ARTISTS - Arterial streets for people

Guidance for planners and decision makers when reconstructing arterial streets.

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Arterial Streets Towards Sustainability

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ARTISTS Project: Arterial Streets Towards Sustainability

ARTERIAL STREETS FOR PEOPLE

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ARTERIAL STREETS FOR PEOPLE

CONTENTS

EXECUTIVE SUMMARY

Conventional guidance on the design and management of urban roads and streets has tended to focus on either *arterial roads* or local *access streets*. There is currently a lack of a clear, consistent approach to the design of *arterial streets*, which combine both significant through traffic and urban place functions. This report aims to address this gap, by setting out an approach to the design and management of arterial streets - from a people-oriented perspective. This means that:

- As users of the street, people – rather than vehicles - are taken as the starting point for the analysis and redesign of street-space; and
- As local stakeholders, people are taken into account and included in the design and management process.

In addressing people's use of streets for a diversity of urban functions – and not just motor traffic movement - the aim is to achieve streets that offer a more positive contribution to sustainability, in all its economic, social and environmental dimensions.

This report encourages new ways of thinking about how arterial streets are conceptualised, designed and managed, as part of the overall street system. This requires a rethinking of how the various functions of the arterial street are reconciled and provided for; and involves addressing the processes by which street-space is allocated, the ways in which design options are generated, and how options are selected for implementation.

A series of ways of addressing the 'arterial streets for people' theme are recommended, including:

- Recognising that arterial streets satisfy the needs of both 'through users' and 'locale users';
- Developing a functional classification of street sections based on two independent dimensions: 'link status' and 'place status';
- Incorporating public participation at each stage of the redesign process, including contributions to functional classification, visioning, generating designs, and option selection; and
- Suggesting a process for problem identification, objective setting, option generation and assessment.

The guidance in this report is based on experience and research from the European Commission project ARTISTS (Arterial Streets Towards Sustainability). This project has drawn on a series of street case studies in seven European countries, as well as learning from research and practice elsewhere.

The report is aimed primarily at city authorities and other policy makers, practitioners and consultants with responsibility for the design and management of streets. It gives general guidance on concepts and techniques, which may be adapted to fit the relevant national or city context.

1. INTRODUCTION

This introduction sets out the context for this report, its purpose and an outline of its content.

Arterial Streets

Throughout history, towns and cities have been organised to a significant extent around their streets: and none more so than arterial streets. Traditional arterial streets are often historic radial routes that existed before they were part of any urban area, but gradually became a focus for activity and urban development. They assumed a variety of *urban functions* in addition to their original role for movement.

Arterial streets have traditionally formed the focus for a variety of urban roles

An arterial street is, therefore, much more than simply a road in an urban area. An arterial street is also an urban place with a definite identity and character; a physical environment or behaviour setting; a social space. Arterial streets may perform a variety of civic, ceremonial, political, cultural and social roles, as well as commercial and economic roles, in addition to their movement roles.

The challenge of arterial streets

Accommodating many different kinds of street activity within the constrained form of the arterial street can be a challenge. This became a particularly acute problem in the latter part of the 20th century, when high volumes of motor traffic became increasingly incompatible with other street roles. Heavy flows of fast-moving motor vehicles create noise, pollution and the risk of accidents, and make it difficult to cross the street. The mix of street uses was regarded as inefficient and dysfunctional. As a result, the arterial street came to be seen as one of the main problems of the traditional city.

Arterial streets often have problems reconciling through traffic flow with other urban activities

With the emergence of the new disciplines of traffic engineering and planning in the twentieth century came a series of conventions that separated the roles of movement from the other urban activities. Although these promoted principles of amenity and safety for all road users, in practice they often tended to take traffic flow as the starting point, with other road users and urban uses accommodated around this. But, in the course of time, these traffic-oriented 'solutions' have come to present problems of their own.

Problems with conventional approaches to arterial street design

Conventional principles of design and management of streets have tended to separate the through traffic function of streets from the other urban street functions.

While it is relatively straightforward to design either a *main road* catering primarily for traffic movement or a *street* for urban activities, it is not so easy to combine the main road function and urban functions in the design of a single *arterial street*.

In practice arterial streets have often been recognised principally for their arterial role, geared towards expediting traffic flow. The result has been that arterial streets have often been re-engineered as urban *roads* – that is, according to the engineering standards optimised for accommodating vehicular movement, as with modern inter-urban roads. This may satisfy requirements for traffic capacity, efficiency and safety for motor vehicle users, but often at the cost of displacing or even endangering pedestrians, cyclists and other urban activities, with the streets themselves losing many of their traditional urban functions and qualities.

Although today there is a greater aspiration in principle to accommodate street uses other than traffic movement, today's practice is still typically underpinned and constrained by the conventional approaches oriented to roads and motorised traffic.

For a start, conventional classification systems often have no place for the traditional arterial street. They typically tend to have an underlying assumption that there must be an inverse relationship between 'mobility function' and 'access function'. They tend to only recognise and offer guidance on the design of arterial *roads* or local access *streets*, but ignore the possibility of *arterial streets* which combine mobility and access functions to a significant extent.

Despite the lack of official recognition, of course, arterial streets continue to exist, and people continue to use and value them in their various roles. To properly support these uses, arterial streets require a different form of guidance for their design and management. This report addresses this need.

An urban arterial street re-engineered to modern highway standards.

A local street

The traditional multi-functional arterial street: should it be re-engineered as a road or redesigned as a street?

More detailed discussion on the problems of existing classifications and guidance is presented in ARTISTS Deliverables D1 and D1.1.

Today's agenda

'Streets are for people'

With today's growing emphasis on urban sustainability, it is recognised that there is a need to shift the balance towards 'more sustainable' modes of transport, improving the local environmental amenity of streets, and supporting social and economic activity along the streets.

This amounts to a 'streets for people' approach, which puts people first, as the starting point for considering the design of streets - whether these people may or may not be using vehicles.

Traffic must still be accommodated in arterial streets, as traffic contributes to the functioning - and ultimately the economic and social sustainability - of the city. But it is considered no longer either desirable or acceptable that streets be considered first and foremost as roads, as conduits of traffic around which other activities must be fitted (if compatible), or removed (if incompatible).

The general task of this report is to suggest, explore and encourage a system of street design and management that is more people-oriented, to contribute towards more amenable, sustainable and people-friendly arterial streets.

Accordingly, this report must specifically recognise the arterial street as a definite entity that combines and fulfils both 'arterial' and 'street' functions.

It aims to do so through a people-friendly, sustainability-oriented approach. Rather than starting with the assumption of expediting the movement of motor traffic, this aims to more explicitly encourage the 'more sustainable' modes of travel, such as walking, cycling and public transport, and accommodating the non movement functions of streets.

In the process of rethinking the way we design and manage streets, this report also aims:

- to develop a more inclusive approach – by involving the public and other stakeholders;
- to take the opportunity to be creative – by generating more design alternatives to meet different problems;
- to arrive at solutions that are tailored to each unique area of street space, 'locale', rather than constraining solutions a uniform standardised template.

This Report

This report presents an integrated, people-oriented approach to the design and management of arterial streets.

It is aimed primarily at city authorities and other policy makers, practitioners and consultants with responsibility for the design and management of streets. It gives general guidance on concepts and techniques, at a certain level of generality, which would need to be translated into practice appropriate to the national or city context.

This report suggests principles and demonstrates processes that may be used to conceptualise and classify arterial streets, set objectives for street management, generate design options, involve the public in participatory design processes, and select the best options for onward design.

Implementing some of the principles could imply that national or city authorities would need to substantially change their current approach to street design and management; others may already conform with many of the principles set out here. The report has been devised to present an integrated suite of principles and techniques, though these could be individually selected for adoption in different circumstances.

Arterial streets

Scope

Arterial streets are here taken to mean major streets that are *multi-functional* – combining a strategic network role with space for other activities, such as crossing movements, shopping, socialising, and other urban activities.

This report considers the *physical design* of street space and carriageway layout, *regulation* in terms of allowance for different kinds of vehicle movements and parking and loading, and wider *street management* issues including objective setting, classification of streets and performance assessment. The process of design and management is devised to be compatible with a comprehensive programme of *public participation*.

Design and management towards sustainability.

This approach has been devised to fit a sustainability oriented policy context. In this report, this sustainability aspect is expressed through a people-oriented approach in which social, economic and environmental considerations ultimately serve to promote people's quality of life.

The basis of this report

This report draws from the experience of the ARTISTS project (Arterial Streets Towards Sustainability), as well as from research and practice from within and outside Europe. It includes examples of best practice from a range of streets around Europe, that help to illustrate the ways in which arterial streets may be improved in practice.

The ARTISTS project is part of the Land Use and Transport Research cluster of the European Commission's Fifth Framework key action on the "City of Tomorrow".

The ARTISTS project itself has included a wide range of research investigations, analyses, development of techniques and applications in the participating cities. This report includes a selection of the most significant findings of the ARTISTS project that fit together to form an integrated approach.

The streets principally featuring this Guide are from:
Copenhagen, Denmark
Freiburg, Germany
Girona, Spain
London, UK
Malmö, Sweden
Porto, Portugal
Thessaloniki, Greece

Overview

Following this introduction, Chapter 2 outlines the main principles which underpin the approach, and Chapter 3 sets out in more detail how public participation may be used to influence the design and management of arterial streets. Chapter 4 then sets out a framework for the functional classification of streets that serves to guide the prioritisation of different roles of each individual street. Chapter 5 explains the project stages involved in the redesign process. Chapter 6 suggests ways forward after the ARTISTS project e.g. the need for demonstrating and making the new approaches operational.

At the end of the report are Appendices with more detailed suggestions for application of the approach, and examples from reconstructions of arterial streets in practice. A list of ARTISTS Deliverable reports and further reading are also included.

A series of Deliverable Reports and other documents are available for downloading from the ARTISTS website: http://www.tft.lth.se/artists.

2. PRINCIPLES

This chapter sets out a series of principles which form a 'people-oriented' approach that can guide the design of arterial streets. These cover street functions and street-space trade-offs that serve a variety of different needs.

Street-space

A substantial proportion of urban land is taken over by public space – not only in the historic forms of streets and squares, but in the more modern transport routes and spaces formed by railways, dedicated highways and intersections, car parks, and so on. Despite so much space set aside for public use, the quality and quantity of public space often leaves something to be desired. There is often a feeling that, despite all the space, there is not enough 'place'.

All this space –
but not much sense of place.

Urban land is a limited commodity, and there are often several uses or activities competing for the available urban street-space. These uses include demand for movement of traffic and pedestrians – both along and across the street – and demand for other on-street activities such as trading, sitting, talking, playing, and so on. These movements and other activities may to some extent be in conflict.

Well used and well loved places need not take up much space.

These kinds of activity all need *street space* to accommodate them; and where activities coincide in space they may need to be controlled so that different movements or activities use the same space but at different *times*.

It is the task of street design and management to mediate between competing activities and afford them an appropriate share of space and time. Given the limited amount of street space available, how do we allocate space and time for different uses and users?

In this context, street space may be interpreted as a specific area of urban land taking the form of a street and designated for public use.

In this chapter a series of issues which bear on the allocation of street-space is discussed. This discussion starts by first considering sustainability, then focusing on a people-centred approach, and finally, the need to consider the different users and functions of a street.

Sustainability

Sustainability is one of the underlying drivers for change in the approach to street design set out in this report. However, the concept of sustainability has a diversity of interpretations and applications; and care has to be taken when applying the concept to arterial streets.

Because streets form part of a complementary system, it is not possible to reliably assess an individual street in terms of sustainability without considering its role in the whole system. In other words, it is not possible to absolutely rank one street higher than another in terms of overall sustainability, since each street plays a different role.

For example, a bypass and a pedestrianised old town street form part of a complementary system; the bypass may be necessary for overall economic sustainability, just as the old town street supports local social and economic activity. One cannot simply convert all streets to 'pedestrian streets' or 'local streets' and expect to have a functioning city. The 'most sustainable' solution is not simply to grass over all the streets in the city!

That said, for a given system, it should be possible to design and manage individual streets so that they contribute to different aspects of sustainability, in order to realise greater sustainability overall. This may be done by encouraging the appropriate mix and levels of social and economic activity for an area, while minimising environmental damage.

In this report, the treatment of sustainability focuses on tangible and immediate considerations appropriate for addressing the design of urban streets. These include:

- accessibility for a range of users;
- the street as a destination for social and economic activity, and as a conduit providing accessibility elsewhere;
- promotion of 'greener' modes - bearing in mind not only immediate emissions but also longer term environmental consequences;
- minimisation of the environmental impacts (including accident risk and loss of amenity) due to motor traffic.

This is operationalised through a people-centred approach.

It's not possible for all streets to look like this.

Some kinds of streets or roads for accommodating traffic are also necessary…

For more discussion on sustainability concepts see ARTISTS project Deliverables D1 and D1.2.

Source: Devon County Council (1991) Traffic Calming Guidelines

A people-centred approach

Streets are, in an essential sense, for people. That is, they are not ultimately for serving vehicles, making architectural statements, or creating environmental habitats, *per se*. Street provision may do all these things, but this is always in the interests of satisfying the needs of people, whether through mobility, liveability or any other means.

Conventionally, arterial streets have often been assumed to perform a role that is closely associated with serving traffic movement. However, in recent years, there has been more emphasis on the idea of 'streets for people', which recognises that a wider range of street activities should be considered as being part of the role or function of a street.

To make the idea of ‘streets for people’ operational, there is need for a better way of accommodating and trading-off between different people wishing to use a street – including people in vehicles as well as pedestrians.

A first and most basic step is to start counting all people using the street as ‘equal’. Therefore, instead of using the vehicle or vehicle flow as the basic unit of street use, it should be the individual person that should be the most basic unit, whether that person is in a vehicle or not.

People’s use of streets equates with social and economic benefits

This approach gives the pedestrian equal weight with the cyclist and the car driver or bus passenger. It also gives higher occupancy vehicles a ‘weighting’ proportional to the number of people carried. This logic is compatible with existing approaches that favour public transport modes over private vehicles such as cars because they carry more people.

The benefit of vehicle use is in people getting places. But the vehicles themselves are sources of environmental disbenefits.

In this way, a people-oriented approach can help operationalise a sustainability oriented approach in which higher occupancy vehicles such as buses, and lower impact vehicles such as bicycles, are seen to perform better with respect to sustainability than low occupancy motor vehicles such as cars.

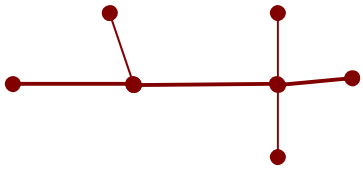
But, even given that some uses may be more ‘sustainable’ or ‘people-oriented’ than others, there is still a need to decide how these different uses - such as different modes of movement, or different land uses - may be allocated appropriate shares of street-space (spatially and temporally).

To do this, we need to look at the fundamental nature of the conflict between street uses.

For a particular street, the more people that use the street and the fewer the vehicles needed to move them, generally speaking, the greater the benefit relative to the disbenefit.

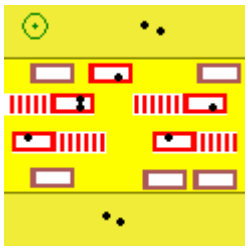
The street section as area

Streets are often conventionally regarded one-dimensionally as links in the road network. While this conception is a useful simplification for the purposes of understanding the movement of traffic in a network, travelling between different origins and destinations, it omits some significant aspects of the street as a place or area. Not least, at the scale of an individual street section, it omits the fact that a street area itself becomes a 'land use', and 'origin' or 'destination' in its own right, and that movement may be across and around the street section as well as along it. The conventional representation of the street section as link has tended to reinforce the linear, through movement function of a street, either ignoring or subordinating the others, as 'collateral' uses of the street.



The street section as a link in the network

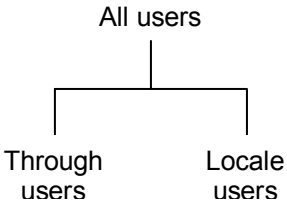
By conceptualising the street as a two-dimensional area, we can better appreciate the scope and potential for street-space to accommodate uses and users other than through movement, and we may be better able to focus on the trade-off before us, of allocating specific square metres of public space to different activities.



A street-space as an area

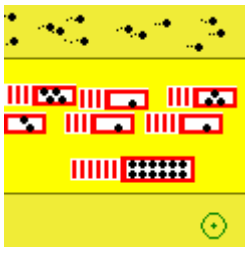
Uses' and users' demand for space

For any particular area of street-space, there will be competing uses, including different kinds of modes of movement, both along and across the street, and different kinds of 'static' activity and 'land use'. While all these are to some extent competing with each other, some are more compatible and complementary than others. To understand the difference between these, we can make a primary division between 'through users' and 'locale users'.



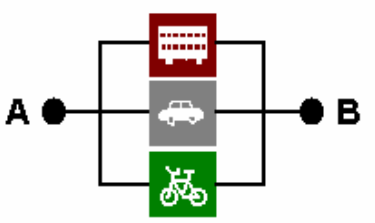
Through users

A 'through user' is someone wishing simply to pass though the street section as quickly and safely as possible. Their essential need is for the street-space to form a *continuous* path or linear *link*, connecting from one end of the street section to the other.

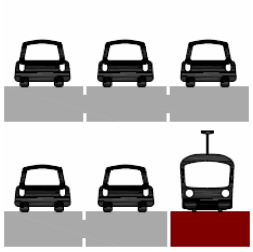


Different modes are used towards the same purpose of getting from somewhere to somewhere else

Through users may be further subdivided by mode of movement, such as pedestrians, cyclists, car users, bus passengers, goods vehicle users, and so on. While there is some competition for use of the available street width, such as between general purpose lanes, bus lanes, cycle lanes and footways, the modes themselves are effectively 'parallel alternatives', in that one typically chooses one mode or the other, to serve the same end.



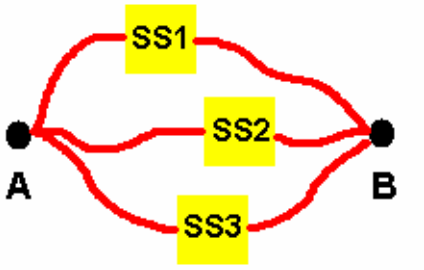
Therefore, the trade-off between rights of way used for different kinds of vehicle users and pedestrians moving along the street is a relatively self-contained transport problem of assessing the different flows and capacities, the proportions of people desiring (or able) to use the different modes for different purposes, and their different consequences for sustainability.



Locale user

A 'locale user' is someone wishing to make use of the attributes of the *particular street area* (locale) as a place – whether in terms of a market place, a play area, a place of 'promenade' or social interaction.

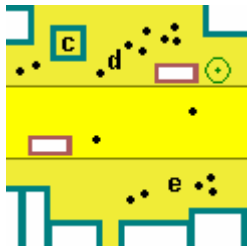
A key difference between the needs of these users is that the 'through user' – although using the same 'area' or 'place' – is simply using the street section as a means to get from somewhere to somewhere else, as it were, via nowhere in particular. If there were an alternative route (such as a parallel adjacent, underground or elevated section) this could serve the same purpose equally well, if not better, than the particular street section that they are actually using.



A 'locale user' of street-space 2 (SS2) needs to use that particular area to fulfil their activity purpose. In contrast, the through user just needs to get from A to B.

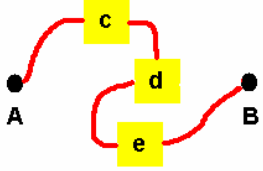
In contrast, the 'locale user' is making use of this *particular space*, and the term 'locale' is intended to convey this sense of immediacy. 'Locale use' implies that the use of a particular space itself fulfils part of an activity or journey purpose – as an origin or destination use – whether the trip to access the location is itself 'local' or 'long distance'.

Locale uses of the street area will include a variety of 'land uses', such as market stalls, as well as flower-beds, seating areas, and other space simply used for occupation by people – or vehicles (parking). Unlike different modes of movement, these 'locale uses' tend to be quite diverse and not interchangeable, for the user's point of view, in the sense that one may expect to do any or all of them, without one substituting for the other.



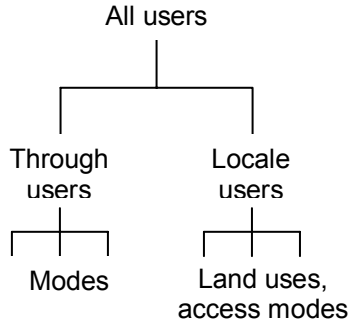
A street-space area accommodates different locale or land uses (c, d, e)

That said, from the supply point of view, the local authority may have to prioritise or substitute one use for another, where there is insufficient space to provide for all.



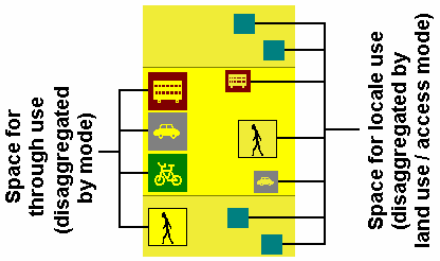
A locale user may access a series of alternative land uses. Each could be an intermediate or final 'destination' that is related to the journey/activity purpose.

The street-space trade-off



In the allocation of street-space to different users, we can consider the primary division between 'through users' and 'locale users'. Through users may be further subdivided into different modes of movement. Locale users may be further subdivided into users of different land uses, or users engaged in different activities.

The allocation of space for through movement, between modes, is principally determined within the transport / traffic planning sphere. The allocation of space between other urban activities may be typically determined within the urban planning/design sphere.

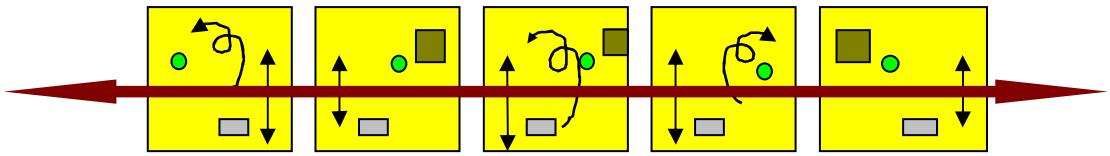


But what is needed is a mechanism for determining an appropriate allocation of space *between* through use and locale use. In conventional practice this is usually done by prioritising one over the other, such as by means of functional classification, where an arterial road will be primarily for 'movement' (through use) and a local street will be primarily for 'access' (locale use).

While this may create a 'balance' overall between these two functions across the road network as a whole, it does not provide a means of balance for an individual arterial street that needs to accommodate both significant through use and locale use. This is because arterial streets have tended to be recognised as being primarily for movement, and hence priority has been set clearly in favour of through movement. In other words, at the scale of an individual section of arterial street, there has not been a balance between through movement and the other functions.

While 'balancing functions' is an abstract consideration, the movement and activities may be disaggregated into individual people and vehicles which have to be accommodated in space and time, just as any other urban activity has to be. The practical effect of this is that when it comes down to individual people trying to use the street-space, not all users are being treated equally. In effect, the person wishing to use the arterial street section for through movement is accorded greater 'weight' or priority than the person wishing to occupy that street-space for other activities (including crossing the street). This is effectively because the 'through user' is recognised as part of a strategic system of movement, and the through movement must necessarily link up linearly from section to section.

Close up, the conflict between abstract 'strategic traffic flow' and 'local urban activity' is manifested as a conflict between individual people and vehicles.



A whole street is made up of a succession of sections. The demand for through movement, common to and continuous through all of the sections, sometimes tends to assume a significance greater than that of any other demand within an individual section.

Street functions

It is the functional designation of a street that effectively sets the balance between the use of street-space for through users (who could use other links to get from A to B) and for locale users (who are seeking to make use of that particular section of street).

Identification of the functions of a street can help prioritise the design and regulation of the street space.

Although this report is intending to better address arterial streets that are, by their nature, *multifunctional*, we should not forget that some degree of functional specialisation can be beneficial, and may be encouraged. This is like a functional 'division of labour', that can boost the efficiency of the overall system, to the benefit of the whole.

For example, if all public space were treated in the same way, then all streets and spaces would be trying to act as traffic conduits, as trading places, as play areas, as meeting places, and so on. These would not necessarily be successful in performing all those roles. But street management can intervene and take, say, two streets, and make one more efficient as a traffic conduit, and the other more amenable as a local environmental space. This can benefit the system overall – although it has consequences for the individual localities.

What we have to avoid is regarding street function *only* or *primarily* in terms of traffic or through movement function. We need a way of recognising and reconciling the necessary 'arterial' functions with the other 'street' functions of the arterial street.

