – works at the facility
		Andy Sankeld – Leicester Council
29	Middlesbrough Cycle Centre	Mike O'Reilly – works at the facility
		Neil Mitchell – Sustrans
30	Stockton-on-Tees Transport Hub	Neil Mitchell – Sustrans
31	Kensington High Street, London	RB Kensington and Chelsea
32	York Cycle Signs, York	Ian Cunningham - Safer York Partnership
33	Cyclehoops, London	Anthony Lau – Cyclehoop designer
34	Holborn Gateway, London	Chris Nicola – Camden Council

2a. European Case Studies – Selected

	Case Study	Contact
1	CarGo Bike Car, Copenhagen, Denmark	Mikael Colville-Andersen – Copenhagenize Consulting
2	Cykelkaelder, Kongens Nytorv metro parking, Copenhagen, Denmark	Mikael Colville-Andersen – Copenhagenize Consulting
3	Fisketorvet Shoppingcenter, Copenhagen, Denmark	Henrik Bjoerner Soee – Fisketorvet Shoppingcenter
4	Københavns Cykler, Copenhagen, Denmark	Seif Alhasani
5	Rackless parking zones, Copenhagen, Denmark	Mikael Colville-Andersen – Copenhagenize Consulting
6	L'îlot Vélos, Neuilly-Plaisance (RER Metro), Paris, France	Edith Peirotes Bérail – FUBicy
7	Parking Vélo de La Gare, Strasbourg, France	Edith Peirotes Bérail – FUBicy
8	Vèloparcs, Strasbourg, France	Edith Peirotes Bérail – FUBicy
		Alexandre Colombes
9	Mobile, Freiburg im Breisgau, Germany	Ursula Lehner-Lierz – Velo:Consult
		Jon Rodriguez
10	Radstation Münster Station Parking , Münster, Germany	Ursula Lehner-Lierz – Velo:Consult
11	Radstation Unna, Unna, Germany	Ursula Lehner-Lierz – Velo:Consult
12	Fietsflat (Bicycle Flat), Amsterdam, Netherlands	Désirée Barendregt – Department for Infrastructure, Traffic and Transportation (IVV), City of Amsterdam
13	Locker Secure Bicycle Shed, Zuid Station, Amsterdam, Netherlands	Désirée Barendregt – Department for Infrastructure, Traffic and Transportation (IVV), City of Amsterdam
14	Residential Cycle Parking, Amsterdam, Netherlands	Désirée Barendregt – Department for Infrastructure, Traffic and Transportation (IVV), City of Amsterdam
15	Assen station , Assen, Netherlands	David Hembrow – Hembrow Cycling
16	CSVVG Assen, School Parking, Assen, Netherlands	David Hembrow – Hembrow Cycling
17	Hotel parking, Assen, Netherlands	David Hembrow – Hembrow Cycling
18	Groningen railway station, Groningen, Netherlands	David Hembrow – Hembrow Cycling
19	Fietsmolen (Bicycle Windmill) & Nieuw Vennep Railway Station Parking, Nieuw Vennep, Netherlands	David Hembrow – Hembrow Cycling
20	Underground Bicycle Park , Zutphen, Netherlands	David Hembrow – Hembrow Cycling
21	Biceberg (and 'Bigloo'), Barcelona, Spain	Eva Sterbova - BACC
22	BiciNova, Barcelona, Spain	Haritz Ferrando - BACC
		Eva Sterbova - BACC
23	B:SM Car and Cycle Parking, Barcelona, Spain	Haritz Ferrando - BACC
		Eva Sterbova - BACC
24	FGC Station Parking, Barcelona, Spain	Haritz Ferrando - BACC
		Eva Sterbova - BACC

