

AN INCREMENTAL STRATEGY FOR ACCESSIBLE URBAN TRANSPORT

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INTRODUCTION

National policy and legislation articulates the responsibility of both government and civil society to promote the full integration of people with disabilities into society (INDS, 1997). This includes the instruction to government to “take steps to reasonably accommodate the needs of [persons with disabilities]” (Section 9, Promotion of Equality and Prevention of Unfair Discrimination Act, 2000).

As an enabler, transport plays a major role in achieving these goals. A number of initiatives have been launched at local, provincial, and national government level to improve the accessibility of the transport system to people with disabilities. These have ranged from installing kerb cuts and ramps at some CBD intersections and new transport facilities, to launching higher cost demonstration projects involving full-size buses retrofitted with wheelchair lifts (e.g. Durban), Dial-a-Ride services operated by smaller accessible vehicles (e.g. Cape Town and Johannesburg), and state-of-the-art low-floor buses (e.g. Cape Town, see Hugo and Stanbury, 2001). These efforts have contributed to the growing local experience with accessible transport (Venter and Mokonyama, 2001). Yet their overall impact has been limited. Implementation has been small-scale and piecemeal, without a long-term plan for the effective utilization of resources.

The Integrated Transport Planning (ITP) process mandated by the National Land Transport Transition Act (NLTTA, 2000) and its regulations presents opportunities for local authorities to address accessibility issues within a holistic framework for the development of transport from the strategic planning phase through to the identification and prioritisation of projects. The process also makes provision for extensive public participation throughout the planning process. Yet very little experience exists on integrating special needs issues into the planning process. The danger is that local authorities, faced with an enormous accessibility problem, scarce funds, and pockets of very vocal demand, will continue to follow a fragmented approach to accessibility. The question is, how does a local authority use its resources wisely to achieve real benefits for people with disabilities? Where does it start?

This paper suggests a practical approach towards planning accessibility improvements to maximise their impact. It argues for a spatially focused approach that pays deliberate attention to the whole travel chain, which provides ample opportunity for input by people with disabilities, and which plans for the incremental implementation of improvements as technical and funding constraints are solved. The concept of “strategic accessible corridors” is proposed as a working concept, and illustrated using a real-world example. The concept is informed by lessons drawn from South Africa and other developing countries, particularly in Latin America.

POINTS OF DEPARTURE

The concept of strategic accessible corridors is introduced against the following background:

- The primary policy objective is to integrate people with disabilities into the mainstream public transport system. This has been made clear in the Integrated National Disability Strategy, Section 4 of the NLTTA and other policy documents. (This does not ignore the reality that some people with greater mobility needs cannot use accessible public transport and require more specialised forms of transport such as Dial-a-Ride.) Strategic accessible corridors are primarily aimed at improving mobility along mainstream public transport routes.
- The emphasis of current transport policy and legislation on the needs of people with disabilities may be appropriate given the historic exclusion of this group, but it may also promote the marginalisation of accessibility issues as issues affecting only a small portion of the population. In fact, accessibility should be seen as a necessary ingredient of improving the usability of transport systems to all users. Investments in accessibility should therefore be seen (and presented to decision makers) as investments in future users.
- The accessibility debate in South Africa has tended to be dominated by predictions of the astronomical costs of making all public transport fully accessible. This has led to some paralysis on the part of government and formal transport operators. Without discounting the cost issue, it must be remembered that significant benefits can result from adopting small-scale, low-cost improvements in an incremental manner. For instance, a recent review of international lessons on accessible transport identified twenty "first steps" that can be implemented over two or three years for approximately 1 to 2% of an annual budget of a transit operator (NDoT, 2001). Indeed, some operators in South Africa are already following an incremental approach, such as Johannesburg Metrobus with their purchase of 10 fully accessible buses. The focus should thus be on what can be achieved with current resources, and where we should start.
- Internationally, political pressure for performance has sometimes led to the adoption of arbitrary quotas, for instance that 10% of a fleet will be wheelchair accessible by a certain date. Such approaches run the danger of ignoring other important barriers to mobility, such as insensitive operating procedures, and inaccessible pedestrian environments. The ultimate test of any strategy is whether it results in higher usage. This argues for a holistic approach to improving accessibility.

CONCEPT OF STRATEGIC ACCESSIBLE CORRIDORS

Principles

The concept of strategic accessible corridors could be useful as the basis of an incremental strategy for moving towards greater accessibility in urban transport. Key parts of the transport network are identified and targeted for upgrading, on the basis of highest cost-effectiveness, and in a systematic manner. Elements of accessibility are combined so as to achieve accessible nodes, linked by accessible corridors.