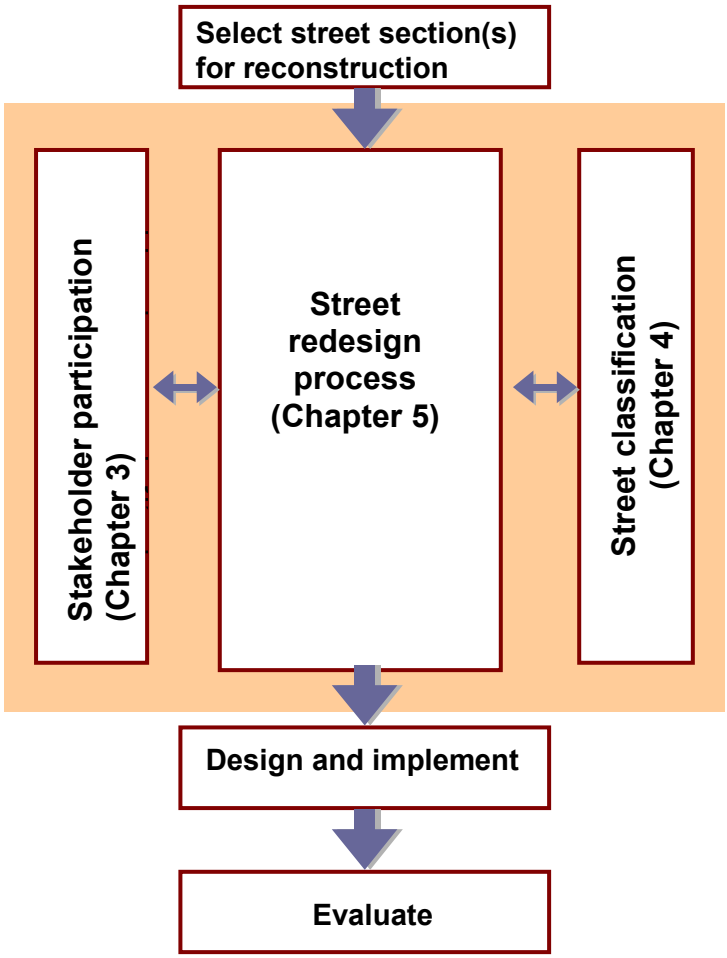
Proposal for defining functional roles in Chapter 4.

We need to define street function in a way that can guide the trade-off of street-space (spatially and temporally) so that it serves both the needs of the immediate locales and the street system as a whole. This should be able to show how priority to through users versus locale users may vary from street type to street type. For some arterial streets, one may outweigh the other, but for others there will be effectively equal priority, that will need to be reconciled in the design of the street.

A process framework

This report sets out a framework in which the processes of street redesign – including setting objectives, identifying problems, generating options and selecting a preferred option – are influenced both by the functional classification of the street and the process of stakeholder participation.

The next two chapters address these latter influences – stakeholder participation (Chapter 3) and classification (Chapter 4) – before detailing the core processes they influence (Chapter 5).



3. STAKEHOLDER PARTICIPATION

This chapter describes the participation of stakeholders in the decision - and design process.

Introduction

An obvious precondition for a people-oriented decision- and design process is to include people both as users of the street and as stakeholders participating in the redesign process.

Stakeholders are "anyone" that is affected by, or can influence any decision or action

Stakeholder participation in the planning and decision-making process can be seen as one of the basic parts of democratic constitutions. The participation of stakeholders in the redesign process of arterial streets is in this respect particularly appropriate as streets are part of the public space. It is also very appropriate as arterial streets combine a high degree of strategic network role with a high degree of local urban activities and are looked upon as multi-use urban spaces rather than single-use spaces.

Local users are usually more aware of problems and needs connected to local functions of the arterial street. Wide user participation in every phase of the design process can therefore ensure that the full range of problems and objectives is considered and innovative solutions are generated. It provides users' prioritisation of function for that street-space, 'locale', and a better public support for the generated solutions. By making a proper selection of stakeholders to the participation events and by involving professional judgement it is possible to balance these immediate demands on street-space role with the urban system function as a whole.

What is stakeholder participation in the redesign process

Participation can be defined as the involvement of stakeholders in the decision making and design process with the purpose of influencing. Stakeholders are “anyone” (person, group or institution) that is affected by, or can influence any decision or action. Key purposes of participation are to improve the quality and efficiency of planning.

At stakeholder participation citizens’ ideas, conceptions, local knowledge, etc. are utilized at the same time as their own knowledge and understanding is raised. Participants gain a better knowledge and understanding of interests of other groups, of transport problems, of technical and regularity constraints and the complexity of planning measures and the need for compromises. Through a greater openness and transparency of the process conflicting ideas are more likely to get thoroughly debated at an early stage in the process i.e. potential objections are minimised. This will ensure a more joint ownership of final solutions proposed which also creates good conditions for a more efficient implementation process.

Initially it may seem as very costly and time consuming to engage stakeholders in the decision and design process but in the long run it will prove to be the other way around. Reviews of existing decision making and design processes show that the most successful reconstructions of arterial streets are projects with early stakeholder involvement and several alternative design options as an output. It is, however, of utterly importance to ensure credibility of the output.

For further information on decision-making and design processes in connection to ARTISTS case studies see deliverables D2.2 and D2.

Participation methods

Typically a participation process is built up of different participation methods (tools) adapted for the objectives of participation, the stakeholders and the stage of the involvement. Participation can contribute to determining objectives, assessing problems, identifying solutions, appraising alternatives, choosing a strategy and implementing strategies. It is, however, important to remember that no method can be used everywhere; Traditions, culture and the legal and the institutional structures have to be considered as well as the scale, the time horizon, stakes and subcultures. The legal status of participation depends on the country and the type of the project.

Stakeholder participation can take place at different levels and in different forms:

1. **Information** (decide and announce) - a one-way process to keep interested people informed about plans.
2. **Consultation** (advice seeking) - where the views of stakeholders are sought and the results are input to the strategy formulation.
3. **Active participation** (agreement seeking) - where the stakeholders work with decision-makers and professionals in formulating the strategies.

More detailed information can be found in reports from EC projects PLUME, PROSPECTS, GUIDEMAPS and TRANSPLUS.

The most frequent use of stakeholder participation in the ordinary redesign project is often restricted to a one-way communication i.e. providing information. This report, based on the ARTISTS approach, points at the advantages to involve stakeholders for consultation and active participation. This means that the discussions here go beyond unilateral information provision, but still retain final control and responsibility for final decision-making in the hands of the city authority.

Consulting and deciding together at a design workshop.

Possible stakeholder groups

User groups and other stakeholder groups within

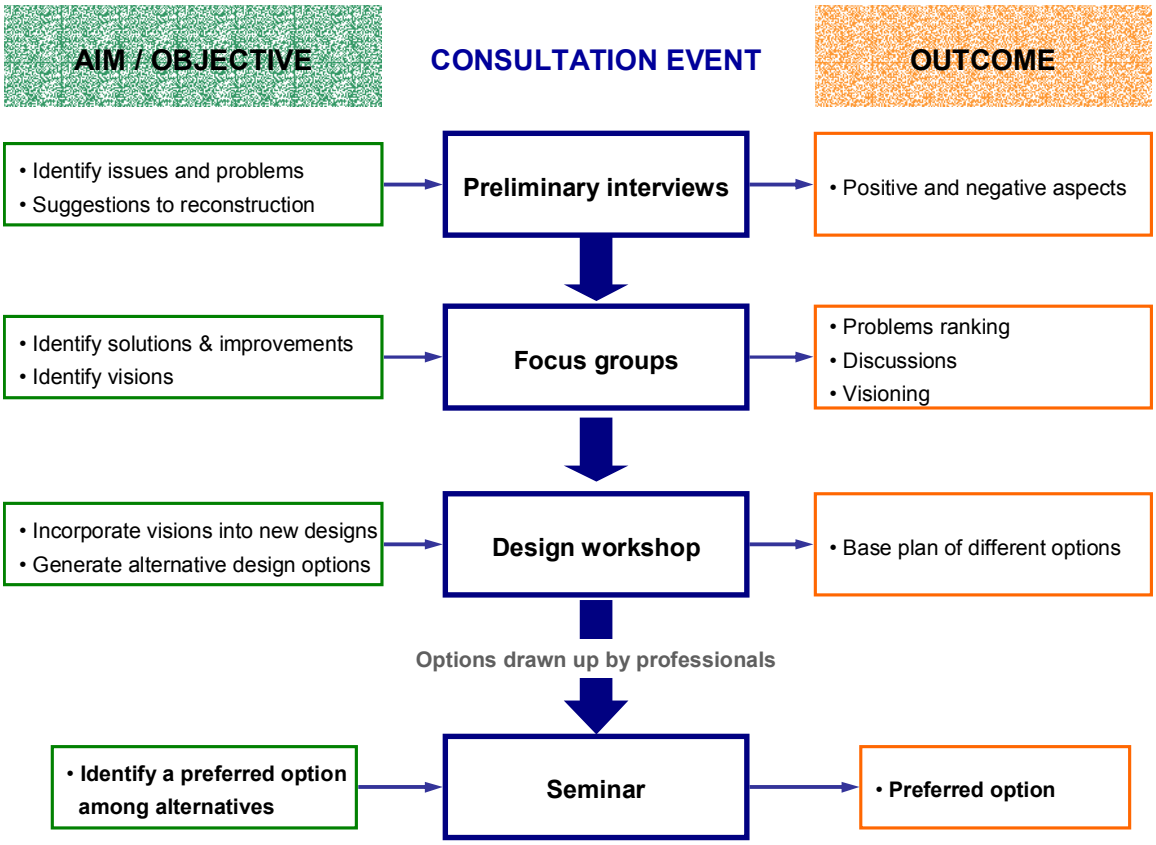
- **Citizens and NGOs:** local residents, pedestrians, cyclists, public transport users, car drivers, visitors of different kind, groups of disabled people, environmental NGOs, motorist associations, public transport user groups, cyclists associations, pedestrian associations, house owners' association, local community-based organisations, local specific interest groups
- **Market:** local van/truck drivers (goods delivery), local public transport drivers, local taxi drivers, local shop owners/street traders (employers and employees), local business employers and employees, transport operators and providers, business associations, local chambers of commerce
- **Authorities:** local transport authority, other local transport bodies, regional government, Ministry of Transport, EU, politicians, professional staff (planners, designers, transport consultants), the police, local road safety council, school boards

Participation should aim at identifying and involving all stakeholders. Groups that often are more difficult but just as important to reach, like; ethnic minority groups, women, low income groups, older, younger and disabled people may need special treatment to get involved. The recruitment may have to be more targeted and the participation methods may have to be adapted towards more informal techniques, small meetings, etc.

The number of stakeholder groups are many. In practice it is of course an impossibility to include all groups in every redesign project. A stakeholder analysis is necessary for selecting relevant groups. It is then advantageous to adapt methods and tools to improve the prospect of these groups actually getting engaged.

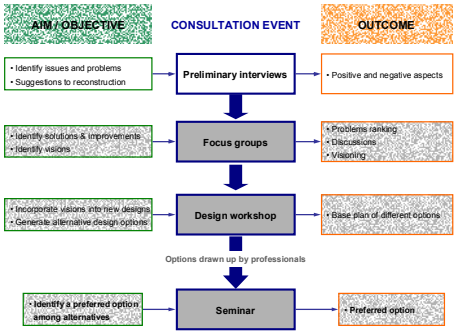
Methods of stakeholder participation in ARTISTS

ARTISTS involved stakeholders to identify problems and needs, to formulate objectives (as part of project brief), to generate alternative design options and to choose option (as part of appraise options). The structure and process of this participation is defined below.



The core stakeholder groups in the ARTISTS participation activities were residents, shop owners, cyclists, pedestrians, bus/tram passengers and car/bus/tram/taxi/lorry drivers. In addition representatives of groups of disabled, motorist associations, cyclists associations, transport operators and school boards were participating at selected events. The participation went beyond information provision i.e. stakeholders were actively taking part in the redesign process.

In the stages of identifying problems and needs and formulating a project brief ARTISTS used two different methods for stakeholder participation to complement the information provided by street data collection. They are preliminary interviews and focus group discussions



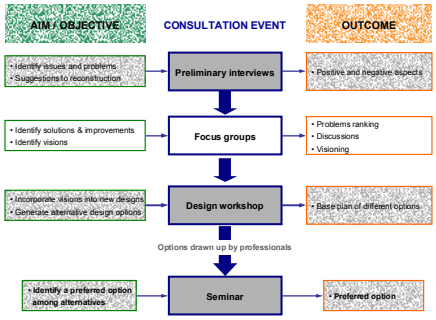
Preliminary interviews aim at assessing widespread public opinion. A survey is distributed to a group of people via a written questionnaire or through interviews in person, by phone, or by electronic media. The limited group of people is considered representative of a larger group. Choice of type of contact approach very much depends on the stakeholder group at target.

In ARTISTS, questionnaires in the form of pre-stamped postcards (free of return) were sent to residents and ship-owners. Other users of the street; cyclists, pedestrians, bus / tram passengers and car / bus / tram / taxi / lorry drivers were interviewed in the street. The preliminary interviews contained a few, open and overarching questions. At this stage focus should be to reach all target groups to (to some extent) make up for less spread in the following stages where it is much more difficult to engage stakeholders. If the main target groups are covered the number of persons interviewed per group can be restricted to 10-15. This is often enough to get a rough conception of the situation at the specific street-space pictured by different stakeholders' own opinions. *Preliminary interviews are further discussed in Chapter 5.2 in connection to identifying problems and needs in the redesign process.*

The workload of handling and analysing open questions is high. Open questions, do on the other hand, invite people to freely express themselves which reduces the risk of disregarding important aspects The results from preliminary interviews,

with a good spread of stakeholder groups, provide valuable information for proper preparation and accomplishment of the phases following in the process.

Focus groups is a structured form of gathering representatives from different stakeholder groups in smaller groups of 8-12 persons. For most people it is less uncomfortable to act in such smaller groups. The aim is to provide the groups with the opportunity to more in detail discuss a pre selected set of topics. In ARTISTS the topics derived from the results of the preliminary interviews. Based on these topics the focus groups discussed the problems with a specific arterial street and different user's needs and visions for the future.

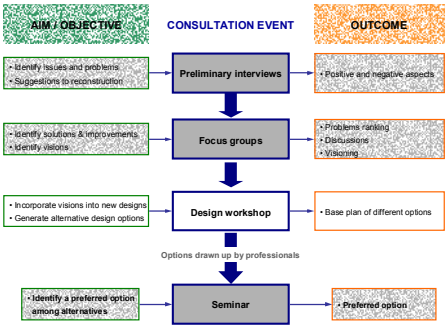


The discussions provided the facilitators with much more detailed information as compared to the preliminary interviews; information that is valuable when formulating the preconditions for the following stage of generating design options. The participants in the focus group discussions were primarily people who in the preliminary interviews declared themselves positive to participate.

Focus group activities in Kalamaria, Greece

Focus groups have, besides providing input to the redesign process, the effect of broadening the understanding of other stakeholders' situation in the arterial street. This raised level of awareness perhaps points towards the advantage of keeping to the same groups of people all through the participation process; time would be saved as some of the introductory formalities could be omitted. A disadvantage, however, by not renewing the groups is that views / visions / solutions might become too narrow and will finally only reflect a kind of common sense within the group, instead of being representative for the whole stakeholder group. *The use of focus groups is further explored in Chapter 5.2 when addressing problems and needs and in Chapter 5.3 when exploring visions to be incorporated in the project brief.*

In the generation of street-space design options, stakeholders participated in the form of **workshops.** The aim was to use stakeholders to identify areas for improvement and to generate ideas that may have been overlooked.

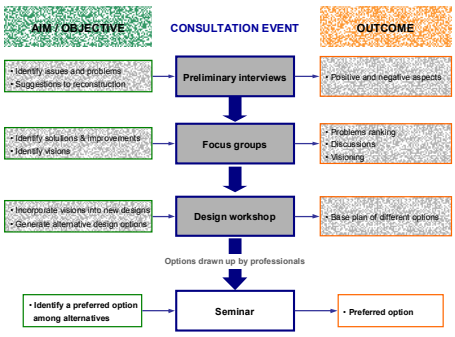


Stakeholders can, again, add the local touch to the design. Stakeholders were split into groups of 5-7 persons with mixed interests and gender. The groups were provided with material to practically build up own street sections. To get inspiration the groups were provided with posters of reconstructed arterial streets and information sheets on design elements. *See Appendix B for more information about developed design tools*.

A design workshop in Kalamaria, Greece

Before starting the workshop participants were informed of the frames and preconditions for the design process i.e. the results from the previous project stage; the project brief. Participants were also told how their designs were going to be used by the professionals – how their ideas would be incorporated into professional designs.

For many participants the struggle for space and time within the scarce street-space becomes evident with such exercises. A very valuable output from the workshop was the recognition of professional planners' work. The workshops were, however, not extensive enough (mostly with regard to time) to bring forward completely new and innovative design solutions. Many details in the street design were on the other hand interesting enough to provide valuable information to the professional planner. *For more information about the workshops see Chapter 5.4*.



In the last phase of the redesign process, when appraising the options, stakeholders were invited to **seminars and / or exhibitions** to vote for preferred solution. The foremost aim of this exercise was to get a wider acceptance of the whole process. By making a more widespread invitation to an event where the alternative design options are presented and preferred solution voted for, it is possible to at least give stakeholder groups that have not been represented earlier a chance to influence the final design. It might, furthermore, be a form of participation that better suits these groups of stakeholders. The participation form here is partly different to the previous ones as the objective is to react and not make own formulation. *For more information about stakeholder participation in the appraisal see Chapter 5.5.*

An exhibition in Kalamaria, Greece

Things to consider when running a stakeholder participation exercise

Principle considerations

- Stakeholder participation takes time and must be allowed to take time if this type of engagement is to be used at all in the planning process.
- Before starting out it must be carefully considered ***why***, ***where*** and ***when*** to involve stakeholders.
- All along it must be remembered that stakeholders - even if they are paid for participating - are providing us with their time. Participants want to know that the time they have committed and input they have provided will be used and will make a difference, and possibly influence the outcome of the project.
- Technical prerequisites and constraints - what is negotiable - must be clear to all parties involved; to avoid raising false expectations
- Politicians and other decision-makers want to know when in the process they will have access to the output and the credibility of the output
- See the different phases in the consultation process as one process thus it could be valuable to have participants who have been involved in all stages in the process
- Despite the involvement of very competent stakeholders, do not forget that the professional still holds the final responsibility - a final responsibility that never can be totally handed over to non-professional stakeholders.

Practical considerations

- Participants must be aware of the whole planning and participation process to fully understand their role in it.
- If possible and without jeopardizing results of previous negotiations, target the exercises to the interests and composition of your audience
- Ensure widespread representation among relevant stakeholder groups
- Be aware of the possible limited scope for dealing with a single street / section; make sure that participants are familiar with this street / section
- To avoid sessions from running out of time it is needed to be realistic about what can be undertaken and how long each activity is likely to take; thus to be very clear about the objectives and purpose of each exercise
- Have clearly defined roles of project staff in consultation events (e.g. event host, technical facilitator, demonstrator, information recorded)

4. CLASSIFICATION OF STREET FUNCTION

*This chapter presents a general framework for the classification of streets, which may be used to inform the design of street-space. This classification takes into account the relative significance of any particular street section both as a **link** and as a **place**, relative to the whole street system.*

Objective

The objective of this classification is to identify the appropriate functional role of a particular street section, in order to be able to decide how best to trade-off the street-space and time.

Given that each street section will have slightly different physical form and slightly different patterns of use, it is necessary to have some rationale for deciding one way or another which functional class or category any particular section of street should be placed in.

Basis of classification system

The fundamental basis behind the classification involves the linking of two ideas:

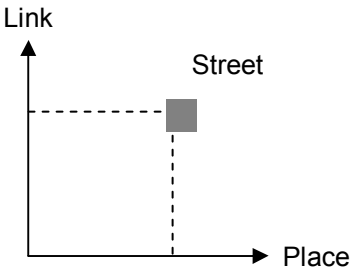
(1) Any street section has a combination of *link status* and *place status*; these are independent (rather than one being the inverse of the other); and

(2) Link status and place status will depend not only on the immediate attributes of the street section (including physical form and use), but also on their role with respect to the wider street and urban system considered as a whole.

The next two pages discuss first link status and place status, after which these are combined to form a single classification system.

Arterial streets typically have multiple functions

While street-space forms a continuum, functional classification can help to distinguish discrete sections and routes.



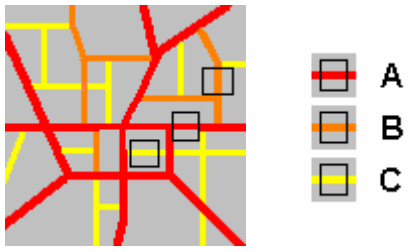
Classification based on a combination of link status and place status.

Link status

Link status denotes the relative significance of a street section as a link in the network. It is effectively based on its scale of significance within the network it belongs to: for example, local access street, district distributor, city arterial. In principle this could relate upwards to a (inter)national scale of significance.

In a people oriented perspective it is important to not only regard link in terms of motorised traffic but in terms of cyclists and pedestrians as well i.e. link function can be fulfilled by different ways of moving along. It is, however, primarily for car traffic the tradition of designating road 'hierarchies' exists – an approach to be further explored for other means of transport. The designation of the status of a particular link will be determined by its role in the network structure.

Conventional classifications and road hierarchies may sometimes be presented as if they related to 'movement' or 'mobility', but the actual designation is more commonly based on a version of link status (sometimes referred to as "network function" or "strategic function"). Therefore, the link status as presented here may be a restatement of (some) conventional practice.



A three level 'hierarchy' based on link function. The levels could represent, for example, city roads (A), district roads (B) and local roads (C).

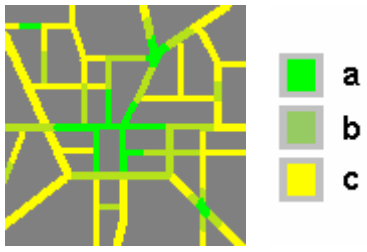
The topological basis for road classification is discussed by Morrison (1966) and Marshall (2004). See also ARTISTS D1.1.

Place status

Place status denotes the relative significance of a street section as an urban place in the whole urban area. For example, a street or square may perform a city-wide role or a more local role. Therefore, the place status is – like link status – related to geographical scale with regard to frequency and type of use, and in principle relates upwards to national or international scale significance.

There is no direct equivalent to place status in conventional street classifications or road hierarchies. However, the designation of status of place is often carried out by urban planners or geographers when ranking places in other contexts – for example, nominating a 'district centre'. The designation of place status is no more or less subjective than the conventional designation of road function.

Whereas the link status of a route will tend to stay constant over the length of a particular street, place status will vary along a street, and could be different in principle for each locale. Indeed, street sections can be defined by changes in place status along a given street, as well as by changes in link status.



A three level 'hierarchy' based on place status. The levels could represent, for example, places of city scale significance (a), district centres (b) and local centres or places of local significance (c).

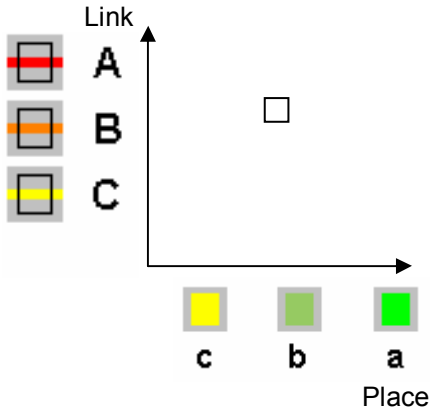
The two-dimensional framework

Each street section is classified according to its link status and its place status. In accordance with the way they are defined, these are independent variables. They can therefore be arranged as a two-dimensional classification framework, rather than the linear ranking typical of conventional practice.

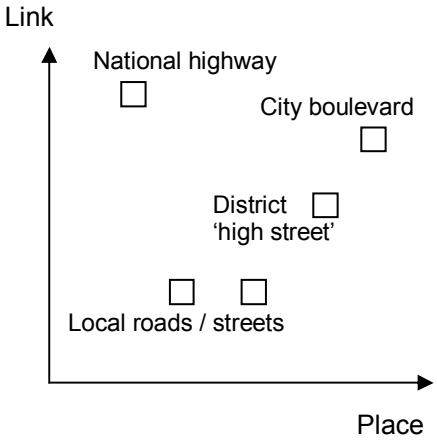
Link status and place status are both ordinal entities (i.e. they can be classified in order in a ranked scale); although they may well be informed by contextual data, including quantitative data, they are in the end allocated by designation. This designation is based on geographical significance in both cases, so both axes have the same scale. This puts link status and place status intrinsically on an equal footing, therefore allowing a real sense of balance between 'right of way' versus 'right of place'.

From this kind of plot it is therefore possible to distinguish different *types* of street. These types are defined by their combination of link and place status. Such a typology includes the general class 'arterial street' and within this a series of sub-classes or individual types of arterial street.

These types may be represented as 'cells' in a 'periodic table' of street types. The number of types recognised (related to the number of levels recognised) and their labels would be tailored to each city's context of application. Here, a generic notation is used to demonstrate the two-dimensional basis of the classification. However, in practice, each institution or language would use its own tailor-made labels.



Each street section (locale) is classified according to two criteria: link status and place status.



Different types of street can be recognised according to their combination of roles as link and locale (place).

ARTISTS street classification table

Link status \ Place status	Local	Neighbourhood	District	City	National
National	Ie	Id	Ic	Ib	Ia
City	IIe	IId	IIc	IIb	IIa
District	IIIe	IIId	IIIc	IIIb	IIIa
Neighbourhood	IVe	IVd	IVc	IVb	IVa
Local	Ve	Vd	Vc	Vb	Va

Arterial roads/ways
Arterial streets
Non-arterial roads/ways
Non-arterial streets

ARTISTS Functional Classification

The street-space trade-off

The two-dimensional system of classification provides the framework for deciding which types of design and regulation will apply to a street section. This will be affected not only by the present demands placed on that street section (e.g. for traffic along or pedestrians across the street), but also by future expected demands and the relative significance of the street section's status as a link and place relative to the rest of the system.

