ARCHWAY

Good Practice Guide

For the Access and Regeneration of Cultural Heritage in Historic Walled towns

Transport

Chester City Council

Walled Towns Friendship Circle

North East South West INTERREG IIIC

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PREFACE

Archway is European Network part financed by the European Union under the ERDF Interreg IIIC programme. Approved in July 2004 for 36 months, the project, aiming to strengthen and extend this network has Chester City Council as its lead partner; Valletta is the theme leader for Transport - the subject of this Good Practice Guide. Four further themes, being reported in other Guides, are led by 's-Hertogenbosch, Arabarri, Piran and Lucca. Lörrach, and Verona are supporting partners as is University of West of England, Bristol, who act as Academic Advisor. Pécs were a supporting partner initially too. The budget for the project was 798,200 Euros.

In the specific context of walled and historic towns and cities, the project aims to develop and expand shared expertise on a range of key urban development issues with the intention of informing regional policy across Europe. Archway builds on the networking potential of the Walled Town Friendship Circle (WTFC - established in 1989) but it is not restricted to WTFC members. The WTFC itself is a European based network of 140 members from both existing EU member states and other countries. For further information on the Circle please visit its website www.walledtowns.com.

The Archway project is a new development for the WTFC in that it seeks to create a basis for a continuing exchange of professional expertise and experience. The Archway network will therefore act as a catalyst to help realise the potential of the wider and more inclusive European network. The Archway project has been developed with the involvement of the Circle's membership as a whole, in addition to a number of non-member partners and its specific results have wide relevance.

The central problem that the network addresses is the restrictions and constraints of sustainable development in the historic (walled) town context. For walled and historic towns five key areas have been identified as important themes that are shared across Europe and are relevant beyond the limits of the immediate network.

Archway is producing Good Practice Guides on five themes, the subject of this one being Transport which was summarised at the start of the project as the problems of transport, parking and access to and within some of Europe's most attractive and historic places.

The other themes, each the subject for a Good Practice Guide were summarised as:

Conservation, protection and enhancement - enabling the development of a modern environment

with the constraints of a historic setting.
Spatial Planning and Development - realistic spatial planning and management systems to create vibrant and modern places without compromising their historic and local distinctiveness.
Tourism Development and Visitor Management - establishing walled and historic towns as a focus for sustainable tourism and economic development without damaging their distinctive and historic qualities;
Creative development and management of the cultural heritage and how to harness this as a driver for their economic future in a sustainable way.

A common thread running through all of these themes is how to overcome barriers to mobility within and around walled and historic towns, which often present their own particular challenges, especially to disabled people and others with mobility difficulties. Other forms of barriers in terms of social disadvantage, which inhibit access to the historic built environment, are also considered throughout and all the issues are seen as significant within the framework of the Commission's "European Spatial Development Perspective" (1999), which is the basis for the INTERREG programme. Tackling them from a walled and historic town's viewpoint makes the solutions and best practice relevant across Europe. This is especially the case for small and medium sized historic urban areas, those with a close relationship with rural hinterlands and those affected by regional, national and international borders and other barriers.

The production of each guide has involved establishing a working partnership of relevant experts in the field. Valletta – Malta was the Transport theme partner, taking responsibility for leading the theme-specific working group and organising workshops in their own region. They were actively supported by Chester, as lead partner and involved the UWE, Bristol as academic adviser, managing e-mail and web-based dialogue and exchanges of information. Two seminars with seminar papers, transcripts and a seminar report have contributed to the production and underpin the content of this resultant Good Practice Guide, providing rich sources of practical case studies from across Europe.

The partners in the Archway project have skills and expertise both in the general subject area - urban development in and around walled and historic towns - and in participating in EU programmes. The ten partners are all public or equivalent bodies, and have excellent understanding and experience of the administrative, legal and political frameworks in their own regions within which the management and development of walled and historic towns operate. This is a highly relevant background for making a collective contribution to developing and disseminating ideas, case study examples and procedures to influence policy at local, regional, transnational and European levels. The fact that the eight of the ten partners are part of the existing Walled Town Friendship Circle network is a major factor in helping to maximise the impact of the Archway Project, which will be brought together at the Legacy Conference, held in Chester in June 2007. The Legacy Conference will help ensure the consistency and validity of all five Good Practice Guides. This builds on the existing credibility of the WTFC in the field and with common editing by the academic partner, gives cohesion to the whole approach to historic (walled) town management reflected in them. The Legacy Conference, the wide circulation through the WTFC and the Internet availability of the guides ensures effective dissemination both to practicing professionals, administrators and politicians and, with the involvement of the University, to the wider academic urban studies community.

This work has been developed by reviewing the effectiveness of policies, instruments and procedures for the implementation of relevant projects at the regional, national and trans-national level. This has been made possible by the sharing of information between historic walled towns and cities and by promoting a culture of innovation based on good practice.

The overall objective of the Partnership through the Archway project is the establishment of a trans-European professional network which builds upon the work of the WTFC. It will provide a principal source of European policy good practice, innovation and excellence in the conservation, promotion, spatial planning, development and management of historic places.

The result will facilitate an open learning network which it is hoped will enable best practice and innovative new approaches to be made to developing, accessing and managing historic walled towns. The focus of the sub-topics is on spatial planning, conservation, transport, tourism and cultural development with an emphasis on access and mobility for all. However, the management of historic walled towns has to be considered holistically and the GPGs take account of this and the relevant policies and projects at the regional, national and trans-European level.

1. INTRODUCTION

Transport is an essential tool in all walks of life. The transportation of people and goods is not only important for economic reasons, but also for the social well-being of any community.

The volume of people and goods requiring ever faster and more convenient transport has risen dramatically, especially over the latter half of the 20th century. This has resulted in disproportionate increases in the use of motorised vehicles, particularly the private car. This creates problems, especially in localities which were not originally built to accommodate today's methods of transport. This is especially true in walled and historic towns, most of which were built hundreds of years ago, when the private car did not exist. Today, many vehicles crowd into the narrow streets of these cities, leaving little space for pedestrian activities and emitting pollutants which are even harder to remove from these locations than in wider newer streets. The private cars also need to be parked, taking up large areas of precious space within the historic towns. Although there are cases, where parking can be accommodated underground, historical cities often have a wealth of heritage underground, making excavation either undesirable or highly impractical.

Therefore, the conflict that arises in walled and historic towns/cities is between the need to keep transporting people and goods into and within the cities and the need to conserve the heritage of the same locality, by minimising the impact of the mechanical modes of transport.