Strategic accessible corridors are based on the concept of accessible pedestrian networks developed by the US Department of Transportation (USDOT, 1980). The principle states that "the sum of the measures implemented to improve accessibility must lead to an accessible system that is continuous and comprehensive in its service to all desired destinations" (p2). Thus vehicles, transport facilities, waiting areas, and the pedestrian environment – in short, all elements of the travel chain – must combine to guarantee effective mobility.

The concept should be applied simultaneously on several levels to achieve a single accessible system (Figure 1):

1. It applies firstly on a citywide scale, where key corridors are identified for accessibility improvements. This leads to spatial focusing of investment and prevents a "shot-gun approach" to upgrading.
2. At the route level, specific modes, routes, and nodes within the corridor are selected for treatment, and vehicle and infrastructure improvements are then targeted at these elements first.
3. Thirdly, at the facility and neighbourhood level, specific features are provided or upgraded within the nodes. Besides accessible stops and stations, these also include accessible pedestrian networks providing at least one fully accessible travel path linking common origins and destinations with the accessible public transport route.

As for the target population of these improvements, the corridor should ideally be responsive to the needs of all disabled travellers. These include people with walking difficulties, vision impairments, hearing impairments, cognitive disabilities, and wheelchair users. In some cases it may be feasible as a short-term strategy only to provide for ambulatory users, in which case full wheelchair access can be added incrementally. What is an acceptable standard for each corridor in the short term could be the outcome of community consultation and technical analysis. This applies to both the type and extent of accessibility provided. For instance, a standard of one fully accessible vehicle every hour in the peak direction may be acceptable to some communities, rather than having thirty vehicles per hour accessible to ambulatory passengers alone.

Benefits of the corridor approach

Potential benefits of the corridor approach to achieving accessibility include:

- It allows for incremental expansion as resources become available. A city may begin with one or two accessible corridors, gradually adding others as funding and opportunity allow. Scarce resources are thus applied where they can be most effective.
- It provides a procedure for integrating all elements of the travel chain to ensure complete door-to-door accessibility, even if only for a selected set of origins and destinations at first. By providing a *usable* accessible network, opportunities are created for integrating people with disabilities into the rest of society, which in turn helps to raise public awareness and leverage further funds for expanding the accessible network.
- It provides a mechanism for drawing together various roleplayers towards defining a common vision. It may make it easier to visualise the end result.
- It creates the opportunity for local input into the planning process, for instance through drafting local disability organisations into undertaking "accessibility audits" at the neighbourhood level.

- It ensures greater reliability for travellers with disabilities. Reliability has been shown to be extremely important to travellers with disabilities. Reliability is normally easier to achieve when concentrating resources at fewer locations, than when spreading them too thinly. For example, experience with introducing some 1 000 low-floor and semi-low floor buses in Argentina among hundreds of routes has resulted in a situation where disabled passengers cannot count on an accessible bus when they expect one (NDoT, 2001). Problems such as assignment of accessible vehicles and trained drivers, maintaining advertised headways and scheduling maintenance of lift equipment, can be minimised by having fewer routes with higher levels of accessibility.
- Focused corridors lend themselves better to coherent marketing, as expected users are easier to identify.

PLANNING AND IMPLEMENTATION OF STRATEGIC ACCESSIBLE CORRIDORS

Moving towards the detail of planning and implementing an accessibility strategy using the strategic corridor approach, it must be acknowledged that local experience on this matter is scarce. The purpose of this paper is not to propose specific technical solutions for accessibility. We focus on a planning approach. Numerous international (and some local) publications give guidance on the specific measures which can be implemented to improve accessibility.

Figure 2 outlines a planning methodology for strategic accessible corridors as part of the ITP process. The importance of identifying or establishing consultative bodies from the disability sector to give input during basically every stop of the process is clear. So is the need to synchronise the strategy with the programming and implementation of the ITP. Specific steps are described in more detail below.

Selection of corridors

The selection of strategic accessible corridors could be based on three basic criteria:

1. The importance of the corridor as a public transport spine

This could be indicated by high current passenger volumes (obtained from Current Public Transport Records (CPTTR)), and the inclusion of major origin and destination areas within the corridor. Major employment areas and shopping malls are examples. The objectives for accessibility need to give guidance here (Figure 2). It may for instance be decided that improved access to employment opportunities is the first priority in a particular location. Corridors which link to other (potential) corridors and major public transport interchanges are also good candidates, even if the connecting corridors and modes are not yet targeted for upgrading.

2. The current and potential demand for transport by people with disabilities in the corridor

Data on potential transport demand by people with disabilities can be obtained from the census, which records the number of disabled residents per enumeration area. Supplementary information of likely origins include the location of retirement homes and residential facilities of people with disabilities. Specific destinations such as pension pay-out points, hospitals and clinics, protective workshops, and special schools should also be identified.

3. Plans for investments in the corridor

When selecting corridors, the potential for cost-effective upgrading of its modes must be considered. For example, upgrading rail corridors is likely to be expensive unless undertaken as part of the station refurbishment programme of the SARCC. Municipalities may find it more feasible to focus on corridors with bus and taxi services first.