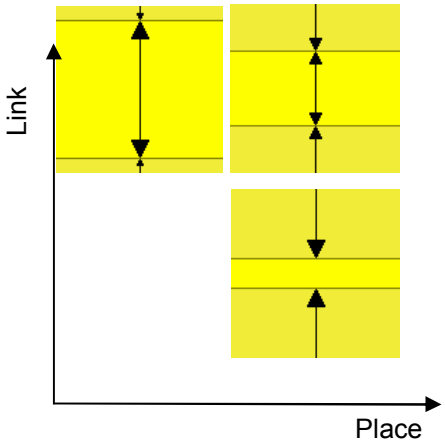
This has the effect that it would be possible – in principle – to have two street sections with *identical* vehicle flow and pedestrian activities, but which nevertheless would have different functions relative to the whole street system, and hence be classified differently. Therefore, in the system presented here, two streets with the same form and use, but which are classified differently, could well have different design solutions.

This classification is therefore different from one based (only) on form or use, which would tend to classify two street sections with the same form and use in the same category.

In other words, the street-space trade-off is not a simple mechanistic decision by which a given traffic flow *x* implies a width *y* or time *z*. There is, rather, a sense of feedback between each locale and the whole system, between supply and demand across the system.

Any street section can be judged as to whether its link status is relatively more significant than its role as an urban place. This is used as a guide to influence the trade-off of street-space within the street section:

- Streets with higher link status relative to place status may allocate a greater proportion of street space and/or time to through traffic;
- Streets with higher place status relative to link status may allocate a greater proportion of street space and/or time to pedestrians, crossing movements, other street activities, etc.



Trade-off of street-space at the micro level is guided by the role of the street determined at the strategic (macro) level

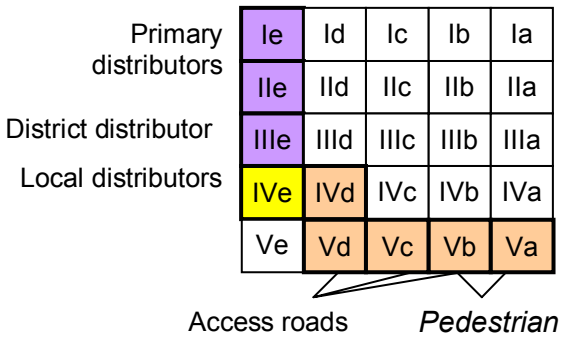
Wider running carriageway – suitable where there is a higher value of link status relative to place status

Narrower running carriageway – suitable where place status is high relative to link status

Relationships with road or street classifications

The classification system outlined here can accommodate a variety of existing street types – including those based on form or use – and in principle can be applied to any street system. There now follow two examples of mapping existing road or street types on to the 'ARTISTS classification table' based on link and place status.

An interpretation of the UK road hierarchy



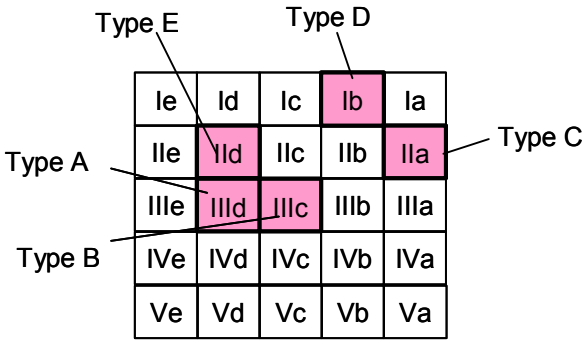
This hierarchy is from the UK guidance manual Transport in the Urban Environment (IHT, 1997)

In this interpretation, the distributor roads are assumed to have little or no 'place status', while streets and squares of any urban significance are assumed to have low link function.

Examples of street types empirically derived from ARTISTS project

For a set of 48 streets consisting of 126 street sections data was collected on street-space descriptors and performance indicators. The data was analysed with cluster analyses where five recognisable categories of arterial streets were identified which potentially could be mapped to the classification table as follows:

For details of identification of street type by cluster analysis, see ARTISTS Deliverable D2.1.



Type A – Low intensity street

Example: Rua do Campo Allegre, Porto

Functional class:
IIId - district link, neighbourhood place.

Type B – Narrow inactive old street

Example: Rua do Monte dos Burgos, Porto

Functional class:
IIIc - district link, district place.

Type C – Shopping street

Example: Carrer Arago, Barcelona

Functional class:
IIa – city link, national place

Type D – Metropolitan arterial

Example: Marylebone Road, London

Functional class:
Ib – national link, city place

Type E – Suburban residential arterial

Example: Nobelvägen, Malmö

Functional class:
IId – city link, neighbourhood place

The foregoing demonstrations show that the classification system presented here is capable of accommodating both conventional 'theoretical' types, and actual streets identified from empirical observation – street types like the 'metropolis arterial' and arterial 'shopping street' – that do not actually fit into conventional classifications.

Professional and public roles in classification

Link status

Classification has traditionally been carried out by roads authorities. In the system set out here, it is expected that the designation of link status would ultimately remain the responsibility of the roads authority. However, the process of judging link status should also ideally involve others with a stake in the role of the streets. That is, the exercise of selecting which links should form routes of different levels of strategic significance can be informed and influenced by other professionals such as planners, and by the public.

The designation of link status could take inventories of existing road, public transport, bicycle and pedestrian transport networks as a starting point, or a participative exercise could start with a 'blank' (unclassified) plan of the city and work through the procedure suggested in Appendix A. Such an exercise could help to take on board not only the opinions of local people about the arterial streets in their own local area, but about arterial streets across the whole city. This could help to balance the interests of stakeholders representing local street users, and citizens who need to use other people's 'local' streets for through movement.

A street seen by one person as a 'local place' will be seen by another person as a potential 'through route'.

Place status

The judgement of the place status of a locale is most likely to be appropriately carried out by the city planning authority, which normally is charged with making decisions of urban status and land use. This judgement may be also informed by other professionals such as the roads authority, and the public.

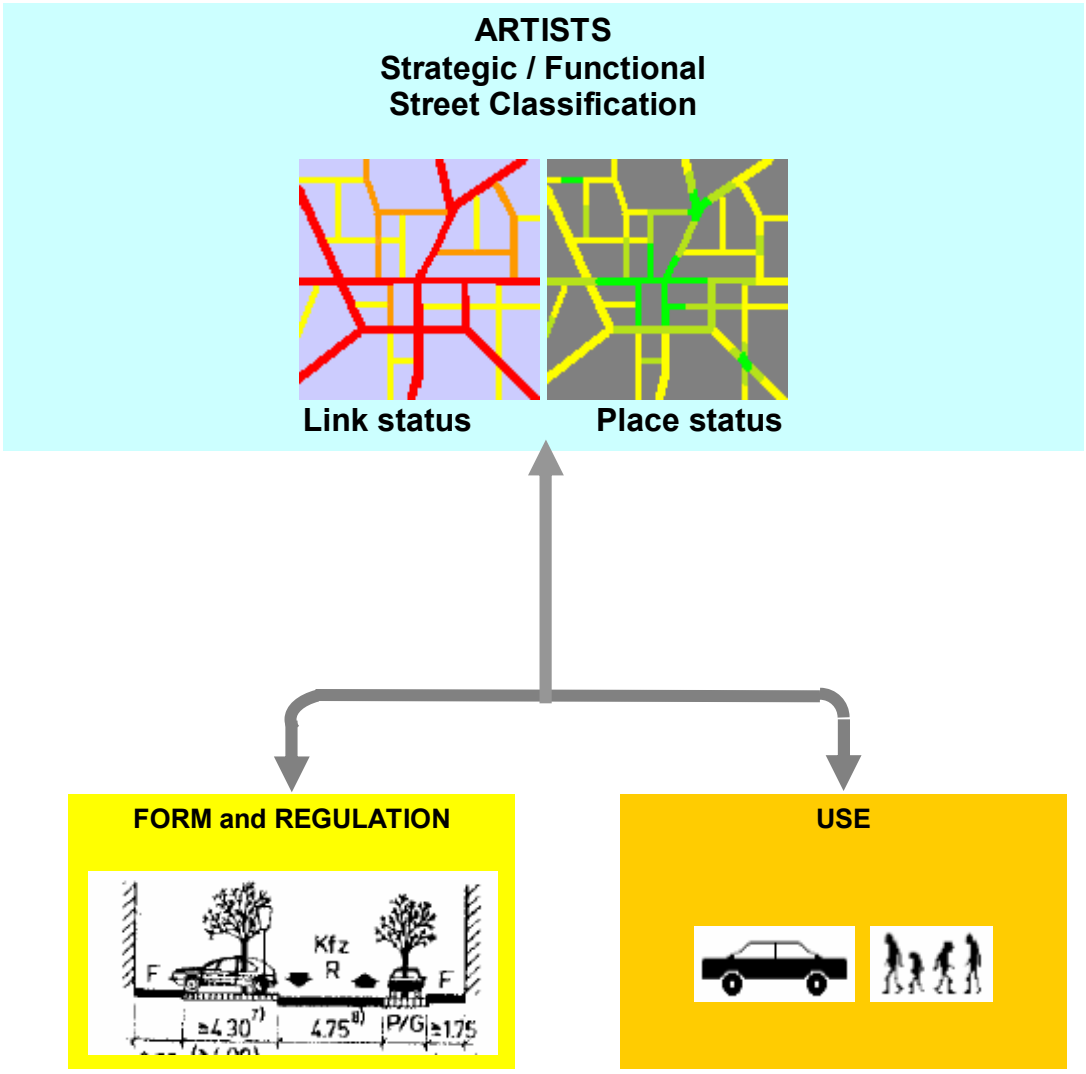
In this case, as part of the overall public participation process, members of the public may be consulted on what they consider to be the most significant places in their local area, their district and their city. By involving people from different areas across a whole city, it is possible to build up a picture of those places, that are significant only to people within a given area, and those places that are considered significant to all citizens. The results from this exercise can inform the professional planners' assignation of place status.

Link between strategic function and design

The strategic function set in terms of link status and place status can be used to guide the design of street sections.

Design of a street section involves manipulating the form and regulation of the street to accommodate uses.

The process of design is described in Chapter 5.



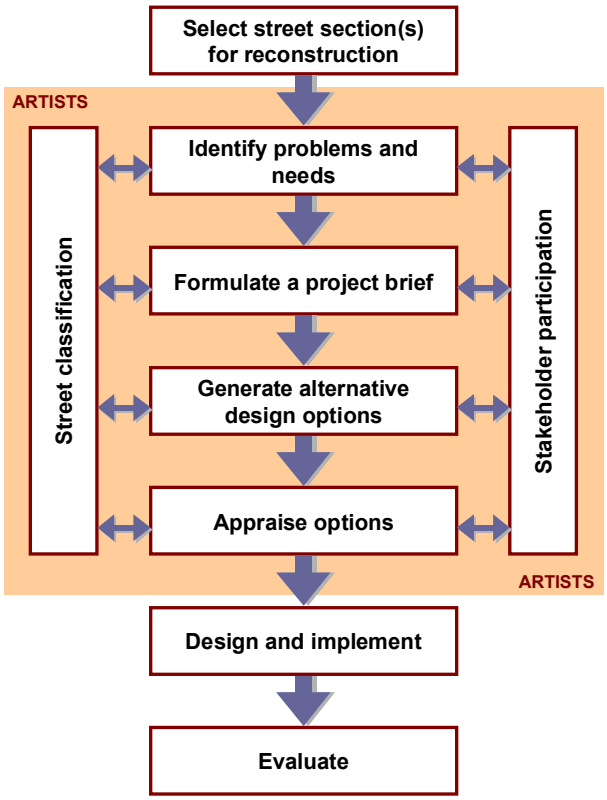
Use, form and regulation
refer to
the individual street section

5. PROJECT PROCESSES

This chapter describes the stages in the redesign process, the relationship between these stages and stakeholder participation and classification. It also outlines the parts where ARTISTS makes a contribution.

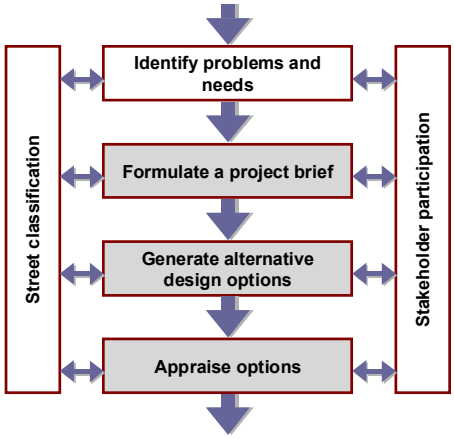
5.1 Overview

The redesign process goes though the stages of: selection of site for reconstruction, identification of problems and needs, formulation of a project brief, generation of alternative design options, appraisal, design, implementation and evaluation. The tasks at each stage are solved by surveys, studies at site and stakeholder participation. Out of a complete decision- and design process (see figure below), ARTISTS contributes with knowledge to the parts enclosed by the marked box. For each of these project stages, tools for stakeholder participation have been developed, tried and evaluated by participants and facilitators at six arterial streets in European cities. More detailed information about the relation between these project stages and stakeholder participation and street classification can be found under each project stage headlined 5.2-5.5.



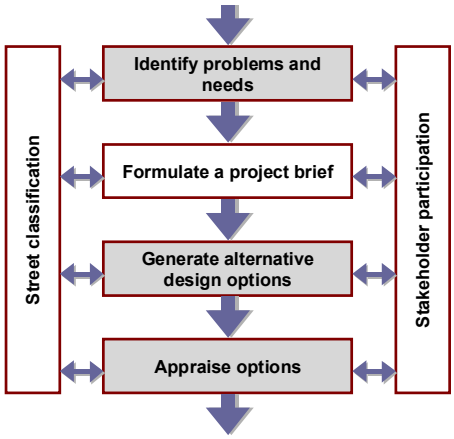
Problems and needs

After the selection of site for reconstruction the first activity is to identify the present status of the street based on objective descriptors of the street, various stakeholders' subjective perceptions of the very same street and different aspects on sustainability. The significance of the problems and needs in the street depends to a great extent on the accordance between actual and intended use / function of the street. (To be further explored in chapter 5.2.)



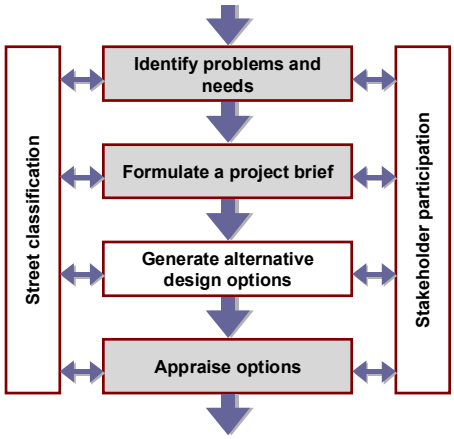
Formulate a project brief

The formulation of a project brief sets out the frames, preconditions and objectives for the design exercise. The objectives for redesigning depend on the present and expected functions of the street and interest groups' views. The prioritisation of function can be an important tool for decision-makers to declare intentions and aims of the city authorities, such as; is the link status to be down graded generally; where is place status to be superior to link status and vice versa, etc. This should of course be balanced with users' visions and preferences regarding function. (To be further explored in chapter 5.3.)



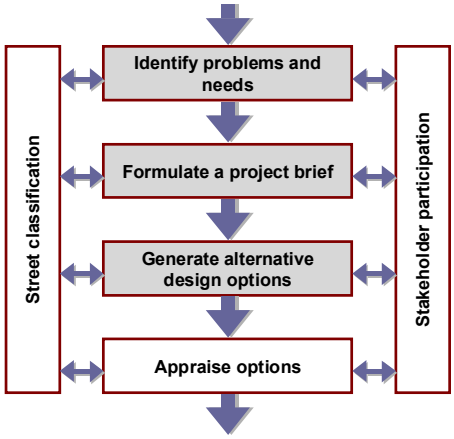
Generate alternative design options

The design exercise is a tool to declare the management of the arterial street in terms of allocating use of street space and time; thus making a trade off between different user groups. The trade off is influenced by the designation of link and place function, the visions and aspirations for the street (objectives), taking into account the available street space, existing constraints, and existing users and interests. (This stage is thoroughly described with practical details in chapter 5.4. Developed design tools to facilitate for stakeholders to participate are further described in Appendix B)

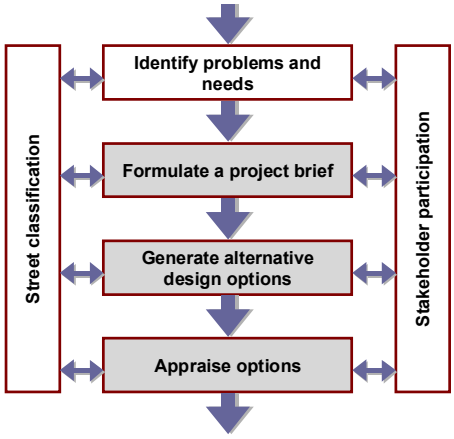


Appraise option

When appraising the different design options to select the one for further development and implementation any possible conflicts that may occur as a result of the design must be considered. If the appraisal shows that the street design doesn't meet the objectives the design and regulation have to be adjusted to meet the function or the function has to be redefined. (To be further explored in chapter 5.5.)



5.2 Identifying problems and needs

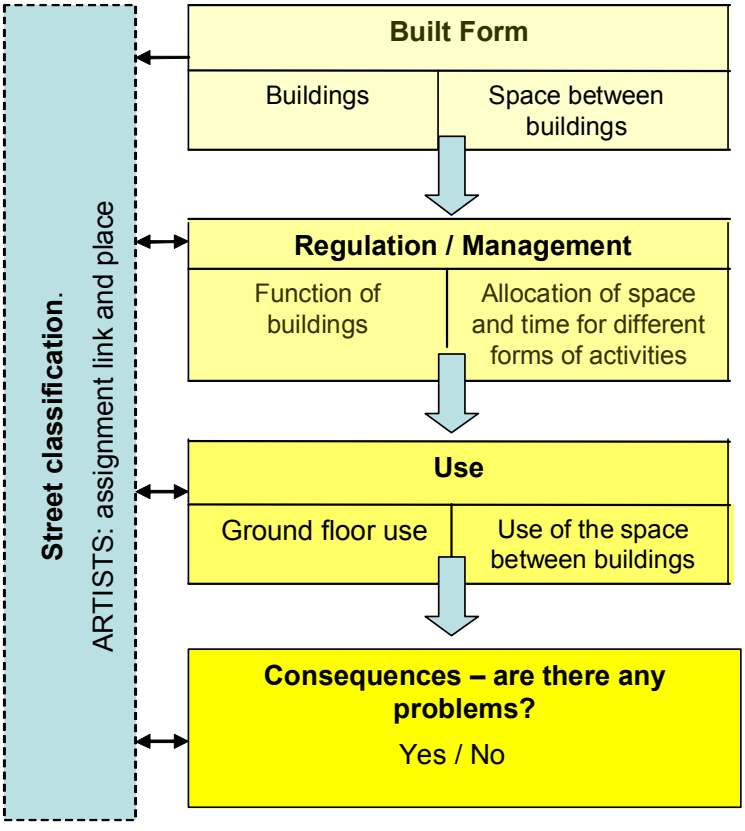


The first stage of a reconstruction process is to select site(s) for reconstruction. The reason for selection is often due to a gradually increased understanding of the site not functioning as intended due to the current use being different compared to the use the street once was designed for. Another reason could be that the values of what is acceptable performance have changed. The phase of identifying problems and needs is the second phase of the reconstruction process. This phase takes its starting point in the detected problems mentioned above, then collects and analyses objective and subjective data and analyses the situation with regard to sustain-ability. It then hands over these results for the setting of objectives in the next stage.

DATA COLLECTION

To get a thorough basis for describing and analysing the problems and needs at the site, information has to be gathered. This information should consist of both objective data obtained through traditional data collection and subjective data obtained through surveys with users of the street.

Objective data to describe the street



Built form provides the physical foundation on which classification and regulation/management operates; it also provides an ultimate physical constraint on the type and intensity of activities which may take place.

Management/regulation applies to the function of buildings, infrastructure and public space. It effectively adds an extra layer of intervention, that comes between form and use.

The **use** indicate how people use streets by using the physical buildings and spaces, moderated by any regulations.

The ultimate **consequences** due to built form, regulation/management and how the street is used; are there any problems or not. Here consequences in terms of e.g. too high speeds, accidents or emissions are measured and fed back into the system in order to assess whether a change is warranted or not.

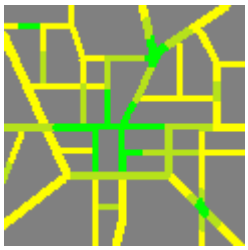
Type of objective data, their internal links and relations to street classification

Street classification has an important role here as it strongly relates to various descriptors of the street. Classification can be seen as the regulator in the system. By going back and redo the classification i.e. based on today's needs and interests and by taking the whole city system into consideration, we would probably get different input for the regulation and management of the street (the design of the street), the use of the street would be different and the consequences would change accordingly; hopefully towards less problems.

Let's just for a moment take one step further back and consider the relevance of street classification for the whole redesign process. Instead of classifying each section in the urban street system ad hoc, i.e. as they become subject of reconstruction, it would of course be advantageous to have a more overarching approach. This means that street classification could be a part of the city planning policy.

This implies that the **actual first step** would be to map the whole transport infrastructure i.e. the infrastructure for car traffic, public transport, pedestrians, bicycles and freight. For each network the significance of its specific links and the significance of its specific places would be determined. Thus, each section of the street would get a link status and place status that is based on specific local aspects while considering the significance of the wider city system. **If** such inventory for the whole city is done, then a lot of work can be saved when other sites are up for reconstruction and consistency in judgement over time and place is to some extent secured.

link status



place status

Designate link and place status for the whole city network

According to figure on the previous page, the objective data collected to describe the street, can be categorised into:

The ***built form*** gives the user of the street an apprehension of the street scape, the framing of the space. These descriptors influence the performance / sustainability of the street indirectly. The number of doorways and percentage of active frontages can, for instance, indicate to what extent the surrounding buildings contribute to the activity in the street.

*Example of **built form** descriptors: height of surrounding buildings, space between buildings, number of doorways, percentage of active frontages, width of the street, greenery.*

The ***management / regulation*** descriptors present the current management, allocation of street space and the main functions of the buildings.

*Example of **management/regulation** descriptors: one- or two-way traffic, type of control at intersections, speed limit, number of lanes and width of lanes allocated to each mode.*

The ***use*** descriptors present the actual use (type and frequency) of the street. When the focus is to design the arterial street for people it is important to collect data that describe the flow of people and not by habit only collect flow of vehicles. The collected data should describe movement along and movement across the street as well as other activities that are not transport related like window-shopping, resting, etc.

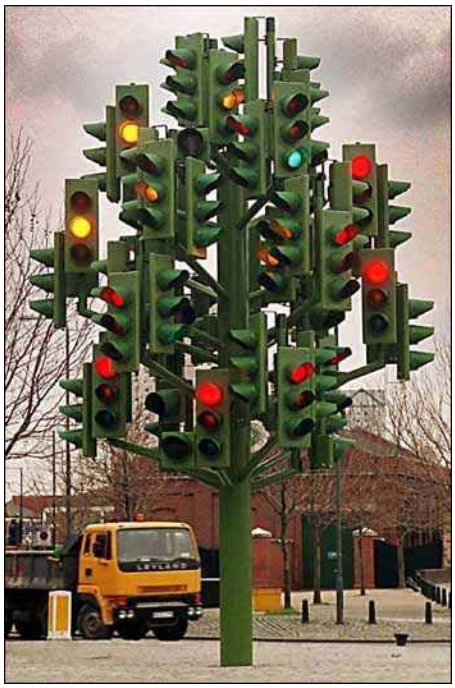
*Example of **use** descriptors: flows of people and vehicles, speeds, type of activities in the street and ground floor use in the buildings.*

The ***consequences*** indicators describe how well the street performs and indicate also whether problems can be anticipated or not. This information is then fed back into the system to e.g. propose changes in the classification of link and place function to better harmonise with actual use to improve performance. (More on this later when sustainability is discussed)

*Example of **consequences** descriptors: accidents, speeds, emission.*

Subjective data – Stakeholder participation

When objective facts about the street is collected and analysed, the process starts to get to know how the users of the street perceive the situation as described objectively. The aim of stakeholder participation in the problem and need definition phase is to understand the situation from the users' perspective. Stakeholders concentrate during this process not only on problems, i.e. what they dislike about the street, but also on the positive aspects, i.e. what they like about it.