2. PRINCIPLES AND OBJECTIVES

The principles and objectives from the various walled and historic towns and cities vary considerably, because although all localities have a common feature that a wall encloses them (or used to at some point), their geography varies widely. Some are small old towns within much larger modern cities, whereas others still make up a considerable percentage of the modern city. The varying degree of intervention that has happened in the walled and historic town/city also plays a role in defining the objectives. The 1960's saw significant changes in a many western European cities, with the car becoming predominant and little respect being given to the heritage. This resulted in road widening schemes which often linked to other redevelopment but which significantly altered and detracted from the character of the old town. In defining their principles and objectives, these cities have a different perspective from cities, which have not been so drastically affected by road widening.

The social and economic importance of the city itself helps to define the principles and objectives. Given the varying of status of walled and historic towns and cities, ranging from capital cities to small provincial towns, the objectives regarding the economic importance will differ.

These are the various objectives being sought by the walled and historic cities participating in the Archway project:

Arabarri:
Balance between different forms of life (urban and rural) - Transport helps to maintain this balance;

Lucca:
Relative advantage of inner town should be maintained, while maintaining accessibility and personal mobility;

Valletta:
Enhancing the vitality of the capital city, as a multi-functional centre;

Chester:
Maintaining and growing the position with regards to the economy. Maintaining the balance between the visitor, the resident, the workers and the heritage. Retaining social inclusion, equity and affordability;

Piran:
Overcoming barriers to accessibility;

Pécs:
The need to compromise between form and function, dictated by the liveability of the historic core;

's-Hertogenbosch:
Balance between the long term and short term. Maintaining the principle of communication and participation of the citizens. Exploiting technological solutions;

Lörrach:
Transport to be part of an integrated system with land-use and social system. Maintaining stakeholder involvement in taking responsibility in the outcome of their actions;

Verona:
Needs to be based on improvements against criteria. Monitoring a set of indicators.

3. ISSUES, CHALLENGES AND OPPORTUNITIES

Walled and historic cities and towns were not constructed with the motor vehicle in mind, and indeed the walls and fortifications were designed to make (unwanted) access as difficult as possible. Inevitably therefore, where these barriers still exist they generate major conflict with the motor vehicle mobility.

There are unlikely to be ideal transport policies for such towns because of the various considerations that may affect decisions. These include:

1. the size of the town (within the walls), its area, its development density and its topography,
2. the difference in levels of various parts of the town, which will affect acceptable walking distances/time for different sorts of people,
3. the amount, ownership and location of parking available within and adjacent to the walled area,
4. the land-use activities that occur and are planned to continue or grow or be phased out within or adjacent to the walls,
5. other cross-cutting policies related to the town in question, such as those related to air quality and conservation of buildings, including the walls and historic fortifications, as well as of public open spaces.

Lastly in line with the ESDP (European Spatial Development Perspective), all elements of sustainability – social, economic, environmental and spatial - need full consideration.

3.1. Objectives

In the light of these considerations, each town needs to set objectives and thereby priorities for preferred modes of transport,

Generally however priority of access will follow the general pattern of:

3.2. Walking > Cycling > Public Transport > Deliveries > Private Cars

Obviously, one needs to take into consideration other modes transport, such as emergency vehicles, which should be given priority over others at all costs; and shop mobility (disabled) transport, which should also be catered for sensitively.

The level of priority given to each of these modes depends on the considerations identified above but it is important to set out this hierarchy plainly, so that a strategy can be built upon it.

3.2.1. Walking

Escalator in Victoria Gasteiz.

As the most local of circulation systems within the walled and historic town and even into its buildings, walking is generally the component that makes up the first and last part of most trips. Any strategy, especially within walled and historic towns, should try and maximise the percentage of this component, not only by discouraging motorised modes, but also by improving on facilities for pedestrians. In many towns and cities pedestrianisation has taken place and motor vehicles are excluded from specific streets for part or in some instances all of the day.

Climate and topography play an important part in the level of modal share that walking can achieve. In very hot, cold or wet towns, allowances need to be made to the fact that it is often difficult to walk for long distances especially where no (or little) shelter is provided. Similarly, where topography is steep (which may be often the case in walled and historic towns), acceptable walking distances will be much less than in flat places.

There are some solutions which can be applied to reduce these obstacles (e.g. shaded/sheltered walkways and elevators/escalators), but it is more difficult to incorporate these within walled and historic towns where they may conflict with policies of conservation.

Nevertheless, the most significant obstacle for pedestrian activity is generally the motor vehicle, which not only reduces the widths of pedestrian passages, but also creates an environment which is not conducive to safe walking.

Removing or reducing the impact of the motor vehicle can often fit in with the conservation policies of the town. However, it is not always feasible to completely remove the motor vehicle and in many instances it is necessary to create properly designed shared spaces which allow access but give precedence to pedestrian movements.

3.2.2. Cycling

Again, cycling suffers from similar climate and topographic problems as walking. Although acceptable cycling distances are much longer than those associated with

walking, it is more difficult to incorporate cycling as a component of a much longer trip, unless combined with modes such as trains. This implies that facilities for cycling should not only be improved within the walled and historic town itself, but if people are encouraged to travel by this mode, facilities should extend further out into the surrounding neighbourhoods and along the main routes leading to the town.

Cycle ways and cycle priority measures are often also beneficial for the disabled as well as for pedestrians.

There is a need to establish pedestrian and cycle networks. Where new development is being allowed it is imperative that this should link to existing networks and care should be exercised to ensure that it does not bisect or remove long standing links.

Piran Case Study:

Barrier – Thematic Greenway

The Parenzana (the Parenzo line), a was a railway, opened in 1902, connecting Trieste, Italy to Porecˇ (Parenzo, now in Croatia), passing through Slovene Istria, a popular tourist area due to mild climate and good conditions for outdoor activities throughout the year. The railway only operated for 33 years as it was highly ineffective – however, after its closure it left a 123km trail of unused land. The stretches on the outskirts of the cities were developed where it was possible, but most of the abandoned railway was well preserved and used by the locals as a walking trail, slowly giving way to ideas about establishment of a walking or cycle path – a greenway.

Already in the 1980s, the part of Parenzana trail on the coastal line between Koper and Izola was renewed as a recreational link between the two cities, and the tunnel between the two tourist hotspots, the towns of Portorozˇ and Piran, was restored and opened for pedestrians and cyclists. Due to its popularity as well as the significant change of the lifestyle and habits in Slovenia in 1990s, the demand for recreational and outdoor activities increased as well as interest in local history and environmental awareness. On the other hand, traffic and commuting increased to the level where there is regular congestions of the main roads and increased use of space for parking, so the need for sustainable transport and alternative ways of commuting is increasing.