Identification of routes and nodes

The same principle of seeking the highest effectiveness for the lowest marginal cost can be applied within the accessible corridor to identify specific modes and routes for treatment. However a large amount of pragmatism is also needed. Many corridors in South African cities are served by two or even three public transport modes, typically minibus-taxi and bus or rail. Until the taxi recapitalisation project gets off the ground, accessibility improvements to taxi vehicles will be hard to implement. As a start, local authorities may have the most leverage with the bus mode, as the planning and monitoring of bus services is a local competency (presently in conjunction with provincial authorities). If rail stations within identified accessible corridors are refurbished, they should be required to have full accessibility features. It also makes sense to ensure that all transport facilities that are constructed within (present or future) accessible corridors are constructed to be accessible, to avoid retrofitting them later at much higher cost. In the interest of affordability the focus may initially be solely on the main mode within a corridor, and not its feeder modes.

Even though this discussion focuses on achieving greater accessibility within the mainstream modes, the approach is flexible enough to allow for specially designed services as a short-term solution. Good examples are the fixed-route accessible bus services operated as demonstration projects in Durban and Pretoria: although they broadly follow commuting corridors, the routes are specially designed with the origins and destinations of users with disabilities in mind.

Not all stops and stations within a strategic corridor need to be targeted initially for accessibility improvements. The focus could once again be on identifying nodes with the highest impact and lowest cost. Data for this exercise could come from the corridor selection step, supplemented by visual surveys and local user input. Depending on the resources available for data collection, "indigenous knowledge" may be a significant source of information.

Planning of accessibility features at the facility and neighbourhood level

The analysis and design of individual elements in the travel chain could start with an audit of the existing situation, to identify specific barriers and problem areas. Use of an accessibility checklist could be helpful, such as the checklist developed by the Institution of Highways and Transportation in the United Kingdom (1991).

Solutions to accessibility problems are needed in at least three areas:

- Design (of infrastructure and vehicles)
- Operations (for instance, keeping vehicles stopped for long enough for disabled passengers to find a seat)
- Knowledge and Attitudes (of drivers, conductors, station personnel, and co-passengers)

Many technical and attitudinal challenges still beg solutions. Some local design guidelines are available to guide the development of local solutions, such as the National Building Regulations (SABS 0400-1990), NDoT guidelines (1992) and Pedestrian Facility Guidelines (Ribbens 1993). Numerous overseas publications, such as the recommended guidelines published by the Disabled Persons Transport Advisory Committee in the UK (various dates) are available on the web (www.mobility-unit.dtlr.gov.uk). These have to be applied with caution to local circumstances.

An element of implementation that is often overlooked is maintenance, particularly of sidewalks and kerb cuts. Maintenance of infrastructure within accessible corridors need to be programmed as a necessary part of providing guaranteed mobility.

ILLUSTRATIVE EXAMPLE: THE SOWETO CORRIDOR IN JOHANNESBURG

In order to illustrate the application of the concept of strategic accessible corridors and some of the planning steps highlighted above, an example is shown for the City of Johannesburg. The example is merely notional, intended to be indicative of possible solutions that may be found at corridor level. It follows from a theoretical exercise, and is not the outcome of a systematic analysis of all potential corridors, nor of a comprehensive process of stakeholder input. The specific technological solutions are therefore not necessarily intended as the most appropriate solutions for this situation.

Assumptions: Standard of accessibility to be achieved

It is assumed for the purposes of illustration that a wheelchair accessible transport service is needed at a frequency of twice an hour during the peak period as the starting point of an incremental strategy. Accessible services are to be accommodated within the current service pattern, and not introduced as new services. It was decided from the start to concentrate on bus corridors, as these provide the greatest possibility for effective intervention in the short term.

Data sources and analysis

Census data (1996) was used to map the distribution of residences of people with disabilities in the City of Johannesburg. The addresses of disabled people's organisations (DPOs), workshops, and special schools were obtained from a database being assembled by the Gauteng Department of Transport and Public Works (Claassen, 2002). These were plotted together with hospitals and clinics, from the CSIR spatial database. Lastly, the 1999 CPTR provided information on major bus corridors in the region.

Figure 3 shows the output of this exercise, for clarity excluding the census data. The residential areas of Soweto and Southern Gauteng, with high numbers of captive public transport users, are connected to employment areas to the north and the CBD via strong bus corridors. Priority origins and destinations such as DPOs and special schools are scattered throughout the area, often away from public transport corridors. However a number of these can still be served by carefully chosen corridor services.