The process of participation in this phase in the ARTISTS demonstration cases contained two steps:

1. *preliminary interviews* to collect information from a large group of users
2. *focus groups* in which a smaller number of stakeholders could brainstorm and express their concerns about the street

Preliminary interviews aim to get a rough picture of the situation at the street or street section reflected by different stakeholder groups. Here more emphasis should be put on getting a good representation of different stakeholder groups rather than to get a high number of interviewees per stakeholder group. Results from preliminary interviews in ARTISTS conclude that it is probably enough to interview about 10 people from each stakeholder group to plan and prepare the focus groups properly. These preliminary interviews may very well be short, it is often enough with a few but overarching questions.

The following table presents the results of the preliminary interviews carried out in London, UK, among residents, local businesses and users of the specific street. It illustrates that both problems and advantages of the place are partly common for the three groups, partly specific according to the way they use the street.

	Residents	**Businesses**	**Users of the street**
Common problems	volume of traffic, traffic noise, air pollution		
Specific problems	unattractiveness of the street	lack of parking provisions	unattractiveness of the street
Positive aspects	frequency and reliability of buses		
	local shops	local shops	ease of getting on and off buses
To be improved	more space for buses, pedestrian facilities, more parking space	more space for cars and lorries, parking and loading facilities	wider footpaths, crossing facilities, more space for buses

In a ***focus group discussion*** representatives of different stakeholder groups are gathered into smaller groups of 6-8 persons. The purpose is to more in detail discuss certain pre-selected topics, in our cases derived from the preliminary interviews. Here the aim of the focus group was to:

- identify additional issues as compared to the preliminary interviews,
- gain deeper understanding of 'problems' and 'positive aspects' in the case study street

Participants of focus groups in ARTISTS were pleased to face representatives from different user groups, it was challenging for them to be confronted with different views. They also expressed that their own apprehension of the street was broadened and that it was fruitful to both discuss positive and negative aspects.

Detailed information about running a focus group can be found in "ARTISTS Participation Forum Guide, WP3 - Focus group 1 and focus group 2")

The following table presents the summary results of focus groups held in London, UK, (in the same area as the preliminary interviews presented above).

Good aspects of the place	Multicultural and shopping mix; great for public transport and linkages; cultural diversity, shops, food, people; leisure facility
Bad aspects of the place	Air pollution – stationary traffic; unsafe – no surveillance; narrow pedestrian pavements; fear of accidents
Priorities	High volume and speed of traffic; traffic noise; community severance caused by the road; narrow pedestrian pavement; traffic reduction; pedestrian vehicle conflicts; cleanliness/ maintenance; personal security; rubbish/ litter; shops/services-area improvements; more parking.

Focus groups held in different European cities in the frame of ARTISTS confirmed the varied nature of “problematic streets”. The problematic arterial street is one that fails to meet the needs of the users of either or both the local and the broader city system. The needs and failures to meet these have to be defined locally. The problematic/non-problematic street is not a black and white issue. The number of people whose needs are not being met, the number and types of needs that are failing to be met, and the degree of that failure are the decisive factors. The two functions of the street i.e. ‘moving’ (link) and ‘residing’ (place) were reflected in the comments of the participants. Generally their emphasis was on place function and on the negative effects vehicle movement has on this. This however is not surprising in the light of the types of participants; they were mostly residents with a few business owners.

Car drivers belong to a powerful group when it comes to lobbying in connection to reconstructions but is also a group that rarely gets involved in public participation activities. Car drivers driving along the case study streets were invited to the ARTISTS focus groups but very few showed up.

SUSTAINABILITY of the street performance

When objective and subjective data are collected we know much more about the situation in the street and can link this to the three aspects on sustainability namely; social, economic and environmental qualities. In connection to the two classification dimensions (se table next page) we can talk about:

Sustainability of the link function; meaning efficient, safe and environmentally friendly modes of travel.

Sustainability of the place function; meaning that people can use the street for activities other than traffic, and the street provides a secure and healthy environment for those activities.

If for instance stakeholders express that the street performs less satisfactory from a social point of view then it might be worthwhile studying the variety of activities and the number of people involved in these different activities. If improvement will be based on this aspect then this is also the indicator to follow up after the redesign.

Social sustainability			
Link function	**Indicator**	***Place function***	**Indicator**
Safety of vehicle occupants	car accidents	*Personal security*	crimes on the place
Safety of pedestrians	pedestrian accidents	*Activities in the street*	variety of activities
Vehicle speed	85% speed level	*Presence of people*	number of people involved in activities other than walking along
Economic sustainability			
Movement efficiency along the link	the ratio of the flow of people to AADT	*Viability of the place*	rents and sales
Delay along the link	delay of vehicles and pedestrians along the link	*Delay across the link*	delay of vehicles and pedestrians across the link
Environmental sustainability			
Air quality inside vehicles	concentration of relevant pollutants	*Air quality on the sidewalk*	concentration of relevant pollutants
		Noise level	dB(A)
		Greenery	indication of how much greenery there is

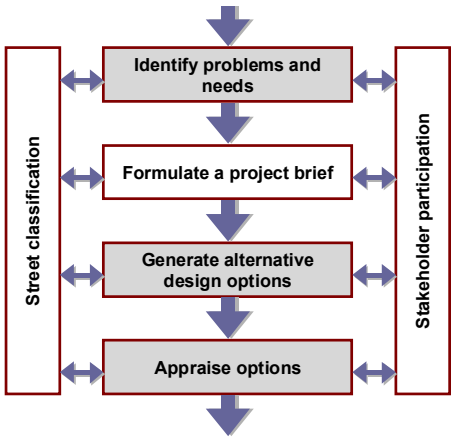
Performance assessment is not simply an indication of different aspects of sustainability, but an assessment of sustainability relative to target function, as defined through classification. This means that different streets with the same performance indicators could be interpreted as having different levels of performance, if those streets have different target functions. Assessment can therefore be used to help judge if a particular street section has the right balance in accommodating the different activities relative to its strategic importance as a link and as a place in a wider system

Output

Based on street descriptors and output from stakeholder participation, the “identifying problems and needs” phase hands over an analysis of the prevalent situation in the street with regard to sustainability, to the setting of objectives in the next stage.

5.3 Formulating a project brief

The project brief sets out the frames, preconditions and objectives for the design exercise. Here the aim is to define desired functions and priorities of the street. It draws on the findings from the problem identification stage, stakeholder participation and professional input.



Frames
This stage includes professional input on geographical coverage (the street section(s) to be redesigned and area of possible impact), specific requirements or constraints on the design solutions, the timing of the exercise, details of the allocated budget, etc. The information to stakeholders about restrictions must be balanced regarding content. Too strict restrictions will of course take the sting out of the stakeholder discussions. It will on the other hand substantially damage the confidence between the city and the stakeholders if facts like these are not presented at all.

Objectives
Objectives of the study are set by drawing on the identification of problems, the views of stakeholder groups, any relevant policy documents and statements, and from the judgements of professionals involved in the study.

Local policy documents might contain goals for the city regarding link and place requirements for a certain street or section of the street; significant foreseen changes may change the function of either the link or place function. For example, a large derelict building may be due to be converted into a national museum, or there may be a proposal to introduce a street running tram along the route. In addition to formal policy statements, city officials and the many professionals with an interest in the street may have requirements or ideas that they would like to be addressed in the course of the design study.-

Various stakeholder groups, with an interest in the street section(s), also provide important input to the formulation of study objectives. Focus groups might be used to explore stakeholders' aspirations and visions and to identify stakeholders' preferences regarding future development of the local area and future street functions. These exercises either produce visions and aspirations as they are expressed by the different stakeholders groups or there is an attempt to have stakeholder groups agree upon common visions and aspirations. The latter can initiate fruitful discussions on priorities and how to make trade-offs between different user groups. Some findings from such exercises that were carried out in the ARTISTS project are summarised below.

Chapter 3 suggests ways in which focus groups or visioning exercises can be used

EXAMPLE vision and aspiration

Copenhagen, Denmark

- Major landmark (e.g. arch spanning the street) at the entry to the street section
- An avenue with many trees, plants and bushes
- Remove through traffic (e.g. put it underground), more space for street activities
- Tram line running in a central median

Girona, Spain

- Wider footways and more space for pedestrians; more/better crossing facilities
- A greener environment: more trees, flowers, etc.
- More housing and shops along the street
- Better public transport: higher frequency buses, or street trams
- Reduce traffic volumes and impact: build an underpass, or make the street one-way

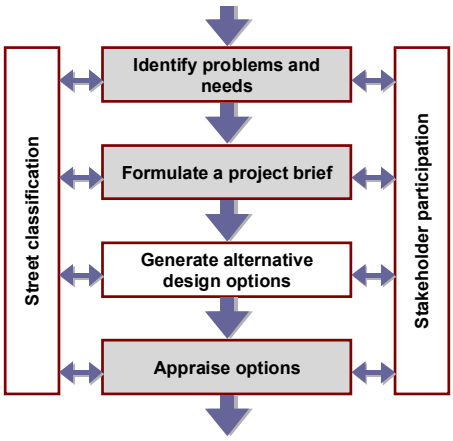
London, UK

- The need for two-way working, including bus travel in both directions
- Better aesthetics and improved pedestrian facilities
- Make the area safer through better lighting;
- Reduce speed by enforcement and reallocation of space from car to pedestrians

Another part of setting objectives deals with making the objectives operational i.e. to choose indicators that are relevant, possible to measure and assess after the reconstruction. If improved safety is the objective then we need to identify indicators for safety; all accidents, injury accidents, serious conflicts, vehicle speeds, etc. The proposed indicators on social, economic and environmental sustainability in the previous section, 5.2, might be of help here.

5.4 Generating alternative design options

Compared to the other stages in the redesign process presented in this report, this stage on how to generate alternative options is presented and exemplified in more detail. The reasons are that this stage constitutes a major part of the stakeholder activities in ARTISTS and provides a challenging new addition to the ordinary design process.



Design process
Based on existing uses and interests, perceived and detected problems, visions and aspirations, classification of link and place status, available street space and other constraints the design exercise declares the management, allocation of time and space to users while considering sustainability. The stage of appraising the design options then follows (section 5.5), where one of the options will be selected for further development and implementation.

The ordinary procedure through the design process differs from city to city and from country to county. The general process is, however, roughly the following. The first step often involves assigning staff at the local authority (often the personnel responsible for traffic planning issues) the task to formulate a number (6-8) of rough sketches. These sketches then get more and more refined and are reduced in numbers as experts from different disciplines discuss and assess the alternatives. Parts of the appraisal considering fulfilling preconditions are cleared off already in these rounds. When there are 1-3 alternative solutions left these are usually designed in more detail.

See chapter 5.5 for appraisal

Stakeholder involvement:
When stakeholders get involved in the design process it is very important that they get acquainted with the preconditions and the design tools properly. Stakeholders must also be told how their inputs are to be used in the process.

Additional information about the use of developed design tools is found in Appendix B.

Possible procedure of involving stakeholders in the design process

The design process presented here has been developed for use in design workshops, where a group of 4-7 participants (residents, shop keepers, NGO's, politicians, etc.) forms a design team together with a facilitator and a technical professional. (One workshop may comprise several design teams.)

The role of the facilitator is to explain the purpose of the workshop, introduce the design tools, explain the design exercises leading to alternative design options and assist discussion.

The role of the technical professional is to guide participants in preparing alternative design options, answer technical questions, draw design ideas onto base plans and take photos of design options.

A process for carrying out a design workshop as part of this process is now suggested.

1. *Divide participants into groups (facilitator role). Give consideration to the composition of each group*.

The facilitator may want to:
- Ensure a broad range of interests in each group; or
- Group people with similar interests, so the composition of each group differs.

Dividing participants into smaller groups for the design exercise, with a facilitator for each group, can provide a less confrontational forum for people to express their views. The facilitator can ensure that everyone has their say.

Possible ways of dividing participants into different groups:
- *Age*
- *Gender*
- *User group (residents, shop-owners, car drivers, teachers and students etc)*
- *Level of previous participation (eg attendance at previous workshop)*
- *Familiarity with a particular street section*
- *None (People allocate themselves to groups.)*

2. *Provide an overview of the street. The technical professional should provide an overview of the section of the street to familiarise participants*

The design process should have a clear objective in terms of what it is that is to be designed. Participants should be clear as to whether the whole street is to be designed or just a section of it. The scope of the design exercise would take into account the homogeneity of the street, its functional integrity (a section that is relatively clear and coherent in its functions), and any issue that have arisen with the public regarding problems or visions.

3. *Set constraints for the design (technical professional role).*

There is a need to be clear at the outset about the constraints or prerequisites – for example, if there is a minimum traffic flow or minimum number of traffic lanes to be accommodated, or a financial budget constraint.

The degree of constraint could be looser or tighter. One possibility is to start by having the professional designers generate some possible options which are presented to participants for scrutiny. Another is to have almost no constraints, and allow participants to come up with whatever they want. The first possibility may be felt to be too constraining; on the other hand, the second might give rise to designs that are not feasible or need to be 'changed out of recognition' (and therefore no longer felt to be 'owned' by the participants) before they could be considered for implementation.

Examples of minimum requirements or constraints that might be specified

- *Building line (mandatory)*
- *Minimum number of running traffic lanes to be provided (one or two way)*
- *Minimum provision of a pavement (sidewalk)*
- *The existence of bus routes along the street*
- *The need to maintain existing land uses*

4. *Provide participants with design objectives (facilitator role).*

The scope for the stakeholders is simplified if they're asked to focus on solutions regarding e.g.

- meeting specific visions or goals
- resolving particular problems or challenges
- different stakeholder interests in the street, for example, pedestrians or shopkeepers.
- a specific section or part of street.

Participants should be reminded to consider the results from any previous focus groups (e.g. covering vision, objectives). Participants are encouraged to work together to find solutions, within the constraints identified, using a variety of design and materials. The technical professional will encourage participants to think about these different design elements and how they may be used towards generating design options for the street.

Detailed guidance on the practical and operational aspects of setting up and running a design workshop is given in ARTISTS Internal Guidance Note "Participation Forum Guide, WP3".

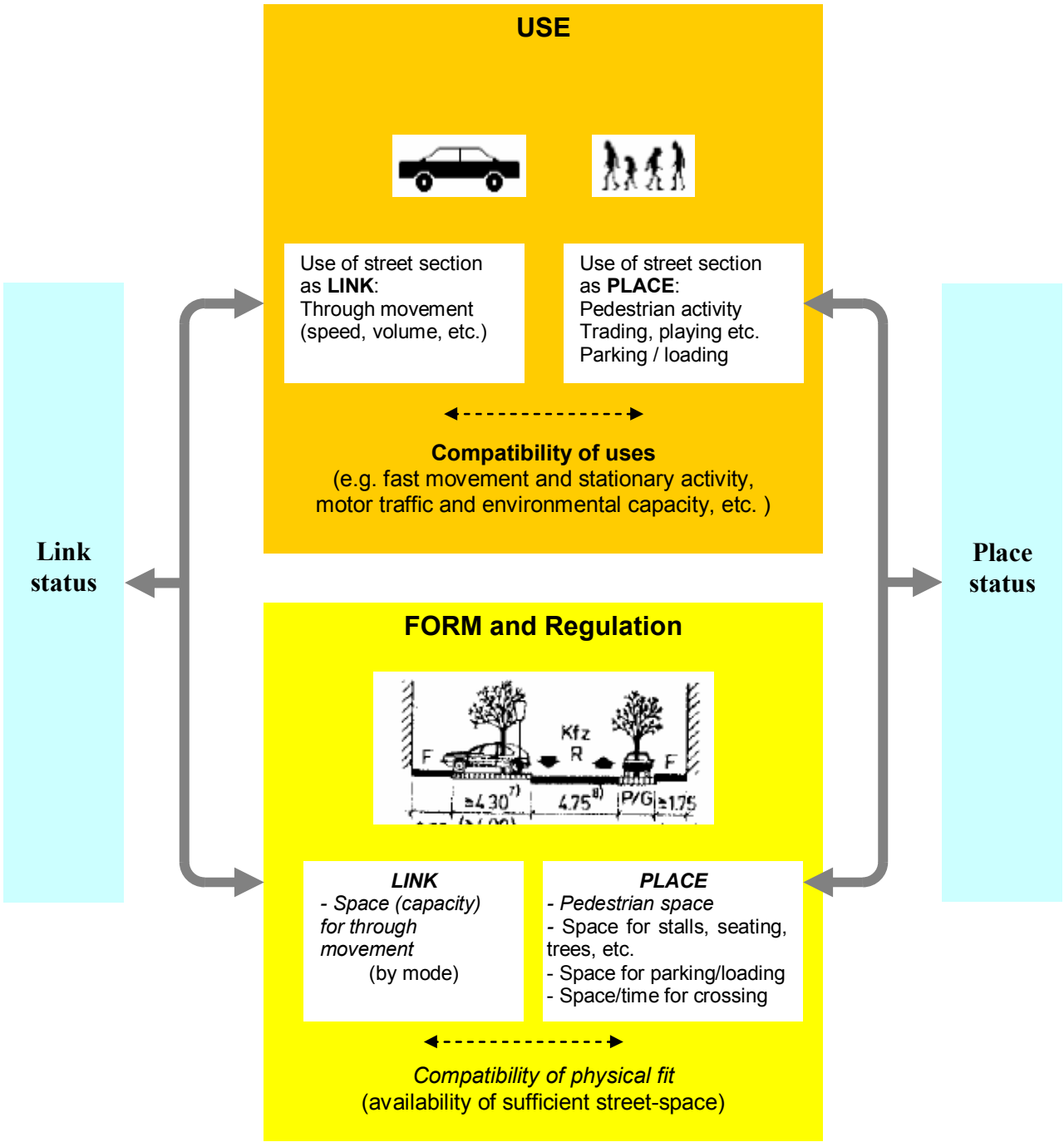
Use of the following possible design tools is presented in Appendix B:

- Poster
- Street Elements Information Pack
- Transparent Overlays

Fitting functional role and street-space design

Chapter 4 outlined a framework for the functional classification of arterial streets (with a more detailed procedure for classification provided in Appendix A).

Functional classification and street-space design are linked in an iterative process, in which the existing form and use of all street sections influences the functional classification of the street system as a whole; and this classification is then used to guide prioritisation of street-space allocation in the design of individual street sections.



*The design challenge. Design involves matching form and regulation to support use, bearing in mind the intended functional role of the street. Note that although both components of the functional classification, link status and place status are **independent** of each other.*

Note that we distinguish here between two separate compatibility issues that need to be resolved in the act of design:
(i) “physical fit” – or the ability to accommodate space for different uses within finite street-space; and
(ii) “compatible use” – the suitability for different uses to be located next to or mixed with each other.

These are independent, since, for example:

- a wide road could accommodate all uses for which there is demand, yet some of those uses may be incompatible (e.g., fast heavy traffic next to pavement café);
- a mix of uses (e.g. pedestrians and market stalls) could be compatible, but simply might not physically fit, for example, on a particular narrow street or lane.

In effect, conflicts are resolved by deciding that
(i) one use is given sole rights to the space, instead of another, where the two uses are completely incompatible, or accommodation of both uses is physically not feasible;
(ii) one use is given greater priority than another, with more space (or time) allocated to it;
(iii) both uses are accommodated, in a compromise, in which provision for neither is optimised.

In each case demand for both uses may have to be suppressed, or partially accommodated elsewhere – or in the case of (i) above, one use is wholly accommodated elsewhere.

The decision in each case is guided by the functional classification, which accounts for the role of that street section relative to all others. The design trade-off is therefore not just the immediate trade-off of area within the street section itself, but implies trade-offs of street-space and uses (capacity and demand) across the whole street system.

In any particular circumstance, then, a compatibility conflict may be resolved internally, by the physical design of the street section – for example, to separate uses that otherwise would be incompatible if mixed or adjacent.

If this is not possible, the intended role of the street section could be adjusted, by

(i) limiting the accommodation of through movement, which could imply a diversion of the high status route to other streets, accompanied by a downgrading of the link status of the street section in question; or

(ii) limiting the accommodation of the non-through uses of the streetspace, which could imply a diversion of activities of high place status and a downgrading of the place status of the street section in question.

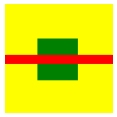
This demonstrates the potential for feedback between street management, performance assessment and functional classification (recognition of role).

The adjustment would take account of not only the relative significance, but any absolute limits. For example:

- a town square might have a place value immovable and inextricable with that particular street space, whereas the arterial route could be rerouted;
- a settlement with only one through route might have certain street sections (e.g. a bridge or bridge approach) that would absolutely have to be designated with strategic link status, whereas functions associated with urban place status could be accommodated off-line.

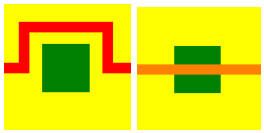
The final overarching decision when elaborating with designation of link and place will be to balance local aspects with city context aspects while considering sustainability.

Problem:

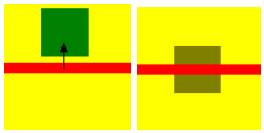


A particular street section has difficulty accommodating uses associated with both high link status and high place status.

Possible solutions:



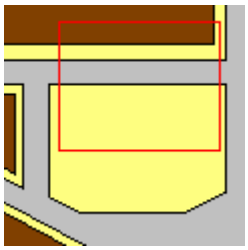
(i) Route of high link status diverted or downgraded



(ii) Activity of high place status moved off-line or downgraded

In addition to these adjustments in the two dimensions of the streetspace, other possibilities in principle are adjustments in the third dimension (overbridge or underpass) or the fourth dimension (separation of movement / activities in time).

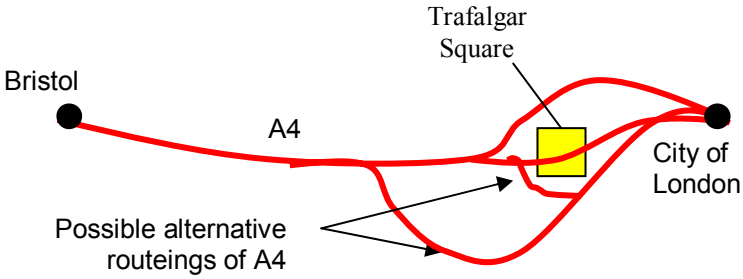
Trafalgar Square, London



Trafalgar Square, one of London's key civic spaces, suffered from being surrounded by a traffic gyratory. The city authorities decided to close off the Square's north side to traffic (then forming part of the A4 between Bristol and London), to enlarge the pedestrian area, connecting the square with the nearby National Gallery.

The redesign decision effectively involved first weighing up the relative significance of the A4 as a strategic route and Trafalgar Square as an urban place. The ultimate choice is not a trade-off between the A4 and Trafalgar Square as such, but the degree to which that particular space (i.e. the North Terrace) necessarily forms part of the A4 or part of Trafalgar Square.

North Terrace of Trafalgar

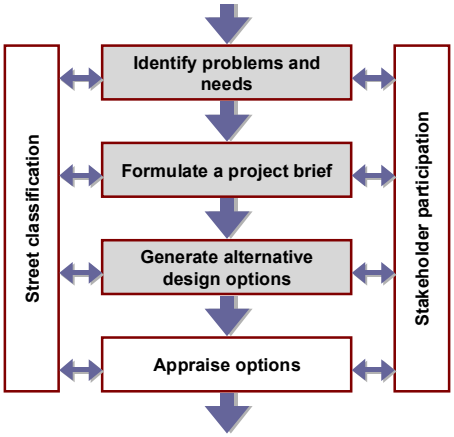


In terms of the classification framework, the North Terrace had effectively been performing as a type [Ia] street, but with pedestrianisation its status became the equivalent of type [Va].

Further information on the case of Trafalgar Square is provided in Appendix C.

5.5 Appraising options

When appraising, the different design options' pros and cons are compared to each other and compared to the predefined objectives, indicators and other factors of importance. The objective for the appraisal exercise is to on well-founded basis select one, the most appropriate, of the options for further development and implementation. Thus, the output of this process is the choice of one option and a justification for this choice. However, if the appraisal shows that not any of the street designs meet the targets set for performance, the design and regulation have to be adjusted to meet the function or the function has to be refined.



Appraisal and factors of reference

When estimating the likely effects of a future reconstruction the factors of reference have to be decided. These differ from project to project but are based on objectives and operationalised sustainability indicators and other non-project specific factors. The latter predefined criteria, like influence on different user groups, parking and loading possibilities, maintenance, etc., are based on city or country directives and are always to be included in the appraisal. Overall cost-benefit analysis and SWOT (Strengths, Weaknesses, Opportunities and Threats) analyses can be carried out. As stated above, the appraisal must be conducted on well-founded basis. With a large number of indicators more information is provided but it also implies that the assessment becomes much more complicated. This must be balanced.

Sustainability indicators

ARTISTS related indicators for link and place function are found in the detailed and operationalised list to the right.