As the need for recreation was increasing in 1990s, several local enthusiasts and recreational societies in the Municipality of Koper initiated the idea of a revival of Parenzana as a well-mantainted recreational trail and a greenway. The Municipality of Koper as well as the neighbouring Municipalities of Izola and Piran took up the idea, so various activities were initiated on the local as well as international level, resulting in the Slovene section of Parenzana being restored and opened as a greenway in June 2002. It starts in the village of Sˇkofije on the border with Italy and is effectively linking the three main coastal cities Koper, Izola and the Piran-Portorozˇ-Lucija agglomeration, stretching further south towards the Croatian border.

In the future, it is intended to connect about half a million people of three neighbouring nations along the disused railway trail and to enable enjoyment of natural environment as well as cultural heritage, therefore it was named "The Trail of Health and Friendship". Similar activities are going on in Italy as well as in Croatia, therefore it might soon be possible to enjoy all the original 123 km of Parenzana, thus making it one of the longest, if not the longest greenway in the Northern Adriatic area.

Parenzana is intended not just for recreational and tourist use, but also to increase sustainable mobility between the cities and towns in the coastal zone of Slovene Istria, thus adding to integrated coastal zone management and reducing the environmental burden of motorised transport. Some of the sections are not that suitable for daily commuting as they are too steep, but the flat sections will increasingly see the use of bicycles and rollerskates as the preferred method for commuting to work, schools and running errands in the public institutions. The section between Koper and Izola, which was established first and runs directly along the coastline, is already popular with commuters. It is expected that the newly established flat sections such as the one between Secˇovlje and Portorozˇ will further enhance commuters' use. In addition, Parenzana is very suitable for activities for children and as a safe route to schools as it is closed for motorised traffic. For the same reason, it is very popular for recreation with young families and persons on wheelchairs. It is also one of the safest places for rollerskating.

Lörrach Case Study

Increasing Bicycle Usage

During the past years, Lörrach undertook a considerable amount of work related to cycling. In this city, there are no difficulties with cycling, because on a bicycle, one can easily reach most of the residential areas, the town centre, the schools and commercial areas. There is also a special cycling track along the railway line (Wiesentalbahn) to Bale.

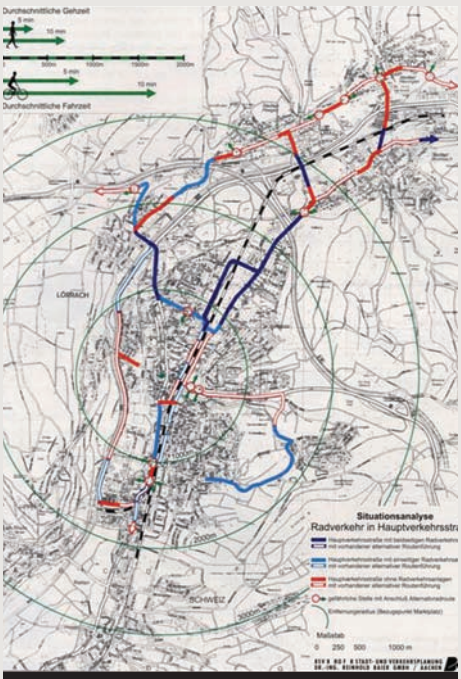
On most of the main roads there are "advisory" bicycle lanes, since there is not enough space for a proper bicycle path or for a separate cycle lane. In most parts of the town traffic speed is limited to 30 km/h, and there are some attractive cycle tracks along the Wiese river and in the recreational areas. Some junctions incorporate "Advanced Stop Lines" which are particularly helpful when there are traffic signals.

When approaching such a junction, one has to use the cycle lane to bypass car-traffic and get safely in front of the queue. Here cyclists may wait in the 'cyclist's reservoir' at the head of the junction, and when the traffic light turns green, they are the first to pull away.

Advisory bike lane, big cars like buses or trucks may use them.

Advanced stop line: cyclists are the first on the junction.

Recreational cyclists, as well as other cyclists, will benefit from the special signposts in the Wiesental (valley). In 2006, this cycling network was completed all



Cycle lane network in Lorrach.

over the county and also on the opposite side of the Rhine – in France.

Bicycle parking facilities are placed at every station of the regional rapid transit (Regio-S-Bahn) and at the more important bus-stations. Near the pedestrian area in the town centre a roofed parking facility for bicycles was constructed, and there is another small parking facility in the middle of the pedestrian area.

Another project is the bicycle-service-station, to be placed near the main station, similar to other well-known examples from the Netherlands. Due to the reconstruction of the train station, some new areas are now available for housing this bicycle-service-station, which should offer secure cycle parking,

3.2.3. Public Transport

Within the "heading" of Public Transport, there is a wide range of modes, such as trains, the public bus (both local and long-distance), tourist coaches, taxis, horse-drawn vehicles, road-trains, boats etc. The degree of priority given to these different modes varies from town to town, based on the existing infrastructure as well as the tradition of using certain modes.

The level of provision of public transport within and around walled and historic towns depends on the available road widths and alignment, as well as on the type of vehicles used. In many medieval towns only smaller public transport vehicles can reasonably take access.

Apart from the size of vehicle used, the type of vehicle used is of utmost importance in relation to the conservation of the urban environment within the town walls. This is essential, not only to promote a more pedestrian friendly environment, but also to protect the buildings from deterioration due to pollution. Ideally, public transport vehicles in walled and historic towns should be zero-emission vehicles, which can manoeuvre easily within the narrow streets that are generally typical of these towns.

Depending on the size and topography of the walled section of the town the use of a public transport system using larger vehicles can be accommodated outside the walls. This allows for a wider catchment area to be served, bringing passengers to the walled section but without the significant impact that these larger vehicles would create if they actually travelled through the historic core.

In cities where the railway has already penetrated into the centre of the walled area, the use of the train should be coupled with supplementary public transport that leads from the terminal to various points within the walled area. The use of smaller, low emission vehicles is appropriate for this function (e.g. electric buses, taxis).

Where the topography and size of the walled area does not make it easy for people to walk from the bus stops, these should be integrated with other means of transport, such as smaller buses, which can penetrate the historic area. In some locations it may be appropriate to use elevators or escalators.

In any case, whatever form of public transport is used, it is essential that the public can penetrate deeper into the walled and historic city and get closer to their destination than any car park. The end walk between the mechanical mode of transport and the final destination can have a significant effect on the decision on the mode of transport used. Therefore, placing a car park much further away from a common destination than a bus stop will help to swing the modal shift towards public transport.