Selection of strategic accessible corridor

The corridor connecting Soweto to the Johannesburg CBD via Auckland Park was chosen as an illustrative accessible corridor (Figure 4). The 23km long corridor is presently served by Putco buses (approximately 10 000 seats per hour in the peak direction), Metrobus routes, and minibus-taxi services along all or parts of the route. The following features made this choice attractive:

- It connects the residential area of Soweto (population 1.2 million) with the important employment and transport node of the Johannesburg CBD;
- The corridor follows arterial streets along its full length, providing better access to opportunities along the way than would perhaps a freeway corridor;
- The corridor includes several DPOs such as the Soweto Workshop for the Blind, the International Sports Complex for the Disabled, the National Council for Persons with Physical Disabilities and several special schools;
- The corridor gives access to a range of destinations including shopping areas (Highgate, CBD), hospitals and clinics (notably Coronationville and Helen Joseph Hospitals), social services (community centres and government offices in Soweto), and commercial areas in Auckland Park and the CBD;
- Passengers of Metrobus and taxi services operating along parts of it can also benefit from any accessibility improvements made;
- The corridor provides access to intermodal transfer facilities at Phefeni and Dube stations in Soweto (to rail and taxi), Park Station (to rail and taxi), and Gandhi Square (to Metrobus) in the CBD -- some of which are reasonably accessible, and may in future also become fully accessible.

Identification of modes, routes and nodes

Regarding the route, accessible Putco buses (and not necessarily all buses) are rerouted to enter the CBD instead of passing it by on their way to the Northern Suburbs.

Figure 4 shows the nodes that were identified so as to include all priority origins and destinations within an accessible walking distance. Within the CBD, two large areas were identified, namely around the commercial centre, and around Braamfontein. Full pedestrian accessibility in these areas will yield wide benefits, including to passengers travelling from other parts of the city, tourists, vendors with trolleys, and so forth.

Local accessibility features

A visual survey of the route and nodes in the example corridor showed that substantial investment has already been made in accessibility, most notably in the CBD where approximately 90% of intersections already have serviceable kerb cuts. Outside of the CBD area, however, pedestrian mobility is often encumbered by narrow or obstructed sidewalks, an absence of kerb cuts, and poorly marked pedestrian crossings. Notable exceptions occur around new intersections or new building frontages, where there is evidence of user-oriented design.

Regarding public transport infrastructure, minimum requirements to bring bus stops in major nodes up to a fully accessible standard are assumed to include:

- bus shelters with benches,
- large print signage on bus poles,
- raising and broadening kerbs somewhat to decrease the first step into a bus or to provide a platform for lift operation,
- painting no-stopping zones in the roadway (where bus bays are not provided) to prohibit car parking, and
- pedestrian crossings and audible traffic signals near bus stops.

The combination of the above elements needed in each node is dictated by its current state, and its importance in the corridor. Expensive items such as shelters and audible signals are not installed in all nodes, as long as the node is physically accessible.

To make high-floor vehicles fully accessible, it is assumed that low-cost improvements such as grab rails and high contrast paint are applied inside the vehicle. Wheelchair lifts need to be installed on the vehicles, as well as hinged seats to avoid a significant loss of seating capacity. The experience with retrofitted buses in the Durban and Pretoria pilot projects is indicative of the technical feasibility of this course of action, although new operational problems will have to be solved when such buses are put into general service.

To provide an accessible bus every half-hour during the peak period, approximately eight accessible vehicles will be needed. It is conservatively assumed that accessible vehicles make only one trip in the peak period, carrying on to their usual destinations after visiting the CBD.

Bus drivers on this corridor will need to be trained on serving passengers with disabilities. The costs of this training are not included here, as training is already a cost item for operators.

Cost estimates

Table 1 shows the unit costs assumed for the calculation of the marginal cost of implementing the accessible corridor. Unit costs were obtained from audits of the Accessible Transport Pilot Projects (ATTPs) (Venter, 2000), and information from city authorities and consultants.

Table 1: Estimated unit costs

Accessibility feature	Unit cost	Source
Sidewalk repair	R100 per metre	Consultant
Sidewalk construction	R150 per metre	Consultant
Kerb cuts: installation	R750 per unit	Tshwane Metro
Kerb cuts: maintenance	2% per year	Tshwane Metro
Audible traffic signals	R300 per unit	Consultant
Major bus stops with shelters	R2 000 per stop*	Tshwane Metro
Bus stops without shelters	R1 500 per stop	Consultant
Bus: Extra cost of grabrails, paint, lift, etc.	R45 000 per stop	ATPP audits
Bus: Lift maintenance	R2 500 per year	ATPP audits

**Note: shelters erected at no cost to city.*

The total incremental costs for implementing a strategic accessible corridor between Soweto and the Johannesburg CBD are summarised in Table 2.