The values of the indicators will depend on the function of the street i.e. designation of link and place function. For example, the average waiting time for a pedestrian to cross an arterial street (designed a certain link function) will be

Sustainability indicators

Place function	***Indicator***
Social sustainability	
Personal security	Crimes per 1000 inhabitants per year (medium - long term)
Activities on the street	Mix / intensity of activities (on a scale 0 to 10) (medium term)
Presence of people	Daily number of visiting people or ratio of visitors to inhabitants per day
Economic sustainability	
Viability of the place	Rent per m^2 per year (medium - long term)
Delay across the link	Average waiting time per pedestrian to cross the street during peak period
Environmental sustainability	
Air quality	Pollutant emissions per peak period or per day (short term)
Noise level	L_{eq}
Greenery	m^2 of greenery per 1 acre
Link function	***Indicator***
Social sustainability	
Safety of vehicle occupants	Car accidents per year per km (short term)
Safety of pedestrians	Pedestrian accidents per year per km (short term)
Vehicle speed	85% speed level (short term)
Economic sustainability	
Movement efficiency long the link	Ratio of flow of people to AADT
Delay along the link	Average delay of vehicles and pedestrians in peak period (short term)
Environmental sustainability	
Air quality	Pollutant emissions per peak period or per day (short term)

The reference within the parenthesis is referred to the time dimension of the effect, which is generally divided in short, medium and long term period

comparably shorter at sections with a higher place function than at sections with lower place function. Similarly, will the accident rate depend on traffic volume and number of persons active in the street. In theory it would be possible to use a benchmarking procedure to compare arterial streets within the same function i.e. for streets or sections of streets with the same combination of link and place function in the classification table. In this project this has not been possible to accomplish as it would require much larger studies. A step forward in this direction would be if targets for sustainability indicators per street type could be set on professional judgement and apprehensions of the public.

PIAP - Project Identification, Appraisal and Prioritisation – an example of a project evaluation tool from London using a set of general non-project specific factors.

In the reconstruction process of streets in London, Transport for London will be proposing the following factors to be included in the appraisal; road safety, buses, general traffic, parking/loading, access, pedestrians, cyclists, maintenance, environment, short/long term. The influence on each factor is then estimated by professionals and if possible by forecasting models in the range from poor to outstanding performance. *For further information see Appendix D*.

Irrespective of the choice of indicators and factors to be included in the appraisal a crucial question is; How to balance the relative importance of these factors? For example will an option that reduces speed and increases vehicle delays at pedestrian crossings result in higher vehicle emissions as compared to another option that maintains movement efficiency for vehicles. On the other hand will the former option result in less accidents and personal injuries; thus comparably better safety indicator values. These trade-offs will be project specific and will in the end be a balance between priorities set in the project brief, apprehensions expressed by stakeholders while considering the wider city context.

Stakeholders

In ARTISTS we recommend that professional judgement of preferred option is complemented with stakeholders' views. This participation can be organised through seminars and / or exhibitions where the alternative design options are presented. This is a way to further involve the various stakeholder groups in the redesign process, to secure wider acceptance for the preferred option and even to improve the selected

option. It can also be an opportunity to rank alternative options with regard to specific qualitative indicators. Stakeholder participation provides an added value to the final synthesis of pros and cons of the different design options; a synthesis on which the professionals make the final decision on selection of option.

EXAMPLE: - appraisal process at *Adrianoupoleos Street, Kalamaria, Greece*

Example of appraisal process in connection to the redesign of the Adrianoupoleos Street in Kalamaria, Greece.

Adrianoupoleos Street, the ARTISTS case study street in Kalamaria, is one of the main arterials of the Greater Thessaloniki Area. It is a one way street with 4 lanes for general traffic. It carries very high traffic volumes, with a high percentage of both through and heavy traffic. The one-way operation was implemented in the late 70s, to increase movement efficient for motorised traffic i.e. to strengthen the link function of the street. The main land use along the street is residential with commercial businesses in the ground floor. This type of function of the buildings together with the frequent bus service in the street and presence of schools, generate high pedestrian volumes along and across the street.

Kalamaria and Case Study Area

The stakeholder participation process, as part of the ARTISTS project, included preliminary interviews, focus group meetings, a design workshop and an exhibition. The identification of problems and needs pointed at high vehicle speeds, high accident rates, high noise levels, illegal kerbside parking, as well as the segregation of urban spaces. The objective of the redesign was to enhance the place function of the street while maintaining most of the strategic link functions. In operational terms this meant a reduction of speed levels, improvement of pedestrians' level of service, protection of sensitive land uses and overall increase of road safety.

At the design workshop stakeholders produced two different design options for a 600m long section of the street. The design options were further elaborated on by experts and presented in an exhibition where participants voted for the preferred option. There was not a definite winning option as both design options got almost the same number of votes.

The first design option reduces the number of traffic lanes from four to three, exploits the released space for on-street parking, proposes the free public area to be used as off-street parking space and introduces measures for traffic calming and noise reduction in the school area.

First Design Option for Adrianoupoleos Street

The second design option maintains the four traffic lanes, one of which is exclusively used by buses, motorcycles and bicycles. It also includes the provision of on-street parking space (both for private cars as well as for loading and unloading), of greenery and street furniture (lighting, rest facilities etc). The free public space is used as a green space.

Second Design Option for Adrianoupoleos Street

In terms of the classification framework Adrianoupoleos street is currently performing as a IIc street (link status = city, place status = district). Both options suggest a future equivalent to a IId steet (link status remains city, place is upgraded to neighbourhood). Both options were assessed with regard to their social, economic and environmental sustainability using the list of indicators suggested above. For some indicators the values of the existing and redesign options are obtained through simulation models. The other values are based on judgement and comparative analysis.

The table on the next page presents the existing and expected indicators' values of the redesign options for the different sustainability dimensions, both for link and place functions. The table shows that the two design options are very similar i.e. the indicator values do not differ significantly. In this case it would have been preferable with more and more different alternative design options. Besides the indicator values, additional appraisal criteria could be the number of people affected, type of

stakeholder groups affected in each option, long-term effects as well as stakeholders' preferences. The final synthesis will include a judgement of the relative importance of each sustainability objective or criterion. When the appraisal result is on the table the responsible authority, in this case the Municipality of Kalamaria, will select the preferred option.

EXAMPLE: Adrianoupoleos street – values of sustainability indicators in the present situation, design option no 1 and design option no 2.

		LOCALES					
		Link Function			Place Function		
SUSTAINABILITY	Social	**Safety of vehicle occupants** (Car accidents per year per km)			**Personal Security** (Crimes per 1000 inhabitants per year)		
		DO 0 1.5	DO 1 1.0	DO 2 1.0	DO 0 NA	DO 1 Improved	DO 2 Improved
		Safety of Pedestrians (Pedestrians accidents per year per km)			**Activities on the street** (mix / intensity of activities)		
		DO 0 0.5	DO 1 0.3	DO 2 0.4	DO 0 6	DO 1 7	DO 2 6.5
		Vehicle Speed (85% speed level)			**Presence of people** (daily number of visiting people)		
		DO 0 85	DO 1 50	DO 2 60	DO 0 1500	DO 1 1600	DO 2 1650
	Economic	**Movement efficiency along the link** (the ratio of the flow of people to AADT)			**Viability of the place** (Rent per m^2 per year)		
		DO 0 1,49	DO 1 2,05	DO 2 1,89	DO 0 53	DO 1 55	DO 2 58
		Delay along the link (Average delay of vehicles in the peak period)			**Delay across the link** (average waiting time per pedestrian to cross the street during peak period)		
		DO 0 0	DO 1 3,2	DO 2 0,8	DO 0 75 sec	DO 1 50 sec	DO 2 60 sec
	Environmental				**Air quality** (Pollutant emissions per peak period or per day)		
					DO 0 CO 1004 g/hr NOx 194 g/hr VOC 232 g/hr	DO 1 CO 1432 g/hr NOx 276 g/hr VOC 330 g/hr	DO 2 CO 1339 g/hr NOx 258 g/hr VOC 309 g/hr
		Air quality (Pollutant emissions per peak period or per day)			Noise Level (L_{eq})		
		DO 0 CO 1004 g/hr NOx 194 g/hr VOC 232 g/hr	DO 1 CO 1432 g/hr NOx 276 g/hr VOC 330 g/hr	DO 2 CO 1339 g/hr NOx 258 g/hr VOC 309 g/hr	DO 0 73 dB	DO 1 65 dB	DO 2 67 dB
					Greenery		
					DO 0 NA	DO 1 Improved	DO 2 Improved

DO 0: Existing Situation
DO 1: Design Option 1
DO 2: Design Option 2

6. WAY FORWARD

This chapter discusses threads and approaches that are opened up but not completed within the ARTISTS project; approaches that are promising and interesting enough to be continued in future planning and research work.

The ARTISTS project and the ARTISTS results are part of a wider movement in Europe; a movement towards more sustainable cities. This is for instance expressed by EU's 5th framework programme "Cities of Tomorrow and Cultural Heritage" where the PLUME project has the overarching task to summarize achievements and identify remaining gaps. Here it is recognised that the most imperative challenge on the work towards more sustainable cities lies in adopting a new way of thinking i.e. some old-fashioned traditions / truths on how to deal with transport and land use planning must be challenged. It is, however, not enough to raise the questions and pinpoint previous weaknesses; new frameworks/principles must be introduced, validated and get widespread recognition throughout Europe. National and local planning authorities must also get support when incorporating the new premises in their daily transport and land use planning.

With ARTISTS some fundamental challenges are expressed; principles and frameworks on how to move forward are presented. These now have to be demonstrated in real life and tested empirically.

This report advocates a "people-oriented approach". This implies that we should take people into account, not (only) vehicles, and actually count all people. To operationalise this, it implies that it is recommended, for example, that road authorities always actively attempt to monitor street flows by counting the people inside the vehicles, not just the vehicles, as well as counting pedestrians and cyclists as full worthy users of the street. A future task would also be to explore new indicators for people movement and intensity and other types of activities (not transport related).

This report draws attention to the scarcity of urban street-space, and the need to share it "spatially and temporally". A future task for authorities could be to explore the possibility of explicitly "calculating" the share of space and time given to different users, though a combination of area, signal time, time for parking and servicing, and bearing in mind time taken for different modes at different speeds, etc.

A new "functional street classification" system is suggested in this report. To operationalise this, the functional classification approach implies that authorities should, at least, (re)consider how their street classification is currently done, and how closely it might be related to link status, and consider if they can introduce the new place dimension. The overall classification process and the introduction of place status involves stakeholders' views and the engagement of the urban planning department in the discussion.

With a street classification system including all streets in the city, it will be possible to in a city perspective decide how much motorised traffic the city can bear and which parts of the city that are best suited to take this traffic. With a holistic perspective it will also be possible to better handle the migration of traffic when streets are redesigned. The migration will be planned rather than an uncontrollable side-effect.

Indicators for sustainability must be elaborated further on. Most sustainability indicators are still on link status. Local application will produce valuable contributions on place status indicators.

Design- and decision makers now have to use stakeholder participation themselves in order to get own experience and to be able to propose the use henceforth. The aim must be to have the method incorporated in national guidelines.

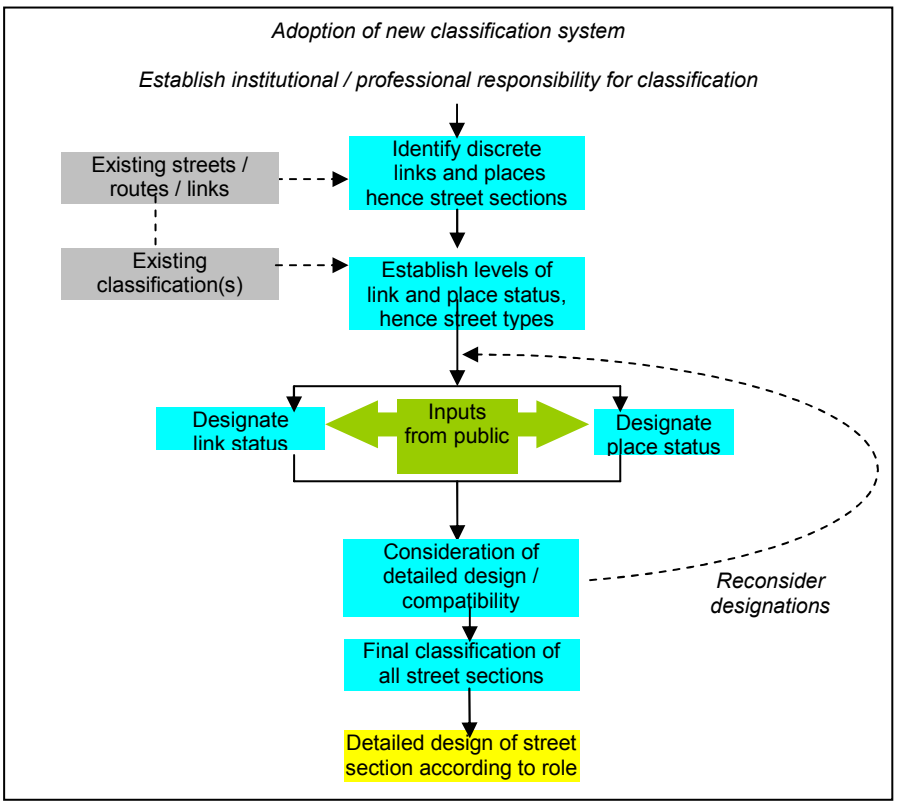
The most natural way forward from this generic, EU-based research is to continue the work on national and city level; to have the principles and frameworks applied on national and city level and to produce locally adapted guidelines. When the empirical work starts it would be preferable to have a network on EU-level that holds the reins; collects and spreads new knowledge and experience. The present ARTISTS web-site is an excellent tool for such purposes.

APPENDIX A
A PROCEDURE FOR STREET CLASSIFICATION

This Appendix presents a process for classifying streets based on the classification system set out in Chapter 4.

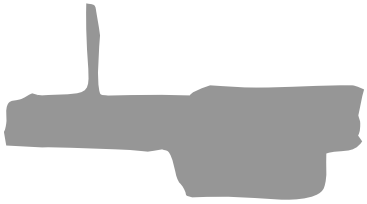
Introduction

The approach to classification in this Guide is based on the recognition of the *link status* and *place status* of each street section in the street system. This Appendix sets out a process for allocating link status and place status to the streets in a street system, where status in both cases is based on a scale of geographical significance. The recommended approach is outlined in the flowchart below, and described in detail in the rest of this Appendix.



Identification of discrete street sections

A necessary prerequisite to street classification is the identification of all public streets or areas of street-space that are under the control of the public authority.



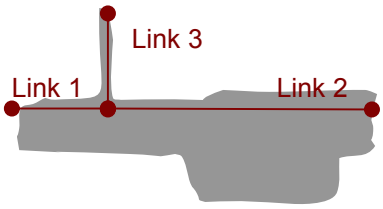
An area of street-space to be classified

The next step is then to identify the street sections that are to be the 'objects' of classification.

Links

In a conventional network classification, street sections are naturally identifiable with links in the network, where a link corresponds to a section of road between two junctions. Such links may be further sub-divided according to other significant changes along the length of route. For example, a change of link designation may occur:

- where a road changes from being a single carriageway to a dual carriageway
- where a link crosses an administrative boundary
- where there is a change in regulation, for example where a section of on-street parking changes to a section with no on-street parking.



Links joining together at junctions

The identification of what is or is not a discrete link, and where it starts and ends, reflects judgments about kinds of street character which may themselves be used in the classification.

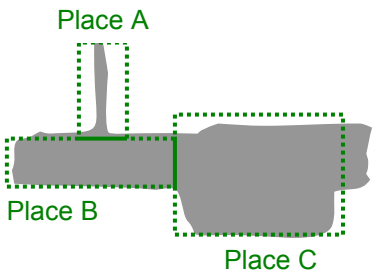
Places

The identification of places has some equivalence with certain kinds of urban planning or urban design assessments of urban space, but has not typically been carried out on a systematic basis as part of an integrated street classification system. (The suggestions here are generated from research explorations as part of the ARTISTS project.)

Indicators found to distinguish different sections of street:
- 'road' versus 'street' character
- buildings fronting or set back
- presence of shops
- presence of greenery
- pedestrian intensity
(ARTISTS Deliverable D1)

Discrete places may be identified according to changes in, for example:

- the form of buildings or spatial character of the street-space;
- land use;
- pedestrian intensity or activity

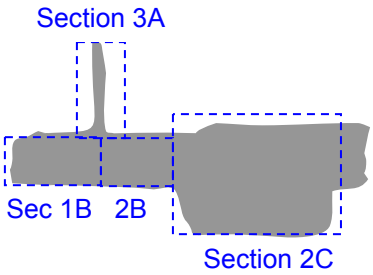


Places typically correspond with areas of homogeneous spatial character

Therefore, from an assessment of all areas of public street space, it should be possible to identify discrete sections of street – including urban squares and other types of public street space – where each one is distinct from the next in terms of some kind of place character.

Street sections

Street sections are finally identified by combining the interpretation of links and the interpretation of places. In some cases these might be coincident – for example, where a row of shops identifying a place changes to a residential terrace at a junction, also being the point at which one link changes to the next. However, it will be common for the two not to coincide, in which case the street section is taken as the elementary (smallest) spatial unit. In this way, a link may straddle two street sections where there is a transition from one place to another, and a place may straddle two street sections where there is a transition from one link to another.



Three links and three places form four street sections.

The street sections are now ready to form the 'objects of classification', by their designation according to link status and place status.

Establishing levels and street types

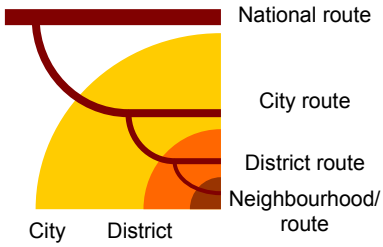
The approach here is based on the classification of street sections, where a street section has:

- a ***link status*** relating to the street section's role as a link in the street network;
- a ***place status*** relating to the street section's role as an urban place in the overall realm of urban public space.

The levels of 'link status' and 'place status' are based on their geographical scale of significance.

There will be a balance between creating a sufficent number of levels to usefully distinguish different kinds of street, while at the same time keeping the number of levels (and hence the overall number of street types) manageable. It is suggested that five levels form a convenient number, for example:

I. National/ regional significance (i.e. above the level of an individual city/municipality)
II. City significance
III. District significance
IV. Neighbourhood sigificance
V. Local (immediate) significance only



Levels in a hierarchy of roads – and places – can be related to the geographical scale of areas associated (Marshall, 2004)

The actual labels used will vary from case to case and country to country.

The combination of five levels of both link and place status will create an overall 'periodic table' of 25 street types (see Chapter 4).

Designating link status

Each city or national authority will already use some form of road classification, which will often relate more or less directly to link status as set out here. Any such existing classification could be used as a basis for designating link status. That said, this section sets out explicitly how this classification by link status could be carried out in the absence of any suitable precedent.

The designation of link status is based on the geographical scale of significance of the network to which a street section belongs, and so is strongly related to the street's position in the network structure.

The desired network structure is one that possesses a property of 'strategic contiguity' by which routes in the top level network (observed at any scale) all connect up. This means that, at the national scale, all national routes form a single national network; and the set of all routes from the top *down* to any given level form a single contiguous network.

In keeping with this topological structure, the status of a particular link will be strongly influenced by the status of adjoining links, and their relation to the overall pattern of routes of different status. This means that a particular street section that forms part of a sequence of links constituting a continuous strategic route could be considered to have a high link status even if the particular section was currently of low standard or had relatively low traffic flow.

A procedure for constructing a classified network with the above properties is now set out. (This procedure may well be the kind of process followed intuitively by traditional acts of classification, although these are not normally set out explicitly in this way.)

Recommended procedure

1. Take a plan of the city, ideally one where streets are *not* already distinguished by any existing route classification. At the same time, refer to a regional or national map, to give the wider network context into which the city network and classification will fit.

2. Select a set of 'strategic corridors' that connect key external destinations to each other and the city centre. This procedure is likely to result in a pattern of both radial and non-radial routes.

For each corridor, select a set of links that join to form a discrete strategic route, bearing in mind travel desire lines and road capacity.

Factors influencing judgement as to the link status of a street section

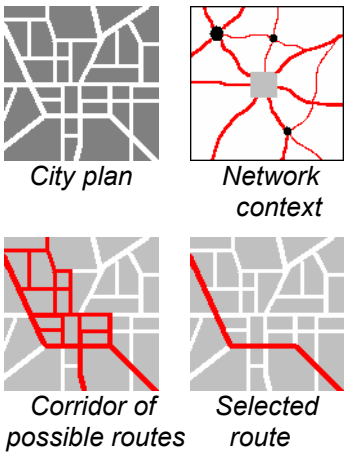
Location:
Position in network

Use:
Traffic flow
People flow
Trip length (trip origin-destination)
Destination status
Traffic speed

Form:
Street width
Available capacity
Streetscape factors

An analysis of different classification themes is given in ARTISTS Deliverable D1.1.

A more detailed exploration of this kind of network structure is given in Marshall (2004).



City plan *Network context*

Corridor of possible routes *Selected route*

A balance will need to be struck between having sufficient routes to form a network and having too many. There will also be a balance between 'supply' and 'demand', in that the choice of which links to include will be affected not only by their topological utility in connecting strategic origins/destinations, but in their physical suitability for performing that role.

Typical overall strategic structure

The resulting networks should give:

- a reasonable connectivity - not too sparse nor too dense. Too sparse means it is inefficient as a network or not a network. Too dense means it has so many links that it ceases to be a strategic network but tends towards simply being the whole network, with no distinction between street sections – which would defeat the purpose of classification. While some quantitative measures of connectivity could be proposed here, it is likely that judgement (of the desirable level of connectivity) is more likely to be used on an individual case by case basis.
- a reasonable geographical coverage, so that most parts of the city are served by some part of the strategic network.
- roughly match high demand with supply of high capacity links.

Strategic network too sparse. Although minimising route length, not so efficient as a connective network.

Strategic network too dense. Coverage is so comprehensive that this is hardly a 'strategic' network at all.

The above procedure gives rise to a single strategic network, and a *scatter of sub-networks*, the latter so far unclassified.

The terms 'strategic' and 'local' are relative to the context, with strategic relating to the greatest scale and local relating to the smallest scale, within any frame of reference.

3. Now take the sub-networks lying between the strategic routes, and for each sub-network repeat the above procedure, but for successively more local scales.

Hence, for a sub-network at the district level, we consider district-level routes that serve to connect the main centre or centres within the district or along the edges of the district, or points external to the district.

District sub-network

This procedure can then be repeated two or three times down to the most local network scale.

The result is an overall network whose routes all connect up in a particular way, in a structure which effectively replicates itself at different scales. At any scale, the link status of a street section is related to the strategic significance of the network that it belongs to, e.g. national, city, district, neighbourhood, local.

Neighbourhood sub-network

Designating place status

Place status should reflect a variety of urban activities and physical qualities. Some examples are listed on the right.

While a number of characteristics may be used to differentiate different kinds of places, the purpose here is to rank different types of place in connection with their geographical significance. (This is for the express purpose of balancing place against link status, so that the parameters are equivalent – Chapter 4).

Place status denotes the relative 'urban place' significance of a particular locale relative to all other locales. This means, for example, that in the commercial context a street with a certain kind of specialist shops or department stores associated with high urban status (e.g. only found in larger cities) would be considered to have a higher ranking as a shopping street than another street which had only local shops. The status of the shops here is, of course, in principle independent of the link function of the street: one could have 'city status' shops on a street that performed a local arterial role, or local shops on a primary (city status) arterial.

In urban planning terms, this ranking is typically done by relating to the geographical scale of their catchment areas, though other factors are also involved. For example, different urban centres may be distinguished by their degree of specialisation – a city centre usually has more specialist shops than a district center; a city government or hospital has more specialist functions than a local community centre or health centre. Yet this 'functional' specialisation can nevertheless be expressed in geographical terms, since it relates to the catchment area of shops, or coverage of services.

Unlike link status, in which a generic pattern or structure is definitely proposed as a target one (see top of previous page), place status will form an *ad hoc* pattern. That is, the distribution of place status will not have any predetermined assumptions about contiguity of high status places, or adjacency of places of adjacent status.

Factors influencing judgement as to the 'place status' of a street section

Location:
Historical identity and sense of place

Use:
Types of building use / land use
Types of use of street-space
Intensity of use of place

Form:
Type and character of building form
Presence of seating, greenery, etc.
Character of streetscape, street furniture, etc.

Note: these can help identify discrete locales in the first place

A notional distribution of locales of different place status

.

Recommended procedure

1. Take a city plan and mark up on it the most significant areas in terms of:

- commercial spaces – streets with frontages for shops and businesses
- civic spaces – spaces used for formal and informal gatherings, parades, political assemblies, cultural events – whether or not associated with building frontages;
- recreational, sight-seeing and environmental areas – including for example park, waterfront, viewpoint, (whether or not these also form civic or commercial spaces, shopping areas, etc.)
- spaces with other historic, spatial or functional significance.

Each city will have its own priorities for what categories to identify – which could be more or fewer categories than the above list.

2. For each category, assign a status of significance relating to geographical scale, reflecting a combination of 'scarcity value' and 'catchment area'. This should therefore distinguish, for example, the status of a city square, a district park or a local street corner where people sit or stand. This status will normally be assigned by local knowledge and judgement, though it may be supported by any relevant data where available.

3. Combine these designations of status to give an overall designation of place status. This combination could be done, for example, by taking

- the highest value of place status for any relevant category;
- taking a median level of status across all relevant categories; or
- taking an average and rounding up to the next highest level.

Taking the highest of the values is the simplest, since it avoids complications arising from how categories are defined, especially for spaces in which civic, commercial and recreational uses may be closely associated.