Lörrach Case study

Regional Rapid Transit (Regio-S-Bahn)

Lörrach is situated in the Wiesental, the valley of the Wiese, a river coming from the heights of Black Forest going into the Rhine near Bale. The town centre is located on the floodplain of the river Wiese, bordered on both sides by mountains. In the west of the city the Wiese River forms a barrier, whilst in the southeast lays the frontier between Switzerland and Germany. Due to these topographical conditions traffic in and around Lörrach is restricted to only a few axes.

There are two important roads: The Bundesstraße B 317 leads along the valley of the Wiese River and the Motorway A 98 which crosses the valley connecting Lörrach with international motorways to France, Switzerland and Italy.

In the mid-1800's, a railway line was constructed through the valley, running from the German station at Bale to Zell im Wiesental, while another branch line connected Lörrach with Weil am Rhein. The Wiesental-Railway was one of the first Railway lines in Germany to be electrified. In the year 1913 electric power was installed, using the alternate-current-system, which became standard at most of the railways in the central Europe.

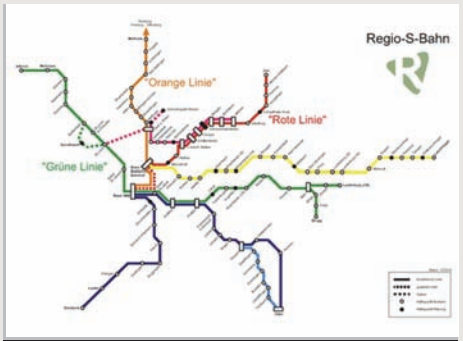
At the end of the 1990's – after the reform of the German railways – a plan was developed, giving the opportunity to modernise the Wiesentalbahn and its integration into the regional rapid transit network in the region of Bale (Regio-S-Bahn). The modernization, which is now finished, brought about a new computer-based railway control centre and renewed platforms at all the stations, which allow a low floor entrance into the trains. Some new stations were added and by the end of 2005 there were 10 new rapid transit trains. The timetable shows a train in each direction every 30 minutes. The timetable of the branch-line to Weil am Rhein is shifted for about 15 minutes to the line to Bale German Station. The result is that the regional trains travel every 15 minutes through Lörrach.

In the summer of the year 2003, the Swiss Railway company (SBB) took over the train service from DB REGIO (German Railways). The SBB is now managing most of the regional rapid transit trains in the region of Bale.

The conversion of the Wiesentalbahn into the new regional rapid transit (Regio-S-Bahn) brings a remarkable improvement for the access of the city of Lörrach. The new railway station Lörrach-Schillerstraße, situated nearby the southern district of the town-centre, as well as the main station with its new entrance on the eastern side of the rail track allows direct and shorter routes into the city. The integration of the railway line in the townscape is considered to be a success.

New Station Lorrach-Schillerstrasse.

At the end of the year 2006 the connection to the main station of Bale (Bale SBB) was introduced, which connects the City of Lörrach to the City of Bale through a 20-minute journey.



Map of Regional rapid Transit network around Bale.

3.2.4. Deliveries

The commercial viability of any town centre will be affected by the ability for deliveries to be made regularly and reliably to businesses. This issue requires careful consideration when planning to remove traffic from certain areas and give greater precedence to pedestrians.

Depending on the level of commercial activity in the centre it will be necessary to control traffic by the use of appropriate traffic orders which will determine the vehicle types allowed, times of day and duration of stay.

However, certain types of retail may not be appropriate for an historic centre, due to the large volumes of traffic that they may attract, both in terms of deliveries and customers coming in by car (e.g. a large supermarket). Although one needs to be careful to maintain a certain degree of food-shopping within the walls, in order to accommodate the needs of the residents and the normal visitors, one should not over-provide in such a way as to attract shoppers coming in from outside specifically for food shopping. In most cases, these activities can and should be accommodated outside the walls.

3.2.5. Private Cars

It is very evident that the private car should nearly always be given the lowest priority and where possible be excluded from within the walled and historic town. The objective with regards to the private car is to minimise its use subject to constraints.

The land-use strategy for the town will determine the level of exclusion of the private car. The level of private car usage should be constrained to the minimum level necessary to sustain the viability of the town centre.

In most walled and historical towns, it is often desirable to retain a resident [a stakeholder] population, in order to retain/increase the vitality of the town. In this case, it is very difficult to exclude the private car completely, without provoking an exodus of residents from the area. If it is deemed essential that residents remain, then special arrangements need to be made for bona fide residents to be able to take their car into the walled area, assuming that enough spaces exist to be able to accommodate the parking of such cars. Nevertheless, the use of cars by residents should not be encouraged, and if proper alternatives are made available to residents as well as to other users, the long-term aim should be that even residents reduce their level of car ownership or use within the walled section.

Chester Case Study

Residents' and Blue Badge Holders' Parking

Like other historic cities, Chester attracts a large number of visitors; tourists, shoppers and business people. The majority of people arrive by car and need somewhere to park. There are a number of private non-residential car parking spaces owned by the businesses for their staff. In addition there are around 5,000 parking spaces owned by the council and private companies, which are open to the public. In order to prevent cars parked on the streets causing problems of congestion and visual intrusion, parking restrictions have been implemented which are enforced by the Police and City Council.

There are areas in the City where residents do not have off-street car parking spaces. The City Council and County Council have introduced residents parking schemes, which are operated by the City Council. Where there is a suitable number of on-street parking, spaces in a specific zone are designated for use by the residents only.

Local residents are consulted at an early stage in the process about the possibility of providing spaces. This is on the understanding that the spaces available would not be reserved for a particular resident and there would be an annual charge (currently £60) for the permit. Permits are only valid in a particular zone.

In addition to the needs of residents there are spaces designated both on- and off-street for use by people who hold a Blue Badge issued by the Social Services Department of the Council. Blue Badges allow drivers to park where there are parking restrictions, for up to 3 hours, provided they do not cause an obstruction.

At various locations around the City, the Council has designated on-street spaces for use by blue Badge Holders, where the three-hour limit does not apply. These are popular with Blue Badge holders and this often results in these spaces being occupied by the same car all day and often every day.

In some city centre car parks, spaces are designated for use by the disabled, where blue badge holders are allowed to park for up to 3 hours free of charge.

In the hierarchy of who should be allowed to use a car within the walled and historic town, short-term visitors, who generate business to the town itself, should follow the residents. These are generally shoppers or tourists, both of whom are likely to spend money within the town, thus increasing the commercial viability, which in turn augment the vitality of the centre. Obviously, not all shoppers and visitors need to use the car to carry out their activity within the centre, but given that in many cases they spend a relatively short time there, these may be accommodated. Although it should not be made impossible for this type of user to enter the town by car, the car parking/access regime that is adopted by the town should discourage

the use of the car for non-essential trips. Special attention needs to be given to the access issues relating to those with mobility problems and other disabilities.