The estimated costs for upgrading the pedestrian infrastructure in the CBD amount to approximately R106 000, including construction and maintenance for five years. These costs are shown separately, as investments in the CBD may be thought of as investments in all future accessible corridors that connect to the CBD. The pedestrian infrastructure costs for all the nodes in the rest of the corridor amount to approximately R222 000 over five years. The estimated costs for upgrading vehicles to a minimum standard are R460 000 over five years. The total investment required for this example corridor amounts to about R788 000 over five years.

Table 2: Summary of total costs for example corridor

Feature	Estimate: extent needed	Five-year cost
Infrastructure: CBD/Braamfontein		
- Sidewalk repair	150 m total length	R 15,000
- Kerb cuts installation + maintenance	29 needed	R 24,000
- Major bus stops with shelters	12 needed	R 24,000
- Bus stops without shelters	6 needed	R 9,000
- Audible traffic signals	90 needed (major intersections)	R 34,000
	TOTAL: CBD	R 106,000
Infrastructure: Nodes outside CBD		
- Sidewalk repair	460 m total length	R 46,000
- Sidewalk construction	344 m total length	R 52,000
- Kerb cuts installation + maintenance	55 needed	R 45,000
- Major bus stops with shelters	16 needed (both sides)	R 32,000
- Bus stops without shelters	26 needed (both sides)	R 39,000
- Audible traffic signals	22 needed (major nodes only)	R 8,000
	TOTAL: Outside CBD	R 222,000
Vehicles		
- Accessibility features with maintenance	8 accessible vehicles	R 460,000
TOTAL FIVE-YEAR COST		R 788,000

Given the current distribution of functions among government spheres, the costs of accessibility could be borne by all three spheres of government. Costs of vehicle improvements will likely fall to provincial and national budgets, through the bus subsidy system. The vehicle costs in this example – about 60% of the estimated costs – amount to approximately 1,2% of Gautrans' annual subsidy budget for the Soweto bus services. Infrastructure improvements fall within the ambit of the municipal budget. Infrastructure costs in this example amount to approximately 0,3% of the Johannesburg Roads Agency's draft capital expenditure budget for 2001/02.

These costs do not appear to be astronomical – especially considering that it would provide the first guaranteed accessible public transport connecting the center of the country's largest city with its single largest residential area.

CONCLUSIONS

Government authorities are increasingly being challenged to ensure that the transport environment provides reasonable mobility to all users. People with disabilities are among the most excluded groups, and among the groups which will benefit most by improved accessibility to transport. The Integrated Transport Planning process provides opportunities for addressing shortcomings in the transport system, in an integrated, consultative and incremental manner. This paper proposes an approach that can be used to identify the most cost effective interventions at the local level. It is based on the principles of spatial targeting of interventions, and planning for incremental roll-out, in a manner which will guarantee fully effective accessibility to an agreed standard all along the travel chain. The concept of "strategic accessible corridors" can be used in this regard to build consensus and an overall vision of how accessibility is to be achieved in a city. The corridor concept may also later be modified to be applied to rural and peri-urban areas.

This planning methodology doesn't negate the fact that many technical problems still remain with respect to designing and operating accessible infrastructure and vehicles. Local experience is slowly growing, however, and the existence of a planning framework within which experimentation and learning can happen is likely to contribute. In addition, many useful concepts and solutions have already been developed in other countries, including some in the developing world.

The costs of achieving accessibility within competing budgetary needs are likely to determine the pace at which progress is made. However, the example in this paper for the Soweto-Johannesburg CBD corridor showed that the costs need not be astronomical – especially if considered as an investment in the future users of public transport.