25	'Key' cycle hoops , Barcelona, Spain	Toni Lladó – Santa&Cole
		Gabriele Schiavon - Lagranja Design
26	My Beautiful Parking, Barcelona, Spain	Haritz Ferrando - BACC
		Eva Sterbova - BACC
27	Bus+Bici Parking, Seville, Spain	Haritz Ferrando - BACC
28	Bike Barge, Malmo station, Malmo, Sweden	Seif Alhasani
29	Lundahoj, Lund, Sweden	Seif Alhasani
30	Veloparking Centralbahnplatzel, Basel SBB (main railway station), Basel, Switzerland	Ursula Lehner-Lierz – Velo:Consult
31	Velostation Milchgässli, Bern, Switzerland	Ursula Lehner-Lierz – Velo:Consult

2b. European Case Studies – Explored/Considered

	Case Study	Contact
32	Bicycle Point, Antwerp central station, Antwerp, Belgium	Mobiel 21
		Timenco
33	Bicycle parking facilities in the city centre (historic centre), Gent, Belgium	Mobiel 21
		Timenco
34	Bicycle parking facilities in student areas, Gent, Belgium	Mobiel 21
		Timenco
35	Leuven Bicycle parking point, Leuven, Belgium	Mobiel 21
		Timenco
36	In-house bicycle parking for employees of University of Leuven, Leuven, Belgium	Mobiel 21
		Timenco
37	On-street parking, Odense, Cycle City, Denmark	Pablo Celis
		Troels Andersen
38	On-street parking, Næstved, Zealand, Denmark	Pablo Celis
		Anders Gedde Petersen
39	Biketree, Paris, France	Ecomove
40	Vinci PARK, Paris, France	Pierre Chauveau
41	SAEMES car and bicycle parks, Paris, France	Pierre Chauveau
42	On-Street parking sites, Berlin, Germany	Ben Fouassier
		Magda Willi
		Jon Rodriguez
43	Radstations / DB Station Parking, Bremen, Cologne,Frankfurt, Kohln and Munich, Germany	Rupprecht Consult
		Sebastian Buehrmann
		Rafael Urbanczyk
		Enviu
		Chinmay Yedurkar
		Josine Janssen
		Satish Beella
44	Josta Parking, Brescia, Italy	Simone Antonello
45	Monza Parking proposals, Monza, Italy	Vincenzo di Maria
46	Rome On-Street Paring and Public Bicycle Sharing, Rome, Italy	Vincenzo di Maria

47	Car-Space parking racks, Turin, Italy	Simone Antonello
48	ASM Venezia Cycle Park, Venice Italy	Vincenzo di Maria
49	Free City Cycle Park Network, Apeldoorn, Netherlands	Velo:consult
		Jonas Piet
		Oriol Pascual
		Enviu
50	Houten, Netherlands	Satish Beella - TuDelft
		Enviu
51	FAT, Scheveningen, Northern Boulevard Parking, Scheveningen, The Hague, Netherlands	Velo:consult
		Jonas Piet
		Oriol Pascual
		Enviu
		Velo:consult
52	FietsHangar ('Bike Hanger'), Rotterdam and other locations, Netherlands	Jon Rodriguez
53	Rotterdam Station Parking, Rotterdam, Netherlands	Jon Rodriguez
54	Cycle and Car parking - Municipal Parking Company, Utrecht, Netherlands	Velo:consult
55	On-Street and Courtyard parking, Barcelona (Rubí), Spain	Modular Bike
56	On-Street parking, Murcia, Spain	BACC
57	Bicipoda DAE On-Street parking, Valencia, Spain	BACC
58	Trameinsa On-Street and Courtyard parking, Vizcaya, Spain	BACC
59	Future Bicycle Parking plans for Malmo, Sweden	Seif Alhasani
		Vincenzo di Maria
60	Chur, small station parking; Chur, Switzerland	Velo:consult
61	Biketree, Geneva, Switzerland	Velo:consult
62	VD003 Car-Space Parking, Oulens-sous-Echallens, Switzerland	Adrien Rovero

[i] http://www.bikeoff.org/consultation/wiki/index.php/Scale_of_Provision_%28capacity%29
[ii] http://www.bikeoff.org/consultation/wiki/index.php/Scale_of_Provision_%28capacity%29