The last in the hierarchy of who should use the car are commuters, who come in to the town centre, day in day out, at the busiest time of day (rush hour) and stay there for the rest of the day. Furthermore, these visitors generally have a fixed pattern of arriving and leaving from the town centre. It is therefore more likely that alternative modes of transport can be utilised by commuters than for the occasional visitor who may come at irregular hours.

3.2.5.a Minimising the impact of the car

With all modes it is important to plan positively. However, with the private car the objective is to seek to reduce and in some cases prohibit their use. The requirements of each town vary significantly and while some still have the remains of their historic walls for others the legacy is only identifiable by the street pattern. Where the walls still exist access is generally limited to a finite number of openings and in some cases physical gateways. These natural points of constraint provide opportunity to control and manage the volume of traffic entering the walled or historic zone.

Following a decision regarding which cars should be allowed to enter the controlled (walled) area, it is necessary to identify a system that will enable robust management in a transparent, efficient and environmentally sustainable way.

The easiest way to control access is to prohibit all cars from entering, but this may create problems for residents as well as for some shoppers. Inevitably, such a control system will then have to have exceptions, which are generally controlled by stickers or other means of identifying that the vehicle is exempted from the prohibition.

A more common way of controlling the car is to restrain its length of stay within the walled area. This can be in the form of maximum stay, which totally prohibits anyone staying beyond a certain time. Alternatively the control can be fiscal, by charging for the stay by the hour, thus discouraging long-term users. Systems combining the two methods are also in existence.

In either system, the residents have to be catered for and in some instances it may be necessary for them to be exempted from these controls. The way they are exempted depends on the method used for controlling the other cars.

3.2.5.b Different systems and technologies for parking control

There are various methods that one can adopt to achieve parking control. These can broadly be divided into:

- Simple time-control
- Cardboard clocks Scratch Cards
- Parking Meters
- Pay-and-Display Meters
- Telepass Systems
- CCTV Systems

In the first system, motorists are expected to abide by the rules of maximum stay, and the control is carried by wardens who either take notes of parked cars or put marks on the tyres of cars, thus noting when a car exceeds its stay. This can be applied for small towns, where the wardens can cope with the number of parked cars.

With the second system, the motorist sets the time of arrival on the Cardboard Clock, which is then placed in full view behind the windscreen, so that the traffic wardens can check whether the time has been exceeded or not. This can be used in larger towns, since it lessens the dependency on wardens to control all cars at all times.

The Scratch Cards system is a cross between timed parking and pay parking. It serves the same function as the cardboard clock, but in this case, a scratch card is bought every time one wants to park. The use of this system differs from town to town, in the sense that there are towns that accept multiple use of scratch cards for one stay (therefore extending the length of stay), whereas others only permit one scratch card at a time. Whereas this needs the same level of enforcement, it generates more income and is therefore a better deterrent for cars to enter. On the other hand, the system may be cumbersome for the users, especially one-time visitors, since they need to find the right shop to buy the scratch card. Furthermore, the use of so many disposable scratch-cards may not be very environment friendly.

Traditional Parking Meters perform the same function as the scratch cards, since they charge for a limited amount of time. The user can only pay for the maximum

stay, and in order to stay for more, one needs to go back and feed the meter more coins. For the user, they are easier to use than the scratch card, since the motorist does not have to find the relevant shop, but they will generally only work with exact change. From an environment point of view, they create a visual intrusion, since there is a need for one meter per parking space.

Lörrach Case Study

Automatic Parking Guidance System

The number of on-street parking spaces in Lörrach is limited and therefore most of the visitors, customers and commuters have to park their cars in underground car parks or other garages. In some cases, this also applies for residents.

For better efficiency the municipality of Lörrach, together with the owners of the private car parks, have installed a parking control system, which collects data on the number of parking spaces available in the various car parks in the city. The system shows real time information about the situation to the car drivers looking for parking spaces, by means of signal boards showing the number of available parking spaces or showing "full" if parking space is not available.

The car traffic entering and leaving the car parks is counted by using loop contacts and / or barriers. A central control device collects this information from the car parks, and this is immediately relayed to the variable parking control signs on the roads leading to and around the town centre.

Through this automatic parking guidance system, the efficiency of car parks increased – nevertheless some garages remain more favoured because of their short distances to the shops. In these locations, congestion remains high even though the variable signs indicate that the car parks are closed. This is due to the fact that some drivers believe that although the car park is full, cars will soon leave and they will be able to park – therefore they are willing to wait, not realising that this is not the way an

automated system works.
Car parks without a cash-point are not included in the automatic parking guidance system, since they are further away from the city, and they are less sought after.

Pay-and-Display Meters lessen this problem, since one meter can be used for a large number of parking spaces (usually up to a 100 spaces can be served by one meter, depending on the layout of the car park). Most meters can give change and therefore are user-friendlier.

They are however more attractive for thieves, since they would contain more cash than a single meter. Some modern meters also allow the use of credit/debit cards thus reducing this risk.

Two very different systems are the Telepass and the CCTV Systems. These assume that the entire walled and historic town is a car park and detectors are placed at all access points to deduct the time that a car spends within the walls. These eliminate the need for numerous meters around the town, as well as minimise the need for enforcement. Furthermore, there are no cash transactions on the street, which makes it safer against theft. Payments for parking are then carried out in various methods, namely through Internet, telephone banking, as well as in shops or other outlets.

The Telepass system entails that each vehicle is fitted with a transponder, which communicates with a detector at each access point. This method is used mainly on motorways, in order to avoiding queuing at toll stations. However, it may easily be adapted for parking control, since each vehicle is automatically detected. The drawback for this system is that one needs to enforce that each car is fitted with a transponder and that the transponder is actually functioning.

The CCTV system works on the same principle, but uses cameras, which read number plates on the way in and out of the town. Using similar technology as that used in the London (UK) Congestion Charging system, the number plates are identified going in and out, therefore deducting the amount of time spent within the walled area. Such a system has the advantage that it can help determine which vehicles really belong to bona fide residents. Those claiming residency but driving out of the controlled zone for the night are less likely to be residents.

All these systems have their advantages and disadvantages – each town needs to analyse which system (or hybrid of the above) is mostly suitable for its particular requirements.

3.2.5.c. Positive Signage

Invariably, most of the methods mentioned above require a significant amount of signage to warn motorists about the restrictions, to mark where one can or cannot park etc. In the cases of parking meters and pay-and-display, they also require street furniture, which may look out of place in mediaeval towns.