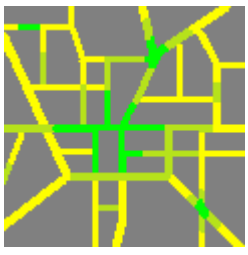
The result of the above is a patchwork of city spaces (locales) classified according to their place status.

Possible 'hierarchies' of place status.

Commercial streets/spaces
a. Shops or businesses of national significance
b. Shops or businesses of city-wide significance
c. District level shops/businesses
d. Local shops / businesses
e. No or negligible commercial significance

Civic streets/spaces
a. National capital square
b. City square or space
c. District square or space
d. Local square or space
e. No particular civic significance other than being a public space in the first place

Recreational streets/spaces
(examples only)
a. National park
b. City park, waterfront, etc.
c. District park
d. Local park, etc.



Place status applied to street network

Combining link and place status

Each section of street now has a link status and a place status. The relative status of each may then be used as a starting point or guide to detailed design in the prioritisation of the use of the street-space.

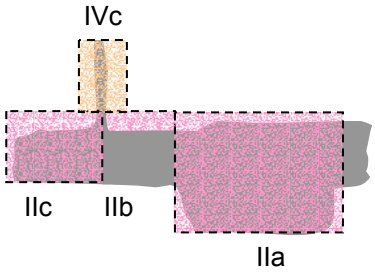
The purpose of classification here, it may be recalled, is about the strategic assignation of prioritisation, as a prelude to detailed design, but is not part of detailed design. It is about what a street(space) is 'for' – what a street is best prioritised for – not an absolute statement of its design parameters.

The implication is that a street section with high link status and low place status can give a higher priority to the use of street-space for through movement; conversely, a street section with high place status and low link status can prioritise the use of street-space for supporting those activities associated with high place status. If the link function and place function are both high, this implies an equitable balance of street-space. The exact balance will be determined by site-specific factors such as available width, etc. – and also the relative demand for space.

A locale serving as a strategic link and as a scenic viewpoint over a city, for example, may not have an ongoing high intensity of 'demand for place', requiring an equal share of streetspace, and may be compatible with the provision of a high proportion of space for through movement. Conversely, a bus-only link may have a high link status yet not require a great deal of space (compared with a high status link in the all-purpose network), and may therefore be compatible with a high place status and demand.

Where it is not possible to reconcile high link status and high place status, there will either need to be a compromise (i.e. some space given to both but not as much as desired in either case), or one role will take precedence over another, requiring a downgrading of either the link or place status.

This is part of an iterative procedure, where the inability to come up with a workable detailed design (ie. where the only feasible designs are incompatible with the designated function), invites revisiting the use of that particular street section in that particular role. In other words, this feeds back to suggesting the need to consider changing its position in the classification.



Street sections classified (above) and located in 'periodic table' (below).

Link status					
	Ie	Id	Ic	Ib	Ia
	IIe	IId	IIc	IIb	IIa
	IIIe	IIId	IIIc	IIIb	IIIa
	IVe	IVd	IVc	IVb	IVa
	Ve	Vd	Vc	Vb	Va

Place status

APPENDIX B
DESIGN TOOLS

This Appendix describes the application of three kinds of design tool.

Introduction

This appendix demonstrates three kinds of street-space design tool that may be used as part of a stakeholder participation exercise.

Design tools

The use of design tools can help stakeholders think more imaginatively about how the case study street could be improved.

Details about the developed design tools are found in deliverable D3.2 and its Appendices.

In summary:

- *Posters* are used to display a breadth of options – including best practice from a range of countries – to assist generation of ideas for design options;
- The *Street Elements Information Pack* (SEIP) is used to explain the possible use of different street design features;
- *Transparent overlays* are used to allow manipulation of design elements in the reorganisation of street-space on the base plan, as a simple way of checking for space constraints and possibilities.

These design tools have been developed for use by ordinary people, not professional street designers. The tools, therefore, do not consider details such as the façades of the buildings, street lighting, type and colour of surfaces and street furniture, street maintenance and more advanced traffic control. However, the tools may be further developed for use by professionals involved in street design.

The tools are discussed in more detail and illustrated on the following pages.

Posters

A poster montage of possible options can be used to facilitate the generation of ideas and to stimulate discussion among the workshop participants. The poster should show a variety of possibilities, providing examples of how similar streets have been reconstructed in other cities and other countries.

Three types of posters should be considered for inclusion in design workshops:

- Posters of *street elements*;
- Posters of *reconstructed streets*, based on previous work;
- Posters about the *design workshop street* summarising the needs for change, including problems, challenges and visions of this street and any constraints.

The posters should be put up in the room where the design workshop will take place prior to participants arriving. Additionally, some of the posters may be given to participants in ordinary A4 paper format. The workshop facilitator should invite participants to look at the posters prior to beginning the design exercises, and encourage them to look for ideas for improvements that they may want to implement in their street.

It is important to show several reconstructed street posters (preferably three or more) in order to provide many ideas for improvement, and hence not set the agenda of the design workshop to focus on a too limited number of design elements or types of reconstructions.

Posters can be helpful in:

- Demonstrating issues participants might not have thought of
- Presenting clearly the before and after situations
- Pinpointing particular problems and features incorporated in the solutions.

Recommendations for good practice:

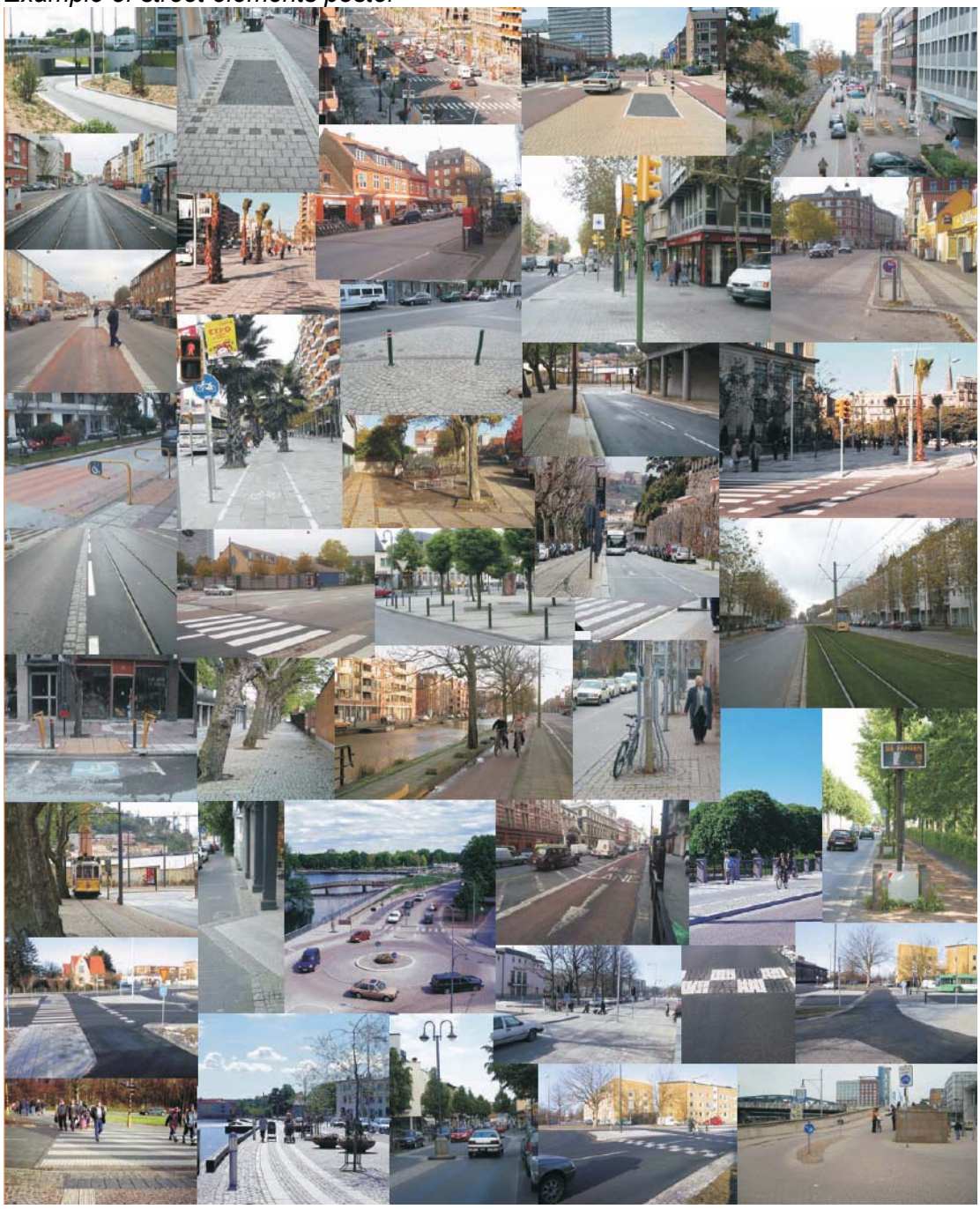
- Take care not to make the posters too small or complicated.
- Leave sufficient time to present what is on the posters
- Make sure the images are clear in format (sufficient size and resolution) and message (showing some definite issue or feature)
- Supplement the posters with plans, where appropriate.

Be clear whether the poster is meant to be used as a menu of design features, that would be capable of being introduced locally, or if it is just a visual stimulus to show a breadth of possibilities beyond what it present in any one existing location. (Ideally the measures shown from other countries should be suitable for introduction in the this country.)

In showing before and after examples, or existing and proposed information, the images should not introduce spurious differences between the alternatives – for example, try to avoid showing the 'existing' on a dull day with few people around but the 'proposed' as a sunny day with lots of people, etc.

Examples of posters

Example of street elements poster



Examples of posters of the following streets cases are available at the ARTISTS website:

Amagerbrogade, Copenhagen, Denmark
Frederikssundsvej, Copenhagen, Denmark
Bismarckstrasse, Freiburg, Germany
Carl-Kistner-Strasse, Freiburg, Germany
Ikonomidi Street, Kalamaria, Greece
Egeou Street, Kalamaria, Greece
Rua do Campo Alegre, Porto, Portugal
Rua da Restauracao, Porto, Portugal
Carrer Arago, Barcelona, Spain
Carrer Marina, Barcelona, Spain
Hamngatan, Eskilstuna, Sweden
Regementsgatan, Malmö, Sweden
Shoreditch Triangle, London, UK

Street Elements Information Pack (SEIP)

The street elements information pack (SEIP) contains a series of information sheets about a number of elements that can be implemented to improve the use and performance of the street, i.e. address problems, meet challenges, visions and goals. The purpose of the SEIP is to provide design workshop participants with information about street elements in order to alert them to different possible design features and help them make a decision about whether they want to implement a particular element in the case study street.

The SEIP is categorised into ten types of street element; in total there are 39 street elements (see list on page opposite). In most cases, the information sheet is double-sided:

- The front side provides photos and a general description of the street element. It is used mainly to inform participants about some of the ways in which that street element might be implemented. Related street elements are also listed.
- The rear side is entitled Planner's Tool. It provides more detailed information about design considerations, indicative costs and its likely effect on the street's performance, and also additional photos, diagrams and illustrations.

These information sheets can be useful in providing:

- A clear and simple presentation of possibilities
- A combination of explanation and information

Recommendations for good practice:

- Allow sufficient time to present – or allow users to browse – the information sheets and other descriptive material;
- Consider providing the information in advance of the workshop;
- However, providing too much, too detailed information may give the feeling of 'information overload' and make the exercise seem like too much hard work. Do not provide information (e.g. technical data) that participants are not expected to use;
- Limit the elements included in the pack to those that can feasibly be implemented in that street;
- The simpler and clearer the process of problem identification and generation of possible solutions, the easier it is to achieve good teamwork.

Street elements information pack

1. Pedestrians
Pedestrian footways
Public/open space
Pedestrian underpass
Ramps and stairs
Rest facilities
Pedestrian crossing (zebra)
Signalised pedestrian crossing
Assisting disabled pedestrians

2. Cyclists
Cycle lanes
Cycle parking
Cycle facilities at junctions

3. Bus users
Bus lanes
Bus stops
Bus priority at junctions

4. Tram users
Tram stops
Tram tracks

5. Van and truck drivers
Loading/unloading

6. General traffic
On-street parking
Motorcycle parking
Traffic lanes
Median strips

7. Junctions
Roundabout
Raised area
Cross roads
T-junction
Signalised junctions

8. Speed management
Road narrowing
Staggering / chicanes
Entry treatment
Speed hump / cushion
Speed campaigns/ information
Police enforcement / cameras
Carriageway surface

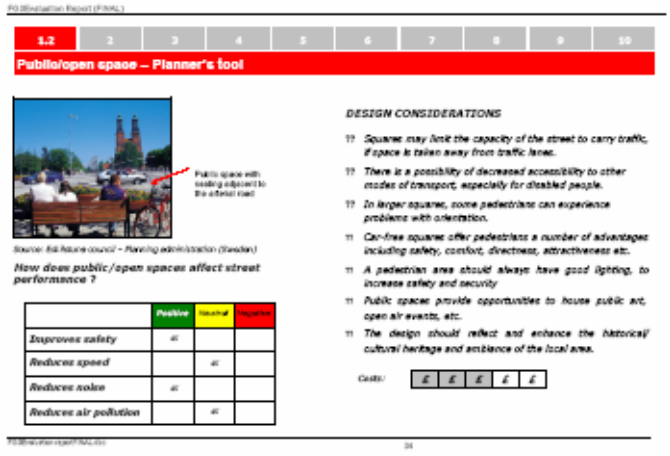
9. Street furniture
Greenery
Street lighting
Street furniture

10. Conflicts and combinations
Combining street elements
Reducing conflicts
Priority to different user groups

Example of information sheet

Front

Back



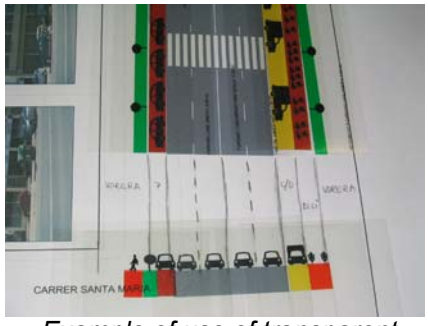
The full Street Elements Information Pack (SEIP) is available from the ARTISTS website.
http://www.tft.lth.se/artists/

This contains an information sheet for each of the 39 elements listed here. The numbering and colour-coding makes it easy to index the SEIP in a ring binder. The SEIP is available in Danish, English, German, Greek, Spanish and Swedish languages.

More design elements could be developed, e.g. turn-lanes and street corners for junction design, flower baskets and fountains for pedestrian space design, and typical transition elements like ghost islands. Another possibility is to build in more knowledge about the performance of different kinds of street element.

Transparent overlays

Transparent overlays can be a helpful way of understanding spatial layout and the challenge of accommodating different vehicle types and activities in limited areas of street space. They can help make the participants aware of the real constraints faced in design situations – even if this may be a source of frustration within the creative process!



Example of use of transparent overlays (Girona, Spain).

In particular, the use of scale representations of vehicles and other street users overlain on scale plans makes clear the absolute spatial constraints faced by designers. This draws attention to the relative 'cost' (in terms of using up scarce space) of different features such as parking bays or bus lanes, and hence the trade-offs required in prioritising one kind of street use over another.

And because the different elements (e.g. bus bays, cycle lanes, etc.) can be combined in different ways, the participants readily get a feel for the different design permutations involved.

Although overlays may be used as part of the creative process, as another means of stimulating ideas or permutations, they may also be used to test or 'check' the feasibility of options that may have been already 'dreamed up' or 'sketched out' by other means.

Twenty transparent overlays are provided in plan and cross sectional view:

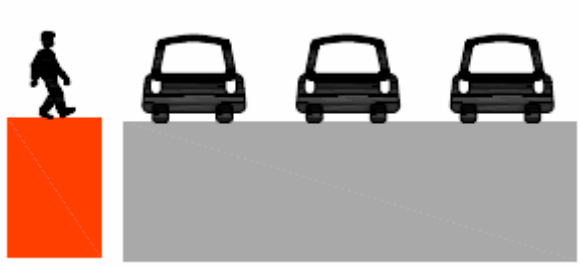
- The **plan view** overlays enable participants to see if the potential changes to the street they have discussed fit within the space available along a section of the street.
- The **cross section view** overlays enable participants to look at critical points along the street (e.g. at pinch points, bus and tram stops and parking bays), to look more closely at what can be accommodated there.

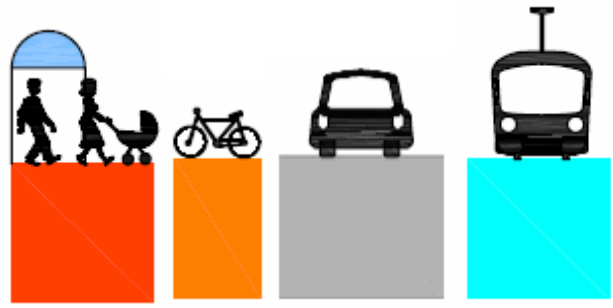
Base plans of 1:200 scale should be provided for each section of the street that the design workshop focuses on. If the intention is to allow technicians, facilitators and participants to draw on the base plan then several base plans of each section should be provided per group of participants. The base plan should include information such as street names, landmark buildings, popular shops and other prominent landmarks and places.

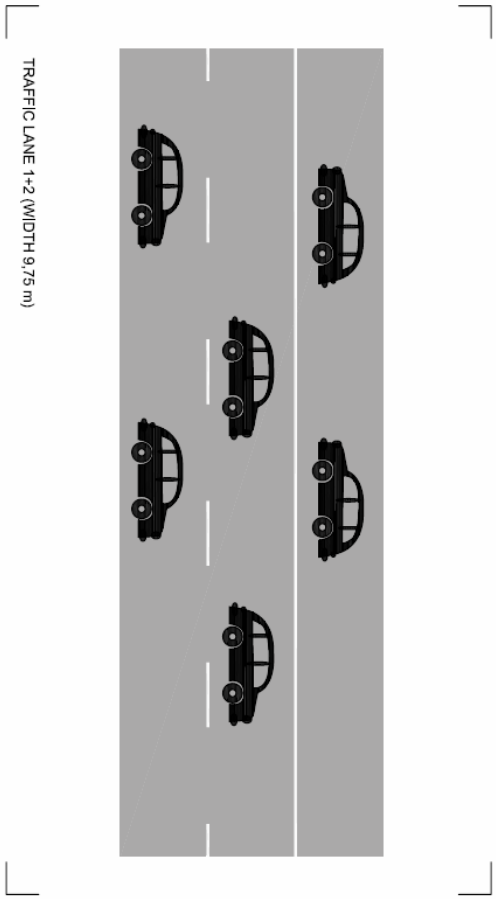
Overlays have been found to be popular and easy to use in general, though they may be a bit 'slippery' or 'fiddly' for some users.

Transparent Overlays

1. ***Pedestrians***
   Footway
   Non-signalised pedestrian crossing
   Signalised pedestrian crossing
2. ***Cyclists***
   Marked one-way cycle lane (on-street)
   One-way cycle path (cycle track)
   Two-way cycle path
   Bicycle parking
3. ***Bus users***
   One-way bus lane
   Bus stop with shelter
4. ***Tram users***
   Two-way tram tracks (two tracks)
   One-way tram track
   Tram stop with shelter
5. ***Van and truck drivers***
   Loading / unloading
6. ***General traffic***
   Two-way traffic lanes (two lanes)
   Two-way traffic lanes (three lanes)
   Two-way traffic lanes (four lanes)
   Parking lane
   Motorcycle parking
7. ***Junctions***
   Roundabout
8. ***Street furniture***
   Line of trees / greenery







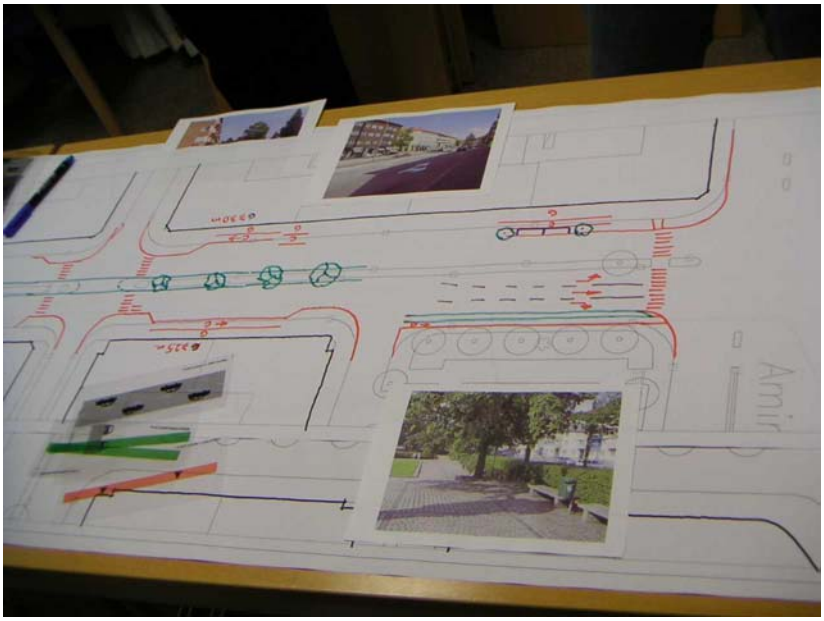
Note: overlays can be reversed and so may be used whether vehicles drive on the right or on the left.

Overlays are provided in plan and cross-sectional views. The varied shapes of junctions have meant that standard overlays are not provided for junctions (except a roundabout). Instead, participants and facilitators of design workshops are encouraged to draw their junction designs directly on blank overlays or base plans.

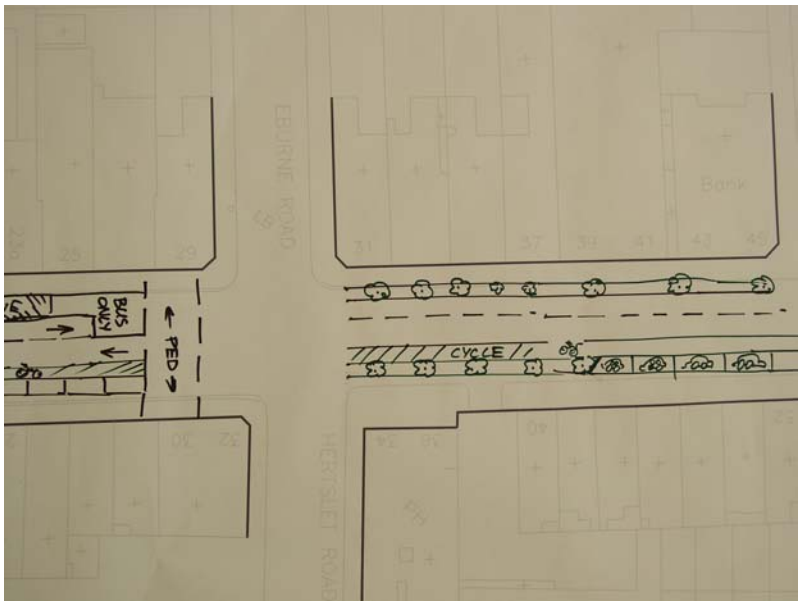
Most of the design elements included in the street elements information pack (SEIP) have corresponding transparent overlays. The full set of overlays is available from the ARTISTS website. http://www.tft.lth.se/artists/

Further suggestions for use of overlays are provided in ARTISTS Deliverable 3.2.

Examples of street designs produced by workshop participants



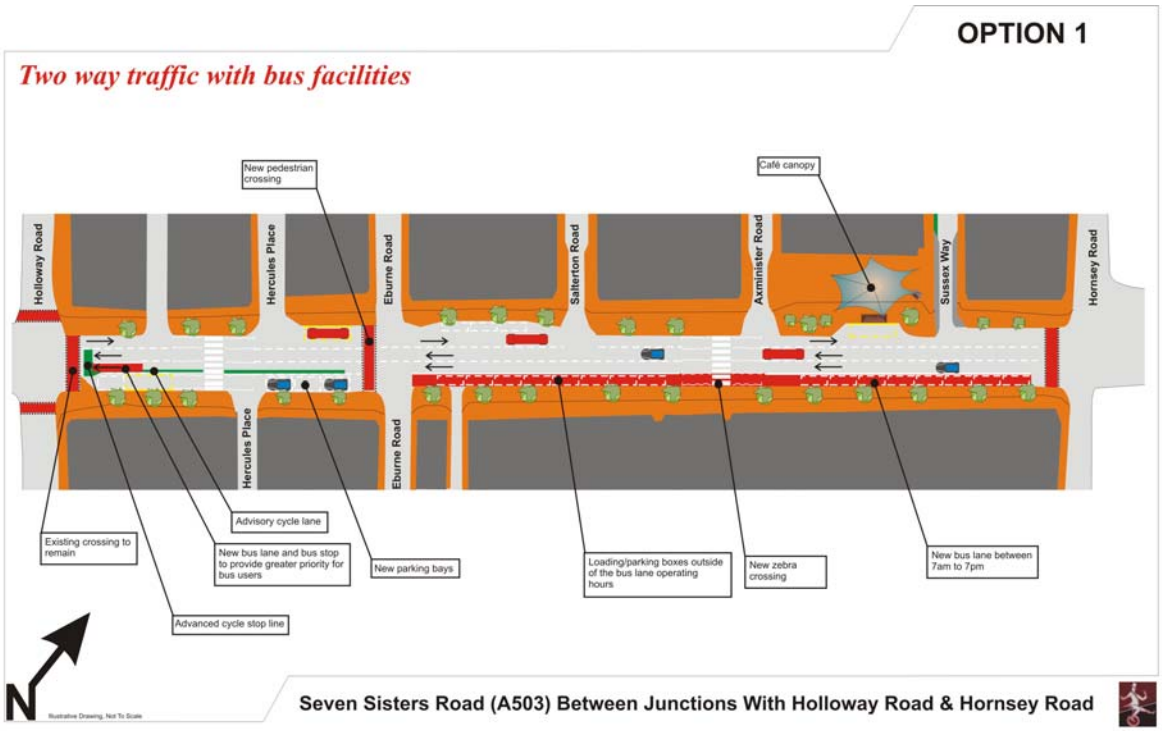
Street Option designed during the workshop in Malmö, Sweden.