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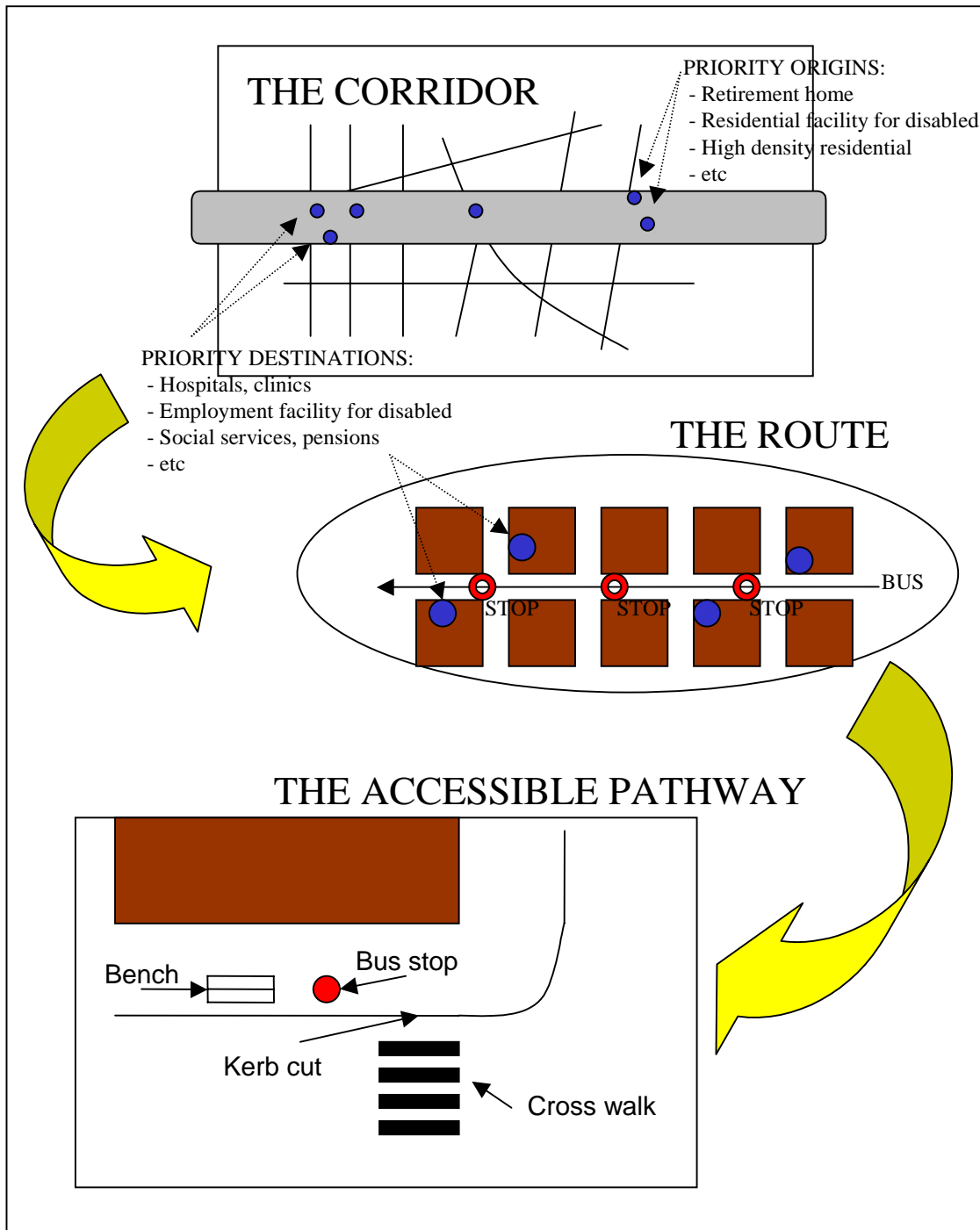