When analysing signage that is found in relation to parking, one will find that most of it relates to prohibitions i.e. "no-parking" signs, time-limit signs, double-yellow lines etc. The walled and historic town, more than other towns, offers the opportunity to adopt the system of positive signage. This means that at each entrance to the town, specific signs are erected indicating all prohibitions, with the exception of where it is positively signed. For example, one can designate a whole town as a "no-parking" zone, with the exception of places, which are clearly marked for this purpose. This would eliminate all "no-parking" signs and double-yellow lines from the streets, and would only require the painting of parking bays on the ground. Obviously, one needs to confirm with the legislation of the country whether this system can be applied.

Mdina Case Study

Positive Parking Zone

Mdina is the old capital city of Malta and is located in the western part of the island. It has a walled citadel with an area of 0.88Km^2 and a current population of around 380. It contains a number of fine medieval palaces, baroque buildings and monuments and has a morphology that in part dates back to the medieval period with a considerable number of narrow streets, some of which are impassable by vehicular traffic. Subsequently, parking spaces are limited with the result that if normal parking signage is to be applied, most of the roads will be covered with double-yellow lines, and "no-parking" signs will clutter all the walls of palaces and monuments alike.

The North West Local Plan recommends that Mdina will be converted into a Positive Parking Zone for residents only. This means that apart from the fact that only residents will be able to park within the city, Mdina will be declared as a no parking zone, with the exception of parking slots which are clearly marked as such. This exemption will be placed at each of the three vehicular entrances to Mdina, therefore eliminating the need for double yellow lines on the new paving and the "no-parking" signs from walls.

3.2.5.d Park-and-Ride

The individual's modal choice is not only related to the ease or difficulty to park a car at its destination, but also the accessibility of alternative and convenient modes of transport. Although public transport is to be encouraged as the means of accessing the walled and historic town, this may not offer the right solution for the individual. The reasons may vary, but the two most common ones are that the public transport service at the origin of the trip is not good (or nonexistent) or that the pattern of

travel for the individual is not a straight journey (e.g. home – work – home) but involves a number of destinations, such as dropping off children to school, picking up shopping on the way home, etc.

In this case, a half-way solution could be offered in the form of a park-and-ride scheme, which serves the individual with the flexibility of using the private car from the origin, but yet still does not allow the private car to penetrate the walled and historic town/city.

Valletta Case Study

Controlled Vehicular Access and a Park-and-Ride scheme

Apart from being an historical walled city, Valletta is also the Capital City of Malta, and therefore has to bear the transport pressures that any administrative capital city has, on top of the normal pressures from residents, employees and visitors.

Valletta, together with its suburb Floriana, absorbs 11% of all Malta's daily road trips. A large percentage of these trips relate to the high concentration of public and private offices, which are located in the Valletta peninsula. The current uncontrolled parking system rewards the commuters, who generally enter the city in early morning, and park for free for the rest of the day. On the other hand, visitors, such as shoppers, tourists and visitors to government departments either have to park at pay car parks or else use public transport – which is often viewed as an inefficient means of transport on the island.

In May 2007, the central government introduced a Control Vehicular Access system for Valletta. The proposal for this system, which was to be introduced for the entire peninsula, found resistance from the Floriana Local Council, and therefore it will be restricted to Valletta for the time being. This system will take advantage of the fact that Valletta has only four access points and will treat the city as one large car park, where cars are charged for their stay in between entering and exiting from the controlled area. The control is affected by means of CCTV which record the number plates of vehicles entering and exiting the city and then charging for the duration.

In order to complement this scheme, government is also operating a Park-and-Ride scheme, which connects a 950-space car park at the outskirts of Floriana to central Valletta, with a series of buses running at headway of 2.5 minutes during peak hour.

3.2.5.e. New Technology

Improvements in technology have made vehicles, especially private cars, more environmentally friendly and thus their negative impacts are reduced. It is important to promote such technology, especially since environmentally friendly vehicles are generally more expensive to purchase than conventional petrol or diesel-run vehicles. Electric vehicles are a common example of how the same activity can be carried out with less local air and noise pollution (although it is necessary to consider pollution created at the source which is creating the electricity).

While electric vehicles reduce pollution they still generate many of the other problems associated with conventional vehicles (e.g. congestion and parking). However, in order to assist with the promotion of such technology, incentives may be given to environmentally friendly vehicles, such as lower parking rates, access to parts of the city, which would be otherwise inaccessible to conventional cars, etc. Nevertheless, such policies need to be reviewed at a later date, especially when (and if) these vehicles become more predominant than the conventional vehicles.

Lörrach Case Study

Electric Citybus Project

Prior to1967, Lörrach had a tram, running on a short tramline (about 2,5km) and it acted as an extension of the Line 6 from Bale, which is still in service today. Currently, public transport in Lörrach operates with buses, which link all quarters and the neighbouring villages and towns to the city.

The Citybus-Service operates with about 10 - 12 buses and depending on patronage, the headway between buses ranges from 20 to 60 minutes. Due to concerns about air pollution caused by buses, the municipality of Lörrach had to consider alternatives to the diesel buses. The city of Bale runs some electric trolleybuses, but these are too expensive for a small town like Lörrach. Similarly, buses driven by natural gas are expensive. Recently the bus operating company purchased a bus with hybrid-technology (diesel-electric), but this still does not optimise fuel consumption.

In 2005, Lörrach embarked on another pilot project, namely by purchasing a small Citybus from Italy, powered electrically

with batteries. The batteries are inductively charged, rather than by cable and plugs or by overhead wires. This innovative technology is an idea of the Wampfler GmbH, which is situated nearby Lörrach.

Line 8, from Brombach to Obertüllingen, was chosen for the pilot project, since this can easily be served by a small bus. Due to the length of the line and the timetable, there is a need for only one bus to operate the route. The work on this pilot project included the construction of two loading stations for inductive charging of the battery power packs. One loading station is situated at the Brombach terminus and the second was built at the central bus station.

The daily circulation of the electric citybus is similar to those of the diesel buses on this line. The difference is, that the electric Citybus has to stay for some minutes on the loading station for charging the batteries. A short loading-time between 5 - 10 minutes is sufficient for travelling on. The technology of inductive recharging has important advantages in comparison to conventional battery-powered buses, which carry heavy power packs with them, staying for a long time recharging in the bus depot or opting for a complicated procedure, installing a fresh recharged power pack.

The electric Citybus is a small and light vehicle with remarkable engine power. The bus is not a significant obstruction to traffic as it can be driven agilely in traffic. The difference is the lack of noise and air pollution – there is no noisy engine and there is no exhaust pipe. There is no need for expensive overhead wiring like for trams or electric trolleybuses – investment is restricted to the loading stations. One disadvantage, however is

that the length of the line needs to be a bit shorter, since in every route-cycle, the bus needs about 10 - 15 minutes for recharging the batteries. The timetable is worked assuming common diesel-powered buses and there is no spare time for recharging.