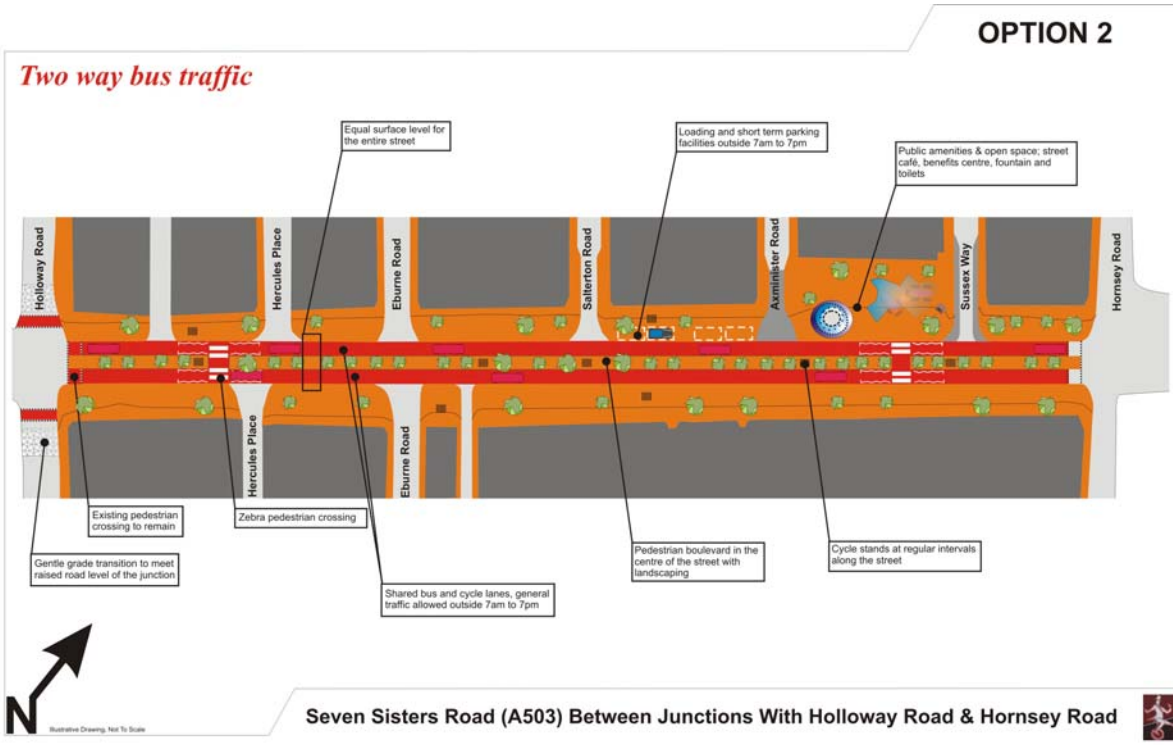


Section of a street option designed during a workshop in London, UK.

Example of worked-up designs

A503, London





APPENDIX C
STREET CASE STUDIES

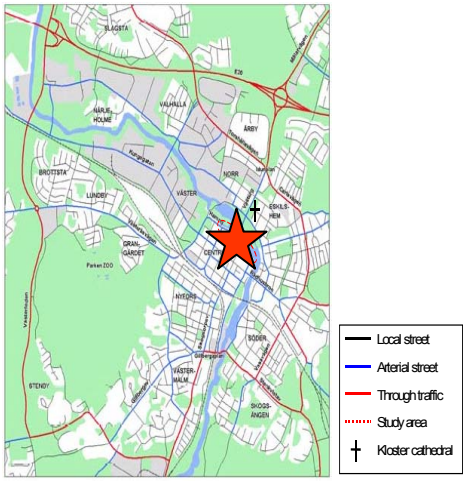
The purpose of Appendix C is to show some examples of rebuilt streets in Europe.

In this appendix we present some examples of reconstructed arterial streets. They are not ARTISTS reconstructions but they hold important ARTISTS aspects like; the arterial character remains; the people-orientation i.e. there is an attempt to recognise different user groups' demands and interests in the arterial street and to make stakeholders participate in the decision- and design process.

Example one: Hamngatan

Country: Sweden
City: Eskilstuna

Street: Hamngatan



Eskilstuna is a Swedish city with 90.000 inhabitants. Hamngatan is located in the central parts of the city and is a part of the inner ring-road going around the most central parts of the city.

The case street is approximately 1.000 meter long. The river flows along one side of the street. Along the other side there is a tree alley at one section of the street and buildings with an average height of 14 m at the other section. There is a lot of space between and in front of the buildings. The main use in the buildings is retail and business.

Problem

Hamngatan formed a barrier between the city centre and the river. The high flows of motorized traffic in the central parts of the city was perceived as a problem. Hamngatan was too much of an urban motorway with two traffic lanes in each direction and the canalization at the Nybron intersection.

Decision- and design process

Politicians in the technical board discussed the possibility to make Hamngatan narrower and launched the idea of a competition for the best design of Hamngatan. The vision “give us back the river” was introduced. The aim was to improve access to the river. Improvement of the environment and a better access to the river would be reached by decreasing the traffic area.

The project organization consisted of Olof Skiött former manager of the Road and Traffic Department at the Municipality of Eskilstuna. There were also representatives from projecting, traffic, planning architect, landscape architect, environmental. Then later on also the architect and the landscape architect from the winning design proposal were part of the project organization.

A competition was launched together with the Swedish Architects Organization (SAR). Six groups of architects were invited to take part. SAR and politicians evaluated the design proposals. The jury made the rejections on basis of costs, fulfilment of the prerequisited conditions; access to the park and the river, improved crossing conditions for the pedestrians; reduction of vehicle speed; maintenance of the Eskilstuna cultural inheritance; etc. The jury was supported by the knowledge among the invited experts.

Public participation

After the choice of winning proposal the details of the reconstruction was discussed in the Technical Board (where amongst others politicians, youth council and pensioner’s council are represented) and with stakeholder groups with special interests like the council for disabled and residents. The detailed plan was launched as according to prevalent custom i.e. official exhibition together with the possibility for stakeholders to express own opinions.

Hamngatan before

The major signalized intersection before the reconstruction.

Hamngatan after

The same intersection as a roundabout in the after situation.

Hamngatan before

Before situation at the stretches

Introduced measures

- Reduced space for motorized traffic
- Reallocation of space to pedestrians and cyclists
- Introduction of roundabouts
- Introduction of a signalised pedestrian crossing

Hamngatan is an arterial street and has remained so after the reconstruction. Before the reconstruction the artery function for motorized vehicles was perceived as very strong. In the after situation this function is still the predominant function for the street but not as strong.

The major intersection, Nybron, was rebuilt from a signal to a roundabout with one entering, two circling and one exiting lane. A smaller intersection was rebuilt to a single lane roundabout. The surroundings around the roundabouts got the character of a market place.

Due to the concern for pedestrians with defective vision two signalized pedestrian and cycle crossings were installed on both sides of (though some distance from) the Nybron roundabout.

On the sections the number of traffic lanes were reduced from two to one in each direction. Each lane was however widened from 3.5 m to 4.5 m. That is, the space for motorized traffic was reduced from 14 to 9 meters. As part of the reconstruction the whole street was moved away from the river.

Before the reconstruction there were no facilities for cyclists and poor facilities for pedestrians. The extra space provided by the reconstruction was now allocated to pedestrians and cyclists both for transport purposes and strolling. Cycle paths were introduced and extensive walking areas constructed with direct access to the river.

The surface along the embankment was paved with cobble stone thus providing a 7-13 m wide passage for cyclists and pedestrians. Several benches were installed.

Hamngatan after

After situation with reallocation of vehicle space to pedestrians and cyclists

Hamngatan after

After situation at the riverside of Hamngatan

Effects

- Improved access to the river
- Speeds are reduced
- Movement across has been improved
- It is still mostly the motorized traffic that use the street as an artery

Time consumption

Time spent for driving a car along the whole case increased by 23%. For 70% of the car drivers, however, it was quicker to pass through the intersection after it was converted into a roundabout. Pedestrians' time consumption for waiting and passing the street has on the other hand decreased.

Hamngatan after

More of the reconstructed riverside

Traffic flow

The vehicle flow is reduced by 13% at sections and by 18% at the Nybro intersection. The cycle flow has on the other hand increased by 21% at the Nybro intersection.

Fuel consumption and exhaust emissions

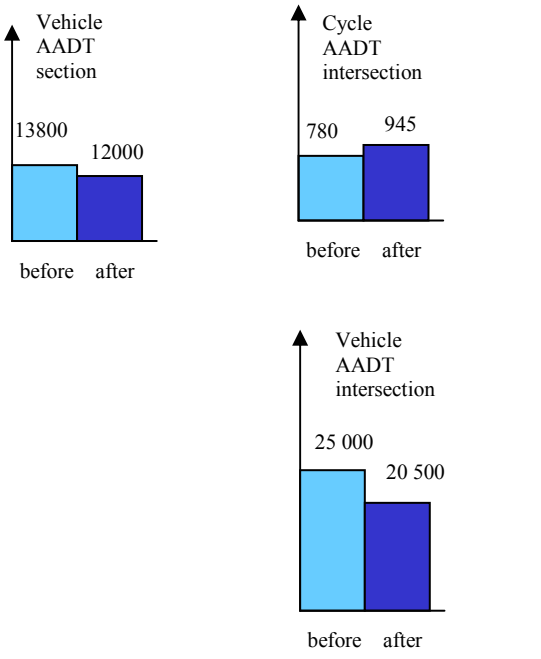
Fuel consumption and the emission of CO_2 increased. The emission of HC remained unchanged. Taking the decrease in car traffic flow into consideration the total increase in fuel consumption and emission of CO_2 is estimated to 16%.

	Fuel consumption	CO_2	HC
After/Before	+16 %	+16%	+/- 0

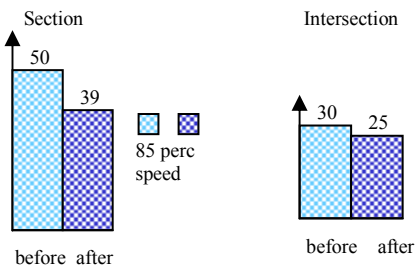
Vehicle speed

Vehicle speeds were substantially reduced by the reconstruction. At sections the average speed decreased from 43 to 32km/h and the 85th percentile speed decreased from 50 to 39km/h thus a 22% reduction. At the intersection the corresponding figures are; average speed from 22 to 18km/h and

Traffic flow



Vehicle speed

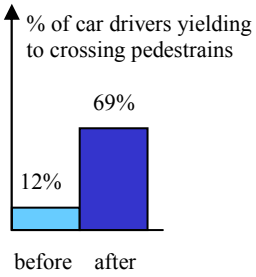


85th percentile speed from 30 to km/h thus a 17% reduction.

Behaviour

In addition do 97.5% of the car drivers slow down when they meet a pedestrian in the after situation. The number of pedestrians walking along the street has increased many times over. The number of pedestrian across the street has, however, not changed much. Their crossing possibilities have however improved considerably.

Behaviour



Comment

Prior the reconstruction there was major negative criticism from the public, residents and media regarding project cost and decreased efficiency for car traffic. Interview studies with people at site today give a very positive image of the project. Also most car drivers seem to accept some reduction of their own transport efficiency and comfort when the area has become so much more safer and attractive.

Example two: Regementsgatan

Country: Sweden
City: Malmö

Malmö is Sweden's third largest city with 250.000 inhabitants. Regementsgatan is located in the western parts of Malmö. The street is one of the major access roads from the west to the city. The specific part of the street that is subject for description here is 720m long and contains five intersections. The surroundings consist of dense block housing on the south side and separate lamella buildings with gardens on the north side. The buildings are from the first half of the 20th century. There is a tree line separating the pavement from the driving lane on the north side of the street.

Problem

The tramline on Regementsgatan was taken out of traffic in the 70's. After the tramline the street became too wide with high speeds and poor crossing facilities for pedestrians. The wide street and the fairly long passages resulted in a feeling of insecurity for the vulnerable road users, especially for children (many of them having to cross the street on their way to school) and elderly people. Many accidents occurred, elderly pedestrians were highly represented, and residents and visitors experienced the traffic as very annoying. During several years, a lot of people required a safer traffic environment on Regementsgatan.

Street:
Regementsgatan in Malmö

Decision - and design process

The complaints from the public supported the view of the traffic engineers at the Department of Public works at the municipality, that the street should be rebuilt. The basic information for the engineers was speed measurements and accident data. The proposal for reconstruction was presented for the politicians in the technical board. The technical board agreed and assigned the department of public works to present different design solutions. The budget for the project was decided.

The main features of the reconstruction was decided upon early in the project. These were; narrow the four traffic lanes to two lanes; maximum vehicle speed of 30km/h at locations with interactions with vulnerable road users; introduce a cycle lane/path; no killed or seriously injured road users. In the reference group there were representatives from media that provided the public with sketches of possible solutions in the newspapers. The politicians were heavily involved during the whole project. The Technical Board took the decision to reconstruct in 1999. There was competitive tendering for the actual construction. As the costs from the competitors were very similar the one with the best environmental solution was chosen.

The reconstruction was implemented in two stages starting in September 2000. Due to delays, the work was interrupted in November 2000 as it was no longer realistic to have it all finished in time for the Christmas shopping. As this was a major concern from the local shopkeepers all arrangements around the reconstruction (sheds, vehicles, etc) were removed. The reconstruction was re-established in March 2001 and the street was completed in May 2001.

Public participation

The project organization consisted of some 20 persons from the municipality and one consultant. The organization consisted of a manager group, and steering group and a reference group. In the reference group there were representatives from media, residents, youngsters and shopkeepers in the area and traffic safety researchers. Parallel to the reconstruction project a specific information project was organized to provide information regarding the reconstruction to the public. There were plans for communication, construction meetings, contact with media, contact with shopkeepers, etc.

The primary objective for the communication with stakeholders was to provide a positive approach to the project. The par-

Regementsgatan before

Source: Didriksson 2000.

Regementsgatan after

Source: Didriksson 2000.

ticipation of the public entered the process at a rather late stage, 2 months before the start of the reconstruction, and consisted mostly of distributing written information about the project to stakeholders. There were also meetings with selected stakeholders like shop owners and disabled about 3-4 weeks before the start of the reconstruction. This communication was very important as the reconstruction meant a periodically total closure of the street.

Introduced measures

The main measure was to introduce speed cushions at all five intersections along Regementsgatan. This was done to ensure a maximal speed of 30 km/h (85-percentile). The speed cushions were combined with lateral shifts in the carriageway. The total street width was narrowed to one traffic lane in each direction.

Effects

The assessment studies of the reconstruction consisted of before and after studies of i) studies of drivers give way behaviour to crossing pedestrians ii) speed measurements iii) conflict studies iv) time consumption for different road user groups v) emissions. In the before situation children's safety and behaviour at pedestrian crossings were studied in-depth.

The aim of the design of the cushion is to reduce speeds for cars to the same extent as if there were ordinary humps while buses and heavy traffic will be able to bestride the cushion thus not having to reduce speed as much to get a comfortable crossing.

Migration of traffic to parallel streets by 35%. Reduction of the 85 percentile speed by 51%. Reduction of number of serious conflicts by 22% and considerable reduction of the severity of the conflicts as the 85-percentile speed at the evasive action was reduced from 60 to 28km/h.

Introduced measures

Before	After
Non-signalised pedestrian crossings at intersections	Speed-cushions located 5 meters (one car length) in front of the pedestrian crossings to secure 30 km/h.
1.5 driving lanes in each direction with the possibility to park at the pavement	One driving lane in each direction. Parking between foot way extensions i.e. narrowing of the pedestrian crossings
	Two-way cycle path on the south side
	Crossable median strip in paving stone
Short elevated refuge at crossings	10 m long elevated refuge at crossings
	Elevated pedestrian and cycle crossings over side-streets
Line of trees on the north side	Line of trees on both sides
Street width = 30m	Street width = 30 m
Side space = 14 m	Side space = 22 m including the parking between foot way extensions
Width between side space = 16 m	Width between side space = 8 m
Median strip = 1 m	Median strip = 1 m

The proportion of car drivers giving way to pedestrians and cyclists with the aim of crossing increased considerably.

Compared to 50% at the control sites, 92% of the elderly pedestrians felt more safe and comfortable when crossing Regementsgatan after the reconstruction. (The introduction of a new law for pedestrian crossings probably contributed to the higher proportion in the after situation at the control site).

Time consumption increased by 12% (27.5 seconds) for car drivers driving the whole case section in the east direction and by 23% (47 seconds) for those driving in the west direction. Time consumption, however, decreased by 2-3 seconds for pedestrians, cyclists and car drivers from the side streets. HC, CO, NOX, CO2 and particles increased by 15%. Also with consideration taken to the lower traffic flows there is a net increase.

Effects due to the reconstruction

	Before	After
Traffic flow		
Car ADT	10800	8100
Truck ADT	1000	700
Speed		
85 percentile speed	53-58km/h	28-34km/h
Serious conflicts		
Total number of serious conflicts	38	29
Car-car conflicts	9	11
Car-pedestrian conflicts	13	11
Car-cyclist conflicts	16	7
Conflicting speed at evasive action (85 perc)	60	28
Time consumption		
Drive a car in east direction	237sec	264.5sec
Drive a car in west direction	207sec	254sec

Comment

Today Regementsgatan is an arterial street with much better conditions for cyclists and pedestrians. The improved and safer crossing facilities for pedestrians are especially appreciated by children and elderly. Comment from an old woman “Nowadays I dare to visit my friend on the other side of the street”. The very narrow carriageways and limited space for loading and unloading has, however, made conditions for bus traffic and goods delivery more difficult.

Example three: Frederiks-sundsvej

Country: Denmark
City: Copenhagen

The street is a primary road that ensures the connection between the different districts of Copenhagen. These roads carry the main part of the bus and bicycle traffic. The case street consists of 3 character sections.

Section 1 is 920 m long and gives an impression of a wide suburban street. It has an average distance between building lines is 32 meters.

Section 2 is 1.410 meter long. There are 4-5-storey houses on both sides of the street with many shops in the ground floor and flats in the upper parts. It gives the impression of a quite normal arterial street. The average distance between building lines is 25 meters.

Section 3 is 550 meter long with 3-4 storey housing blocks and a park on one side of the street and 9-13- storey tower blocks and a church on the other side of the street. It gives the impression of being a wide street.

All along the case there are pavements, cycle paths and space for parking/trees on both sides of the street.

Problem

As compared to the rest of Copenhagen there is a higher proportion of elderly (67+) living in the districts surrounding Frederikssundsvej and the proportion of traffic injuries with elderly involved is also higher at Frederikssundsvej.

Decision- and design process

The overall interest of the Road Directorate in road safety for the elderly population and the specific problems for this group at Frederikssundsvej made this street a natural choice. The overall aim was to demonstrate that accidents with elderly can be reduced. The main objective declared was to improve security and to improve the crossing facilities es-

pecially for children, elderly and disabled persons. A project group was established in 1996 and consisted of representatives from the police, the Road Directorate, the Danish Road Safety Council and the Municipality of Copenhagen.

The project targets were expressed as:

1) a 40% reduction of traffic injuries among elderly in year 2000 as compared to 1986-87

2) lower speeds

3) increased number of options to cross the street

4) increased knowledge in traffic behaviour among elderly

5) improved road safety for other age groups

A draft design was presented in December 1996. The first building meeting was held in August 1998. An invitation to submit tenders was launched at the same time. The reconstruction was finalised in December 1998.

Public participation

In 1997 a questionnaire was distributed to appr. 1000 randomly selected elderly persons living along or close to Frederikssundsvej. The questionnaire contained questions about mode of transport, perceived risks and knowledge about traffic regulations. Later, as a consequence of the questionnaire, a leaflet informing about give-way rules at bus stops was distributed. Continuous meetings with the elderly councils and the bus planning authority to discuss strategies. There were also some 20 events with elderly clubs. The reconstruction design was the product of a co-operation between the project group, the bus planning authority, the elderly councils and was influenced by the responses to the questionnaires distributed to the elderly residents. Before the start of the reconstruction another leaflet was distributed informing about the project. In the implementation phase local shopkeepers were informed about the project.

Frederikssundsvej before

Cycle lane marked on the carriageway

Frederikssundsvej after

Segregated bus lane

Frederikssundsvej before

Introduced measures

The reconstruction consisted of the following elements:

- a painted median strip marked with white lines and red asphalt
- kerbed median islands
- sidewalk extensions in connection to the median islands; the same width as the parking lane.
- zebra stripes
- platforms between cycle path and bus at the bus stop
- blue painted cycle crossings
- changes of the signal phases to increase capacity for motorised traffic
- reduced number of parking spaces

Frederikssundsvej after

Effects

By introducing a median all along the street, as a painted "ghost" median at stretches and kerbed islands at crossings, the expected effects were reduced speeds, decreased overtaking and consequently fewer injury accidents.

	Traffic space width (m)	Median (m)	Number of traffic lanes in each direction
		Section 1	
Before	11,5	-	1 (2 at intersection)
After	8,5	3	1
		Section 2	
Before	11	-	1 (2 at intersection)
After	8	3	1
		Section 3	
Before	14	-	2
After	12	2	1,5-2

<u>Traffic flow</u>

Reduction of motorised traffic volumes by 16%. The AADT for motorised traffic is around 20 000. Bicycle traffic increased by 52%.

Frederikssundsvej before

<u>Traffic safety</u>

There has been a general improvement of the traffic safety situation in the Copenhagen area between the before and after period. Taking this into account there is, nevertheless, a 32% reduction in the number of killed and injured between the before and after period.

Vehicle speeds

At section 1 the vehicle speed was measured before and after the reconstruction. The average speed was reduced by 8 km/h from 52.4 to 44.4 km/h. The reduction of the 85th percentile was of the same magnitude, from 61.3 to 53.2 km/h.

Mode of transport

Between the before and after situation the number of bus passengers increased by 10%.

Frederikssundsvej after

Comment

There are many positive comments to the Frederikssundsvej project: The median has lowered the speeds and improved crossing conditions, especially for the elderly. The islands at bus stops have improved conditions considerably for cyclists and bus passengers. The blue painted cycle crossings have reduced accidents between cyclists and turning cars. There is, however also some annoyance with the project: Migration of traffic to adjacent roads. Congestion - which however is due to missing green waves and not due to the reconstruction.

To conclude - the comments to the project are mixed but generally users seem to be happy with the reconstruction.

Example four: Ikonomidi Street

Country: Greece
City: Kalamaria

Kalamaria is one of the fifteen Municipalities of Greater Thessaloniki Area (GTA), the second one in population size, after the central Municipality of Thessaloniki (its actual number of residents is approximately 120.000). Ikonomidi is located at the northwest part of Kalamaria.

The case street is approximately 1.100 meter long. The daily traffic volume is 8.000-10.000 vehicles, including 2 public transport (bus routes). Buildings at Ikonomidi street study area have 4 floors in average, mainly with residential use.

Problem

Until 1995, Ikonomidi was a two-direction collector street with low traffic volumes. Due to traffic problems of the adjacent street, the Traffic Plan of 1989 proposed one-way operation, Ikonomidi being the second street of the pair of one-way streets. Therefore, in September 1995, Ikonomidi street was turned into one-way operation. After the implementation of the scheme, Ikonomidi became an arterial, passing through a purely residential area. As a result, the traffic volume increased significantly, the environmental conditions and the road safety deteriorated, the illegal parking on the sidewalks caused further problems both to pedestrians and traffic flow.

Street: Ikonomidi

Kalamaria and Ikonomidi Street Area

Decision- and design process

The implementation of the new traffic scheme and the deterioration of the environment caused strong reactions from the inhabitants. Therefore, the City Council decided that the Municipality should take some action to improve the place function of the street and to do something about the unpleasant effects of the one-way scheme.

The Technical Department of the Municipality started to work with the residents in order to record all experienced problems and suggestions to improvements.

Public participation

The public was involved in each stage of the design process. They met one by one with the technicians expressing their problems and visions and commented on the study.