FIGURE 1: The key accessible network

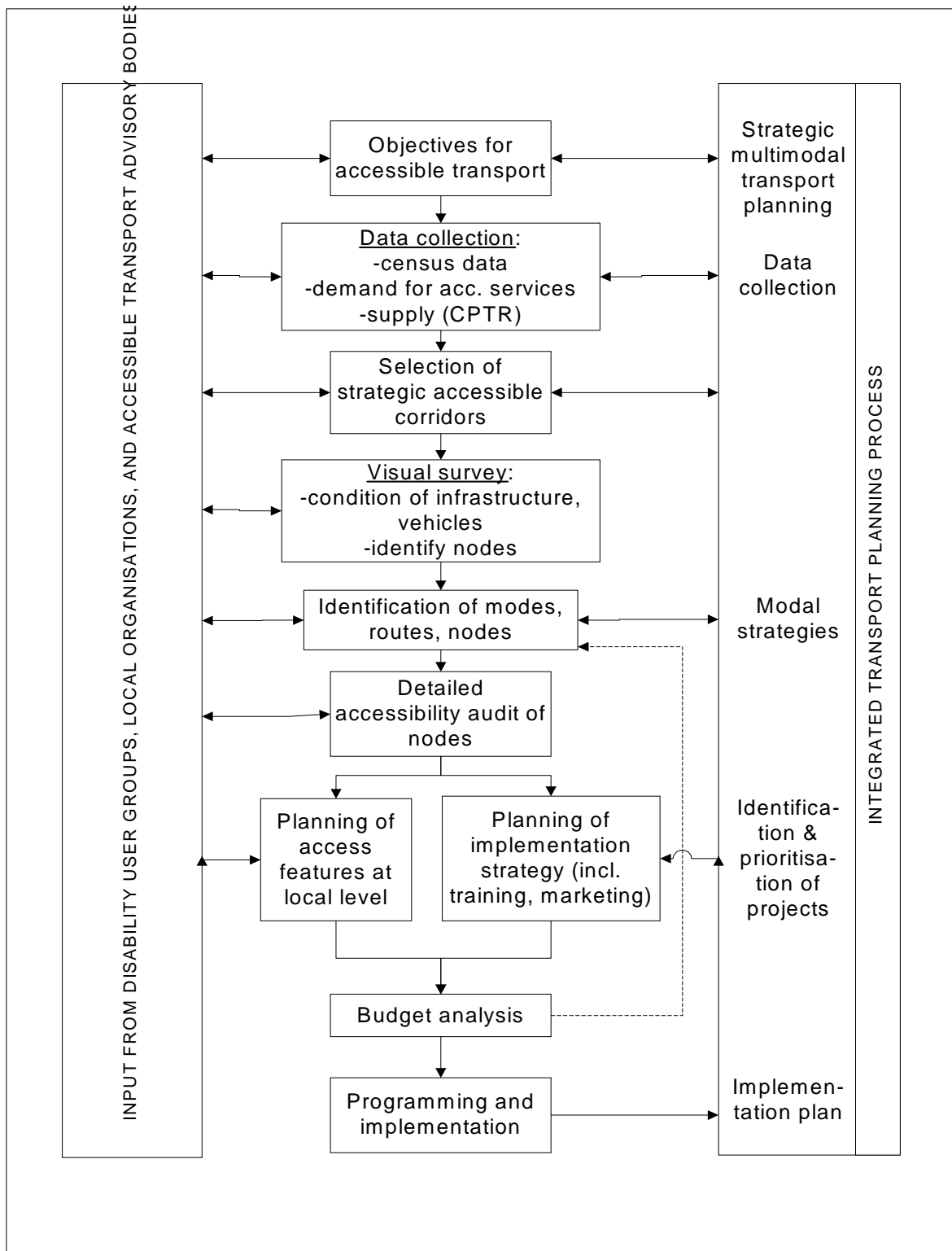


Figure 2: Outline: Planning of Strategic Accessible Corridors through ITP process