Nevertheless, inductive charging is a very interesting technology, which makes it possible – if timetable and circulation suited it – to introduce electric powered and environmental-friendly buses into sensitive town areas.

3.3. Access for All

One sector of society whose transport needs are to be accommodated in any scheme are the mobility-impaired. Whereas most restrictions are made so that the able-bodied visitor or commuter is forced to consider other more environmentally friendly alternatives, these same restrictions can result in more hardship for those with mobility-impairment.

The most common way to overcome these issues is to create exemptions for the mobility-impaired. This means that restrictions for the able-bodied visitors have to be regulated rather than enforced by means of physical barriers. This would obviously require more enforcement to ensure that able-bodied persons do not abuse the advantages given to the mobility-impaired.

Chester Case Study:

Blue Badge holders

In the 1990s, City and County Council had proposals to pedestrianise the main City Centre streets within the walls of Chester. The proposed restrictions included limiting the time for loading vehicles delivering to the shops and businesses to before 10:30hr and after 16:30hr.

The original proposals also included a more restrictive 'badge' to be issued to people with disabilities which affected their mobility to a greater degree than that specified under the rules for issuing a blue badge. However, the administrative costs required in determining the eligibility, (having an appeals procedure, etc) meant that this was rejected, although a similar scheme is part of the pedestrianisation scheme in York. The scheme as implemented allows Blue Badge holders into the restricted streets.

The pedestrianisation restrictions also allow access for guests of the hotels in the area. There are also churches and other places where weddings and funerals take place and these have to be catered for. Some of the businesses in

the area were also anxious to have emergency access for the breakdown of lifts, refrigeration equipment etc. There was also a requirement for security vehicles delivering cash etc. in the restricted area.

Because of the number of exceptions to the restrictions a staffed barrier was considered the only option. This is financed by the City Council and has been implemented in co-operation with the hotels in the area. A more technological solution is being considered.

4. WORK METHOD

This section should provide a simple structure on how to go about carrying out work related to access in fortified towns. As this structure should be generic it does not go into great detail, but should serve as a list that one can use to check all aspects that should be taken into account. The method of work is divided into three parts:

i. Collecting information,
ii. Developing a plan, and
iii. Putting it into practice.

Stages (i) and (ii) may take place iteratively, since at times during plan development, one may realise that more information is required and therefore has to go back to stage (i). However, care needs to be taken during these two stages regarding consultation with the public and other stake-holders.

4.1. Collecting Information

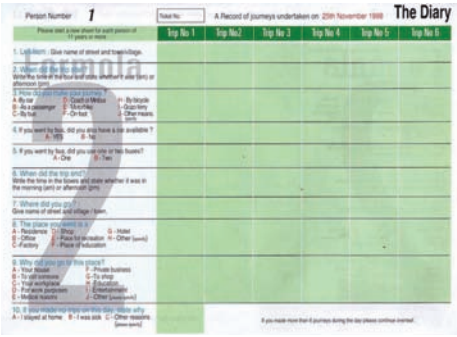
The studies that may be required vary considerably depending on the type of project that is being planned. However, certain studies, such as traffic volume flows into and out of the walled or historic area are very important, and these should be carried out on a regular basis, to detect any changes in trends. Such traffic flow surveys should ideally distinguish between the different vehicles accessing the study area (i.e. private cars, LGV's, HGV's, public transport vehicles, etc), as well as car passenger occupancy data (i.e. the average number of passengers per car).

Pedestrian flow data should also be collected regularly at the entrance points, to establish the number of people who actually assess the area on foot.

A method that generates a significant amount of information is a detailed travel diary survey, which should cover the walled and historic town, together with the hinterland which serves it. Such a survey is generally aimed at the population which lives within commuting distance to the study area. In this survey, a significant sample of the population (between 5% and 10%) will be asked to fill a travel diary for a particular day, where respondents will be asked to give details of all their trips during that same day. For each trip, these details will include:

- Place of departure (i.e. street and locality)
- Type of place of departure (i.e., residence, place of work, shop, etc)
- Time of departure
- Means used for trip (car driver, car passenger, bus, etc)
- Time of arrival at destination
- Place of arrival (i.e. street and locality)
- Type of place of arrival (i.e., residence, place of work, shop, etc)
- Reason for trip (going to work, work related, shopping, going to school, etc)
- Car availability (for trips that involve public transport, it is important to establish whether a private car was actually available for that trip)

This information should be given by all members of the households chosen, who are 11 years or older (this is generally accepted as the age when children are allowed to travel on their own, but may vary from place to place).



This survey will give a good overview of the travel patterns of the local population, but will unfortunately miss out on trips that originate from outside the area, or those carried out by tourists living in hotels or other tourist accommodation. In an area where tourist travel may be significant, it is advisable to carry out a similar survey in hotels and other tourist accommodation.

With regards to projects which involve changes in parking provision or management, it is essential to take stock of all parking spaces available in the walled and historic town area, divided by the type of management regime – i.e. whether restricted by time or money, whether public or private, etc. This will help in the eventual policy-making

regarding parking supply. This applies similarly to bicycle racks.

Apart from a parking supply survey, it is also crucial to carry out a parking demand survey, which will give a clear idea of how the parking supply is being utilised. In the case of on-street parking, this should be carried out by parking-beat surveys, where enumerators are given a walking beat, which can be walked through in less than 30 minutes. During the beat, the enumerator will list all the number plates of the vehicles parked in his/her beat. The survey is repeated every 30 minutes, using the same path of the beat, so that on average each space is surveyed every half hour. This survey should start prior to the morning traffic rush hour and end after the evening rush hour. This will give a detailed picture of which spaces are being utilised efficiently and which are not.

It is also important to have information about the travel patterns and car ownership of the population living with the walled and historic city. This will assist in the assessment of how the residents of the core will be affected by any proposals.

4.2. Developing the Plan

With the wide array of types of projects mentioned above, it is difficult to prepare specific guidelines relating to developing the plan. Nevertheless, the plan needs to follow from a stated philosophy or policy that is in line with the government responsible for the walled and historic town.

The analysis of the travel diary data mentioned above may assist in identifying issues that are not readily observable from more routine traffic surveys. The fact that information on the reason for travelling and choice of mode are given can assist in identifying specific groups that may be more susceptible to changes. This enables traffic management plans to be developed that tackle some of the problems by targeting particular groups.

Apart from the information from the studies related to the specific walled and historic town, a plan needs to be developed based on the knowledge of what technology is available. For example, a congestion charging system such as the one in London would be very hard to implement if the number plate recognition technology had not been developed. Similarly, one can only introduce environmental-friendly measures where it is practically feasible utilising existing technology.