Introduced measures

- Reduced space for motorized traffic
- Increase of on-street parking facilities
- Traffic calming measures in sections with sensitive land uses
- Improvement of pedestrians level of service
- Enhanced area aesthetics

The interventions were mainly towards a safer environment. The street width was reduced from 10,5 to 8,0 m and parking bays were constructed along the sidewalks. The carriageway pavement was changed in front of the school complex and a pedestrian-activated traffic signal was installed. Traffic signals were also installed at two major junctions, and road humps were constructed at every priority junction at the approaches of the vertical local streets. Warning and control traffic signs, as well as pavement marking were applied, including marking signs on the pavement. Finally, the sidewalks were reconstructed with new materials and design, new lighting poles were installed and the sidewalks planting was reformed and organised in a better way. Therefore, both the operational and geometric characteristics of the street were changed.

Effects

Ikonomidi is a one-way arterial street and has remained so after the reconstruction. The average daily traffic volume hasn't changed, however both the pedestrian safety and flow conditions have improved significantly. The speed level has decreased and the crossing of the street has been improved. Also, the illumination and the greenery has upgraded the aesthetics of the area.

Playground

Zebra crossing in front of the school complex

Comment

Ikonomidi street is an example of how the place function of an arterial street can be upgraded without changing its link status. In addition, after the implementation of the reconstruction scheme, there are no reactions about the one-way operation of the street. Overall, the general feeling, both for the decision making process and the existing situation of the street, is positive.

Guard railing in front of the school, parking bays & colourful slab patterns

Example five: Meridiana Avenue

Country: Spain
City: Barcelona

The Meridiana Avenue is situated in the northern part of Barcelona and is the major access road from the north to the centre of the city. It connects with three external important motorways in the urban and interurban area. The facades are formed by mayor blocks with mainly dwellings from 4 to 10 floors. The ground floor contains shops and some small industries and garages.

The buildings are from different decades in the 20th century. The most important part from the 60's and 70's.

Under the boulevard train and metro lines with mayor stations are running, which made it problematic to plant trees along the street when the former design was put in place during the 60's and start of the 70's.

Before

After

Problem

The boulevard had two main commitments: canalise access traffic to the centre of Barcelona and communicate the northern quarters of the city with the centre. Since the end of the 60's the Meridiana Avenue has been connected with the north motorway to Girona and France. The boulevard – or urban motorway – was constructed with two central carriageways and two service roads, each with 3 lanes. In the service roads one lane was used for delivery vans and/or parking. The separation between the carriageways was narrow (aprox. 1.5 m), and many pedestrians were hit while waiting for crossing at light signals.

Constructed partly as urban motorway, there were up to 900 metres between footbridges or signalised pedestrian crossings. This situation reduced the effectiveness of the many bus services along the avenue.

The 6 central lanes experimented high speed level outside peak hours which lead to many accidents especially with pedestrians. The most heavily charged stretch of the Meridiana Avenue supported 145.000 vehicles per day, with the following noise and emission problems. A high share of heavy goods vehicles incremented the environmental pressure.

Decision and Design Process

Before the Olympic games in 1992 a second motor ring road was built around Barcelona which absorbed part of the access traffic through the centre. A basic traffic idea was decided by the Municipality. The lower traffic and road space demand of the Meridana Avenue, inside the ring road area, should be passed over to pedestrian, cyclist and public transport uses. It was therefore decided to enlarge the sidewalks, reduce the number of traffic lanes by two or four, dependent of the stretch of the road, and eliminate service roads. Even so the new design maintain between 8 and 10 lanes for the motorised traffic.

The design was organised and decides in the Urban Planning Department of the Municipality, in collaboration with the Traffic Department. No special neighbour participation took place.

Two different design options were chosen. Close to the centre (a strech of about 500 m), with less traffic demand, a cross section with a wide central median (rambla) was planned with 4 traffic lanes per direction. The sidewalks have been enlarged. In one part of this street section it is possible to park and make delivery operations.

The rest of the avenue (a strech of about 2 km) implicated a more narrow median (2.5 metres) and 5 traffic lanes in each direction. Very wide sidewalks with special public lightning for the pedestrians and with bicycle paths were constructed. The crossing possibilities have been improved, with the opening of two new intersections with their corresponding pedestrian crossings. The barrier effect has been reduced considerably.

The conditions for motorised traffic have been maintained and have even been improved due to the effect of the ring road. The permeability has gained, especially for pedestrians with better waiting conditions for pedestrians who have to wait in the centre median.

Trees have been planted along most of the boulevard, where train tunnels and stations permit sufficient space. Outside peak-period vehicle speeds are lowered due to the new design. Mean speed has however increased due to general less traffic volume. Overall safety has been improved.

Introduced Measures:

Before

- *4 carriageways with 12 lanes*
- *80 km/h speed limit in central lanes*
- *3 medians, 1-1.5 meter wide*
- *Up to 900 metres between pedestrian crossings*
- *Sidewalk width: 1-6 m*
- *Sparsely greenery*
- *Public lighting only for vehicles*

After

- *2 carriageways with 8 to10 lanes*
- *50 km/h speed limit*
- *2.5 metre wide central median*
- *300-350 m between pedestrian crossings*
- *Sidewalk width: > 10 m*
- *Trees on both sides in most of the length of the street*
- *Public lighting both for pedestrians and vehicles*
- *Bicycle lanes on sidewalk on each side of the boulevard*

Effects:

		After
Traffic Flow Car flow ADT	115.000 veh/day	86.000 veh/day
Lorry flow ADT	28.000	2.000
Mean Speed	19 km/h	24 km/h
Personal Injury accidents		
Collisions		
Pedestrian accidents		

The Barcelona motor ring road has helped to reduce the traffic level and especially the number of heavy goods vehicles on the Meridiana Avenue. This permitted a reduction of the width of the carriageway without reducing the service level for the motorised traffic. The street life is now under important change with more pedestrians on the sidewalks, partly because more shops open taking over the space from the small industries and garages.

The improvement of the crossing possibilities for pedestrians has changed the street; from a through way with an important barrier effect separating city quarters, to a more urbanised arterial street with better conditions for a larger group of street users.

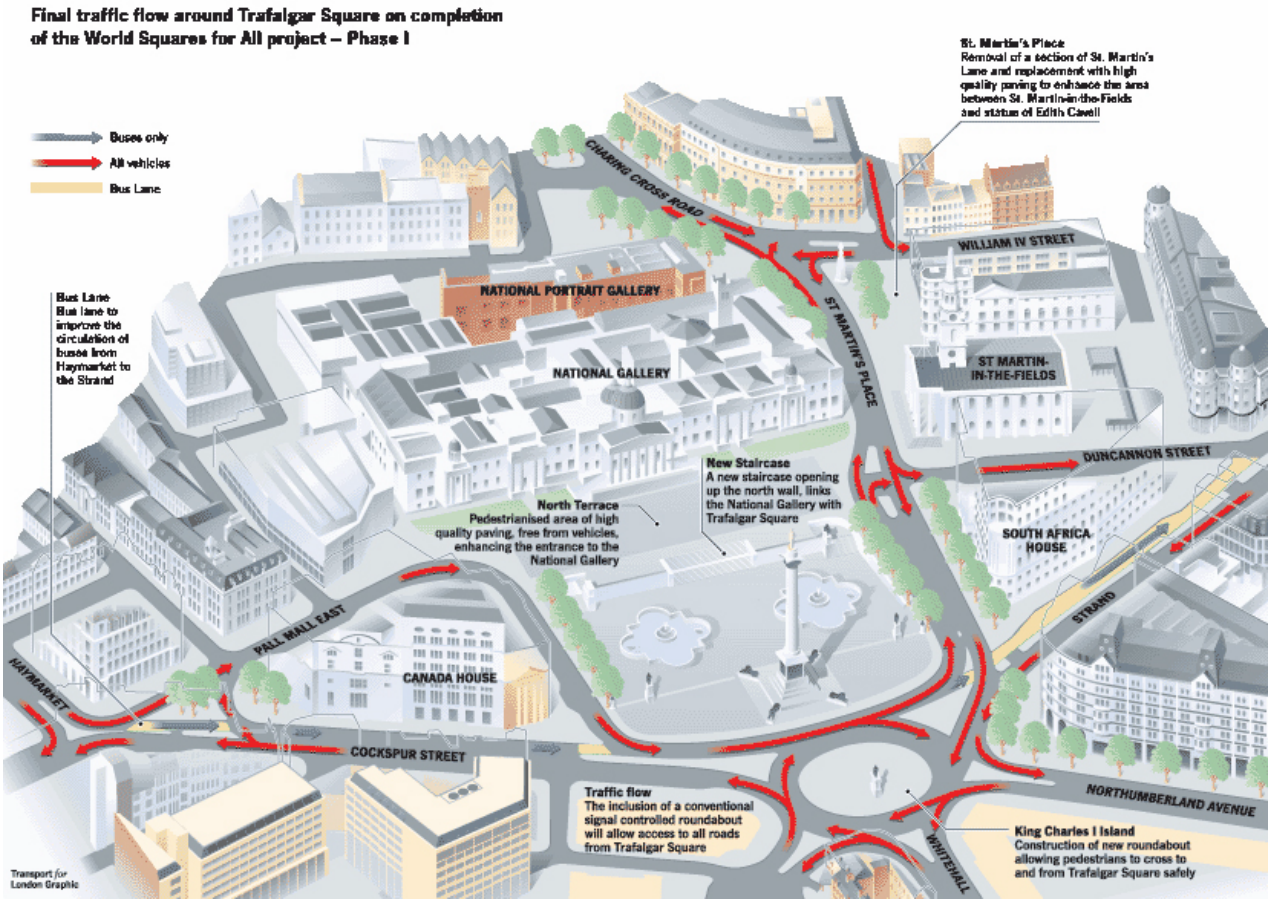
Example Six: Trafalgar Square

Country: UK
City : London

Trafalgar Square is located at the very centre of London and its statue of Charles the First is used as the origin point for calculating all London distances. London's most famous square was designed by John Nash and laid out between 1829 and 1845 to commemorate Nelson's victory in the battle of Trafalgar. Since then it has become a landmark of London and site to many historical events, art exhibitions, public gatherings, celebrations, protests and victory parades

Problem

The area formed one of the busiest traffic junctions in London, the Square being dominated by a traffic gyratory with poor pedestrian access. Despite this, it attracted large numbers of visitors. Key pedestrian routes were difficult and required people to take long detours instead of direct routes along desire lines. Because of the lack of pedestrian crossings, there were serious accident problems at adjoining junctions and along North Terrace. The main problem was the vehicular dominance of what should be a pedestrian-friendly civic space.



Decision and Design Process

The project (part of World Squares for All study) was commissioned in 1996 and while previous studies had recognised Trafalgar Square's failure to fulfil its role as an important civic space, this study recognised the area as a public square of international importance.
With the central objective of improving access for everyone, a new masterplan proposed a scheme that tried to resolve the conflicting needs of traffic and pedestrians. Extensive negotiations with planning authorities, heritage groups, local businesses and residents, Londoners and visitors, a client steering group including national and local government offices, departments and agencies ensured that all key user groups were consulted and their views influenced the design.

Backed by wide public support, the reconstruction was completed in 2003. Total project cost was £25 million.

Before – North Terrace is part of a gyratory

***After** – North Terrace is part of Trafalgar Square*

Introduced measures

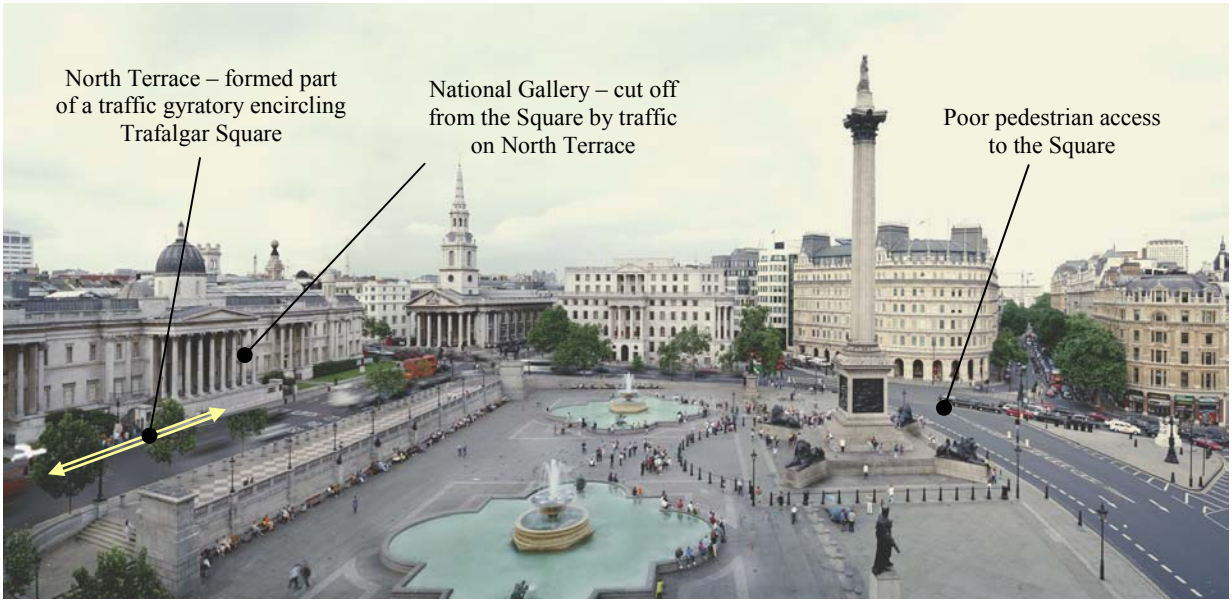
Before the redesign, North Terrace acted as part of national route A4 connecting London to Bristol. The key redesign feature was the pedestrianisation of North Terrace that reconnected the National Gallery and further enhanced the square to be enjoyed by everyone. To make this possible, traffic was re-routed around the square and comprehensive traffic changes were carried out.

A variety of measures were designed at 28 junctions adjacent and in the surrounding area of Trafalgar Square. Most introduced improvements to pedestrian facilities, such as new protected crossing points, increased crossing times and reduced waiting times. Several new bus lanes were installed in Piccadilly and Whitehall.

Redesign also included streetscape and environmental improvements such as new surfacing of pedestrian areas, installation of public toilets, new lifts (enabling access between two levels of the square), new cafe, seating, comprehensive re-lighting and landscaping.

***Before** – Trafalgar Sq is dominated by a gyratory*

After – enhanced public space with a central staircase joining the Square with the National Gallery and pedestrianised North Tce gyratory



Trafalgar Square before reconstruction *– North Terrace (on the left) fragments the square as part of a roundabout around a gyratory providing poor pedestrian access.*

Trafalgar Square after reconstruction *– North Terrace was pedestrianised, now acting as better pedestrian link in the area and connecting the National Gallery to Trafalgar Square. The new space reinforces Trafalgar Square's status and value as a 'World Square'.*

Effects

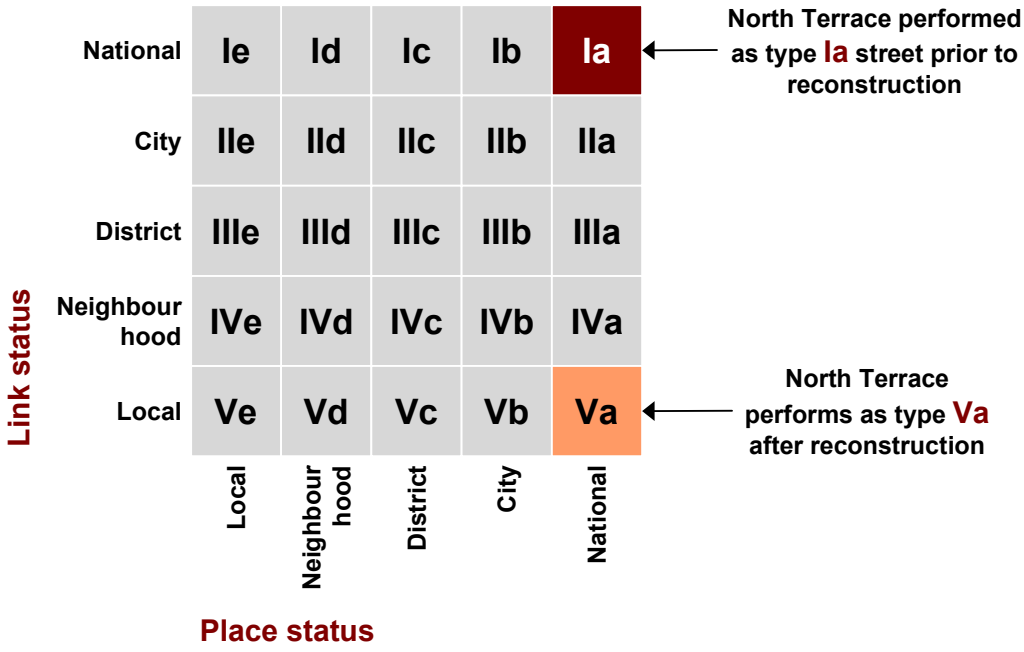
The closure of North Terrace and the wider works described above resulted in a 40% reduction of traffic in morning and evening peak periods, representing a reduction of 3,000 pcu's. Part of the reduction was accounted for by the Congestion Charge scheme (which in 2003 introduced a £5 charge for all cars entering central London), whilst the remainder was gradually displaced over a wider area of Central London to ensure that no individual junction became significantly worse.

In addition, the prioritization of pedestrian movement has been significantly improved with increased pedestrian crossing and clearance times at ten of the junctions and doubled pedestrian times at five of the junctions.

The project has succeeded in improving pedestrian access at Trafalgar Square with parallel improvements in the amenity, function and design of the public space and streetscape.

Comment

In terms of ARTISTS classification table, North Terrace acted as a **Ia** type road before reconstruction. The redesign re-weighed the relative significance of the A4 as an arterial route and Trafalgar Square as an urban space and an important national landmark, and placed a much higher importance on North Terrace to function as a place. Now it could be classified as a type **Va** on the ARTISTS classification table.



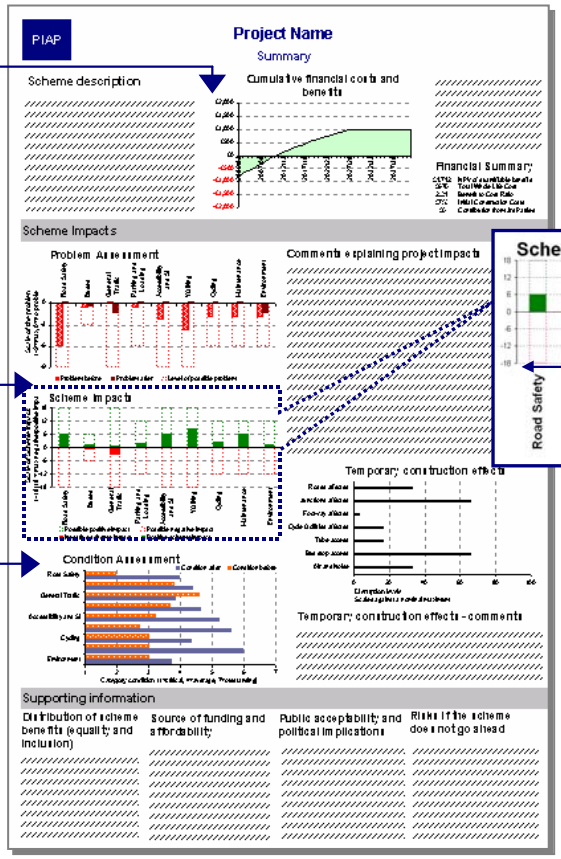
APPENDIX D
PIAP - PROJECT EVALUATION TOOL

In 2004, Transport for London (TfL) developed a new appraisal process (under trial at the time of writing) for all TfL street infrastructure projects under £2 million. PIAP (Project Identification, Appraisal and Prioritisation) is an excel-based tool, containing a number of forms/tabs that assist users in project identification, internal consultation, evaluation of project impacts and obtaining approvals. Below is a view of a PIAP Summary sheet (one of many PIAP components) that presents some of the outputs of the PIAP evaluation:

Financial analysis of quantifiable costs and benefits represented as a cumulative cash flow graph and ratios – benefit to cost ratio, net present value and whole life cost

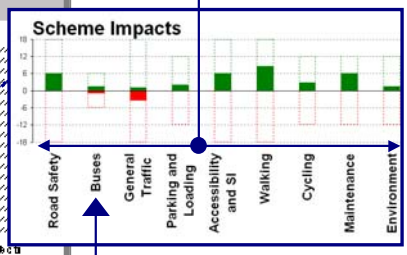
The Scheme Impacts chart in PIAP represents: in green – cumulative positive impact and in red – cumulative negative impact.

Condition Assessment chart in PIAP shows condition for a priority area for existing situation (orange bars) and estimated condition after project implementation (blue bars).



The underlying principle of PIAP is assessment of both existing site conditions and estimated conditions after scheme implementation for all criteria on a seven-point condition scale (from 1-critical to 7-outstanding). Average criteria scores for each of the nine priority areas are then graphically plotted on the charts with comparative bars for 'before' and 'after'.

The basis of PIAP appraisal is a multi-criteria analysis based on nine priority areas derived from London Mayor's Transport Strategy.



Between four and eight criteria were selected to represent each of the nine priority areas. For example, selected criteria for 'Buses':

* *Journey time reliability*
* *Journey time duration*
* *Waiting conditions*
* *Alighting and boarding, accessibility*
* *Bus ride quality*
* *Effectiveness of shared taxi and bus facilities*
* *Enforcement of bus strategy measures*

PIAP draws together traditional financial assessments with a new more lateral approach and thus presents a more balanced and broader view of the project's impacts. PIAP captures project strengths and weaknesses and presents a project evaluation tool to assist stakeholders, consultees and decision-makers in making a decision about the project.

APPENDIX E
LIST OF ARTISTS DELIVERABLES

Deliverables within the project

WP1 - Classification and assessment of arterial streets

D1 A framework for classification and assessment of Arterial Streets. Prepared by Stephen Marshall, Peter Jones and Ian Plowright, University of Westminster. 2004.

D1.1 A first theoretical approach to classification of arterial streets. Prepared by Stephen Marshall, University of Westminster. 2002.

D1.2 A first theoretical approach to sustainability consepts and assessments tools. Prepared by Ian Plowright, Univ of Westminster. 2002.
Appendix - Approach of the Sustainability Concept - Internal technical note. Prepared by D'Ieteren Emmanuel, Morelle Sylvaine, Hecq Walter Centre for Economic and Social Studies on the Environment Université Libre de Bruxelles. 2002.

WP2 - Comparative assessment of European arterial streets

D2 European Arterial Streets. Historic changes, Existing situation and processes. Prepared by Søren Underlien Jensen, Atkins. 2004.

D2.1 Existing problems on arterial streets. Prepared by Paulo Ribeiro and Pires da Costa. University of Porto. 2004.

D2.2 Existing Decision-Making and Design Processes. Prepared by Søren Underlien Jensen, Atkins. 2002.

D2.3 Long and Short Term Effects of Arterial Street Design and Traffic Control. Prepared by Panos Papaioannou, Fani Hatziioannidou, Aristotle University of Thessaloniki. 2002.

WP3 - Stakeholder participation

D3 Stakeholder participation in the reconstruction process. Prepared by Jytte Thomsen, Intra S.L. (2004)

D3.1 Participation Tools. Prepared by Jytte Thomsen, Intra S.L. 2003.

D3.2 Decision, design and prediction tools. Prepared by Søren Underlien Jensen, Atkins. 2004.
Appendix 1: Poster of street elements and posters from 13 reconstructed streets
Appendix 2: Street Elements Information pack
Appendix 3: Transparent Overlays

D3.3 Evaluation of tools for the reconstruction process. Prepared by Jytte Thomsen, Intra S.L. 2004.

WP4 – Practice for the future

D4 Arterial Streets – guidance for the future. Prepared by Åse Svensson, Lund University. 2004.

Various other reports produced within ARTISTS

National reports
Inventory of 48 arterial case study streets in 9 European cities. The inventory includes both reconstructed and unchanged streets. The reconstructions are, however, not realized within the frames of the ARTISTS project.
Case Study Guide – a manual for writing the national reports
Technical Annex – specific details regarding the data collection
National reports from: Denmark, Greece, Portugal, Spain, Sweden, Hungary, UK, Germany and Belgium.

Summary of stakeholder participation at national street study cases: Kalamaria, Greece. Girona, Spain. Freiburg, Germany. Copenhagen, Denmark. Malmö, Sweden. London, UK.

Focus groups 1 and 2 (Problems, needs and visions)
Participation Forum Guide WP3 - Focus Group 1 and Focus Group 2
ARTISTS FG1+2 Guide for evaluation
ARTISTS FG1+2 Evaluation report

Focus group 3 (Design workshop)
Participation Forum Guide WP3 - Design Workshop
ARTISTS FG3 Guide for evaluation
ARTISTS FG3 Evaluation report

Focus group 4 (Seminar/Exhibition)
Participation Forum Guide WP3 - Seminar Guide - Event Guide
Participation Forum Guide WP3 - Seminar Guide - Design Guide
ARTISTS FG4 Evaluation report