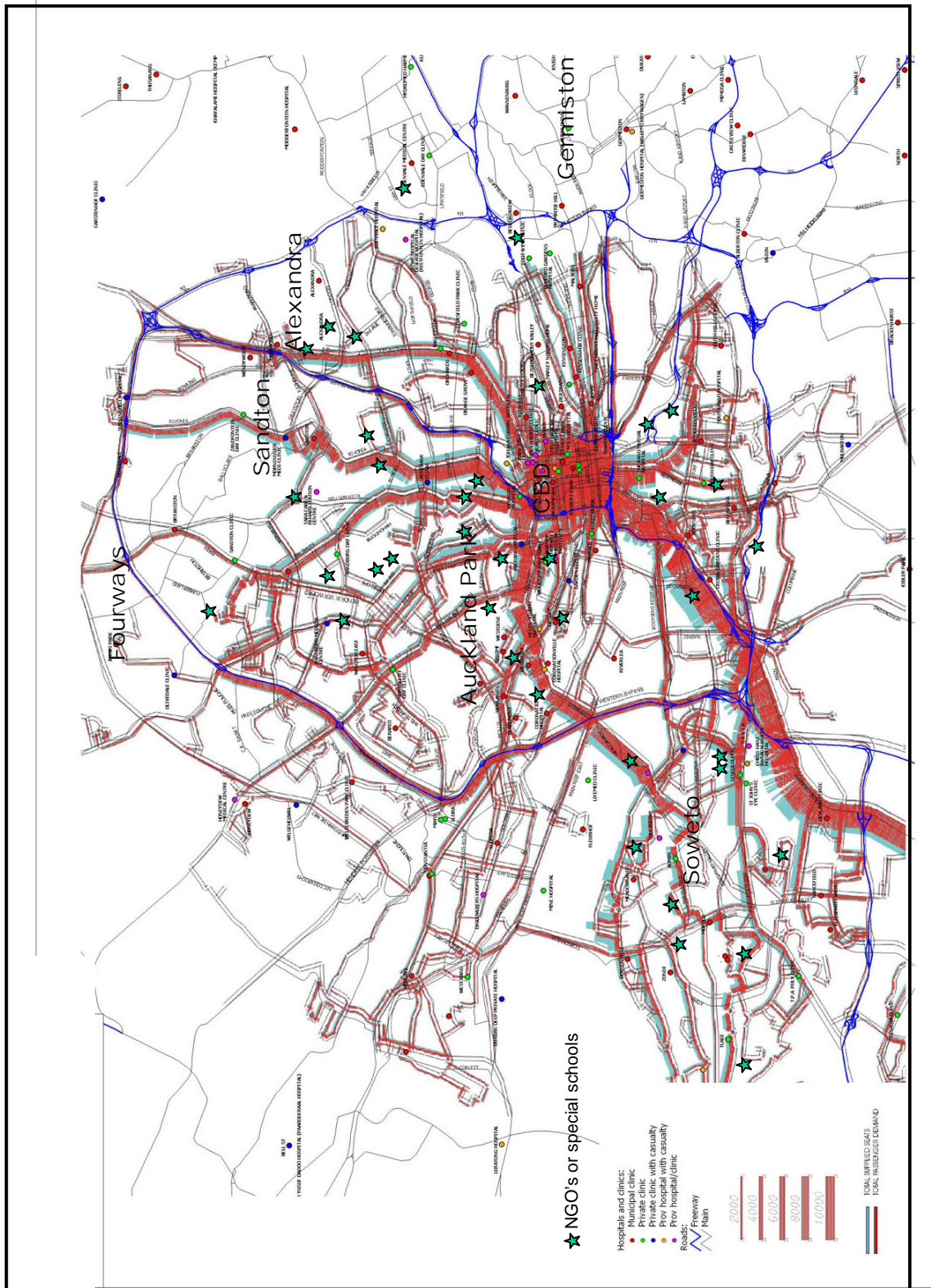


Figure 3: Major bus corridors and priority origins/destinations

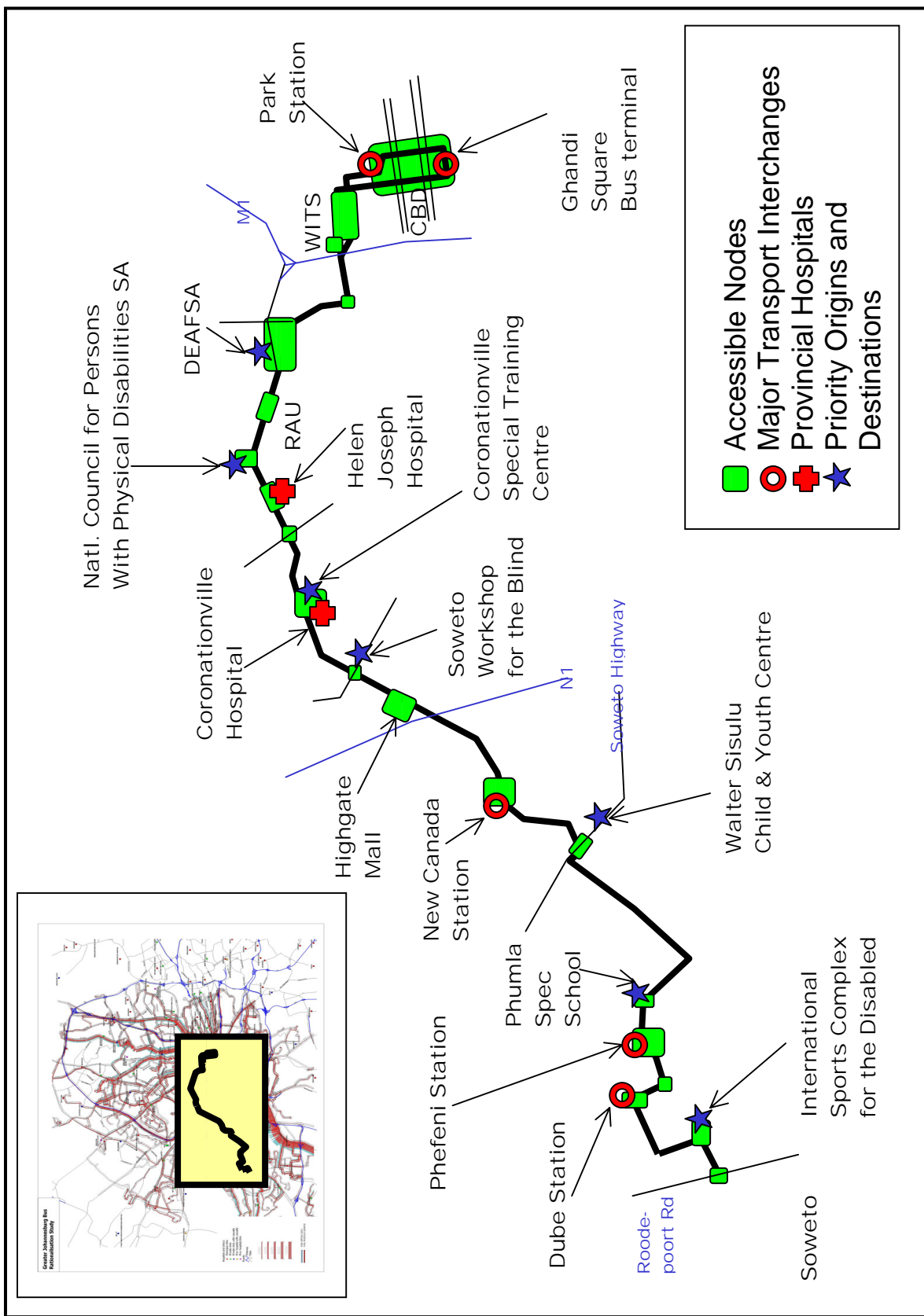


Figure 4: Example: Soweto-Johannesburg CBD accessible corridor

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