4.3. Implementation

The route taken between the initial concept of a project and its actual implementation is often a difficult one. Transport related projects tend to have the additional difficulty that there are too many "experts", who want to have a say. Transport projects, especially ones which restrict the use of the private car, tend to affect a considerable part of the population. Invariably, most people will judge the project in the way it will affect them personally as individuals, rather than as how it will affect the community. This also generally applies to decision-makers and implementers, as well as community leaders.

Therefore, it is essential that before moving on from the concept stage, the project must be well thought out, in terms of:

i. Is this compatible with the general political views of the decision-makers?
ii. What are the environmental benefits/disadvantages?
iii. What will the financial costs/returns be and is it viable?
iv. Which sectors of society will benefit mostly and which will be most disadvantaged?

It is likely that in order to answer some of these questions with certainty, a number of studies must be carried out. However, even undertaking these studies will have a requirement for financial and/or human resources. Therefore, where possible, it is important to try and develop the case for any proposal using data from existing studies and surveys, before commissioning new ones.

The dissemination of the concept needs to be carefully managed, in order to build a critical mass of political will. Initially, it should be shared with those who have an understanding of the issues and are likely to be supportive. Engaging at an early stage with those people who are known to possibly be hostile may result in negative publicity with the resultant problem this generates in securing public support.

Even with "friendly" stake-holders, there will invariably be aspects of the project which they do not support and they will seek to amend. It is therefore important that from the outset, the thought-process on the strategy is holistic, since only the argument of the entire strategy will come to the defence of some of the minor aspects.

Following the first round of feedback from the "friendly" stake-holders, an assessment should be made on the project, taking on board their comments. Amendments may be necessary, but further studies may also be required to substantiate certain claims, especially if these are based on less reliable data. At this stage, the financial aspects of the projects need to be defined properly and presented in order to inform the decision-makers. If the project proves not to be financially viable the arguments in favour of environment and social improvement have to be strong, so as to outweigh the potential financial loss.

Following this re-assessment, a full-scale public consultation should be launched, preferably backed by the "friendly" stake-holders. This is important, so that the public perceives that it is being launched by a wide group of stake-holders and not just by the local authority that will be implementing it. This should increase the public support to it, even prior to its implementation.

Experience has shown in various countries that authorities should not try and demonstrate public support by a popular vote, such as a referendum, prior to implementation. Although a transport project may appear to have public support, an individual is always concerned about the unknowns that the project may bring and when casting a vote, may prefer the certainty of the present situation. The referenda of Edinburgh and Stockholm regarding congestion charging are a very good example. Whereas Edinburgh asked for a referendum prior to the implementation (and failed badly), Stockholm went for the polls after nine months of operation of the scheme. Since the people were able to see the benefits of the scheme together with its disadvantages, they were in a better position to judge and in fact voted in favour.

Ultimately, these schemes require political decision-making, and it is the politicians who need to be convinced. With a public outcry against the project, it will be very difficult to get approval, even if the facts show that the public perception is wrong. That is why it is important to build confidence slowly and to have the studies and facts to back up the proposal.

It is also important that the project plan is robust but flexible, so that changes can, if necessary, be accommodated. It is also essential to identify which aspects of the project are crucial and which can be sacrificed. Invariably, politicians will try to minimise any public opposition by making amendments to the project. As long as these changes do not affect the core principles of the project, they should only be resisted lightly, especially if it is possible to re-introduce these aspects at a later date, when (and if) the project proves to be successful.

Once a political decision is taken to proceed with a project the detailed planning can be progressed. Again, the work required depends on the type of project that is being envisaged. In certain projects, legislation may need to be changed to allow for certain measures (such as congestion charging).

In most cases, it will be necessary to procure work and equipment from the private sector and the normal tendering procedures should apply. However, care must be taken when new technology is required. It is important to try and compile comprehensive specifications to ensure that the tender document is not loosely written. Nevertheless, one need to be very careful not to write the document in such a way that only one bidder can deliver according to the specifications required, potentially giving the opportunity to be held at ransom on the price. It is therefore important to try and find more than one firm that produces the same technology, and then try and write specifications, which although tight, will allow more bidders to submit a tender.

In the case where the private sector is being asked to supply and manage a system the issues get more complicated. The government authority will need to guarantee that the social and environmental benefits that are to be attained from the project are delivered in full, whereas the private sector will need to ensure that the project renders a financial return. Therefore the tender document needs to be written in great detail to cover for all eventualities. Alternatively, the tender document can refer to a steering committee that will be set-up between the authority and the successful bidder to deal with the issues as they arise. The latter will undoubtedly push up the price that the authority will have to pay, since it leaves the bidder with a lot of uncertainties. Ideally, the tender document should include as much detail as possible, especially with regards to the minimum level of service to be provided. However, there will still need to be a steering committee, which will have to deal with minor issues, but which will not be allowed to ask for more than what is in the tender document.

Once the tender procedure is concluded and the project is up and running, it is essential

to monitor the effects of the new project. Some of the studies referred to above may need to be repeated, especially traffic and pedestrian counts. It is not feasible to repeat the Household Travel Survey, mainly because it is too expensive to carry out just for monitoring purposes. However, opinion surveys may be taken to check whether there have been changes to peoples travel patterns due to the project.

The monitoring needs to be carried out on both those issues which were planned to be improved, as well as on those which might have been affected negatively, especially if opponents of the scheme were very vociferous about them. Monitoring should not only be used to see who was right and who was wrong, but to help fine tune the project to improve it. It will also help in the planning of similar projects in the future.

The timing of the monitoring needs to be carefully planned. It is important to monitor the situation in the months preceding the start of the project, to be able to compare the "before and after". Immediately after the start of the operation, there will be some "turbulence", created by the novelty of the project itself. Some people may be over-enthusiastic while others may be sceptical and may initially resist changing, just because they were convinced that the scheme would fail. Therefore, although monitoring in the first few weeks may seem to be essential, especially for politicians to make claims about the project's success, the real monitoring can only happen when the novelty wears off, and people adjust back to a normal way of life with the project in place. Depending on the scale and type of the project, this may take weeks or months, and unfortunately may be too late for politicians to issue 'quick win' press releases about it. However, it is crucial to keep monitoring, since only this will give a good perspective about the success or otherwise of the project, and whether changes are required.

Adjustments to the project should not be made hastily. As described above, the "turbulence" of the first few weeks may throw up signals that changes are required immediately. However, these hurried changes should be resisted, and proper assessment should be carried out after "the dust has settled".

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NOTES

The Valetta group.

The Piran group.

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