

TOWARDS A GENERAL THEORY OF CORRIDOR DEVELOPMENT IN SOUTH AFRICA

Brian Marrian (BSc TRP, MM LG&D)
CSIR Transportek, bmarrian@csir.co.za

For: Franco/South Africa Supervisors
Dr. P Freeman (South Africa) & Prof J.C. Ziv (France)

1. INTRODUCTION

In preparation for the upcoming CODATU Social Aspects Conference in South Africa, and as a final deliverable for the Franco/South Africa corridor project, this paper represents a summary of corridor development thinking in South Africa. The intention is to integrate this draft paper with Mr. Duthion's paper on corridor development in France. Both papers are predicated on case study work in both countries, the findings of which were presented as work in progress at the CODATU Mexico Conference in April 2000.

In terms of outlining a general theory of corridor development in South Africa, the discussions in this draft paper focus on the following eight areas:

- local policy and legislation on the integration between land-use and transport;
- defining public transport-land use corridors;
- pre-conditions for corridor development;
- the advantages of transport-land use corridor development;
- local and international examples of public transport-land use corridors;
- describing transport-land use corridors;
- a summary of the Johannesburg/Soweto corridor analysis and
- a summary of the Cape Town/Khayelitsha corridor analysis.

2. LOCAL POLICY AND LEGISLATION ON THE INTEGRATION BETWEEN LAND-USE AND TRANSPORT

Significant changes have been made in the local policy and legislative environment in South Africa to ensure better integration between land-use and transport. These changes are summarized in the following sub-sections.

2.1 The White Paper on National Transport Policy

In this White Paper that was published in September 1996, the vision of the South African Government for transport is set out as being:

“... to provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and transport customers at improving levels of service and cost, in a fashion which supports government strategies for economical and

*social development whilst being environmentally and economically sustainable*¹.

To realize this vision, it is proposed that the following actions be taken:

- bringing focus to the transport system. This is to be done by concentrating private and public investments on high volume routes and in major nodes. The primary network so established, and which is to form the backbone of the transport system, will also be underpinned by supporting feeder networks;
- developing inter-modal transport facilities in the nodes in the strategic and supporting networks;
- creating an environment that is conducive to the empowerment of customers and which will enable transport service providers to improve on efficiency, productivity and competitiveness;

2.2 Moving South Africa

The “Moving South Africa” policy document published in 1998 describes the most important urban strategic challenges facing public transport. Of these, sub-optimal spatial planning is seen as the biggest driver of public transport costs and also the most difficult to “turn around”. Main areas of concern that are highlighted in the document are long distance line-haul travel, very limited in-fill development on major routes and highly peaked travel demand impacting negatively on public transport vehicle utilization rates and reverse-ridership².

The document also sets out a number of key strategic actions aimed at overcoming these strategic challenges, and to fulfil the aims set out for urban public transport, such as corridor densification and the optimal deployment of modes to meet customer service requirements. With regard to the latter, it is argued in the document that commuter rail, as it is currently operated, only becomes viable in corridors of more than 30 000 passengers per direction per day. Dedicated investment to ensure such numbers is hence required in corridors that have, or show potential to reach, such numbers. In corridors where the number of passengers is between 10 000 and 30 000 per direction per day, road-based transport with dedicated infrastructure or priority measures, at least over parts of the corridor, is proposed. In the case of low ridership corridors of less than 10 000 passengers per direction per day, the policy position as spelt out in the document is that such corridors do not warrant dedicated infrastructure investment.

In a follow-up publication launched in May 1999, the National Department of Transport unveiled the “*Action Agenda*” to give effect to the objectives set out in its Moving South Africa strategy. In this “*strategic framework*”, the Department not only spells out how it will endeavour to meet the transport needs of the nation in a sustainable way, but also expresses the view that transport is “... *an enabling industry, one which exists not only to meet goals inherent to transport, but also to meet other pressing national and social objectives*”³. Included in this list of objectives are:

¹ NDoT (1996).

² It is for instance indicated in this document that whereas the average number of passengers per bus per day in South Africa is in the region of 200, the figure in Latin American and Asian countries is between 4 and 8 times as high.

³ NDoT (1999: 6, 17 and 18).

- “economic growth, creating a high and rising standard of living for all citizens as set out in GEAR and the RDP;
- increased trade, especially with neighbouring SADC countries;
- improved access to employment opportunities; and
- increased social integration”⁴.

In its vision for reaching these goals in **urban areas**, the Department opts for a very definite concept/frame comprising two components:

- a “**Strategic Network**” that forms the backbone of the system and consists of densely developed nodes and inter-connecting linear corridors which, as it concentrates travel demand in a focussed area, leads to more riders/freight per vehicle and subsequent lower unit costs⁵.
- a “**Supporting Network**” that will not only feed into and distribute customers from the “Strategic Network”, but also connect it to areas outside the core network⁶.

To give effect to this conceptual vision, the Department proposes the focussing of investment, resources and high-density land uses in these linear corridors and nodes and, in so doing, providing the necessary thresholds for public transport⁷. This, they argue, will be a 10-20 year exercise and will require very targeted interventions in the form of controls and incentives⁸.

2.3 The National Land Transport Transition Act (22 of 2000)

The main piece of legislation relating to land transport is the National Land Transport Transition Act, whereas land-use restructuring is governed by numerous pieces of legislation, (e.g. the Development Facilitation Act, the Physical Planning Act, the Local Government: Municipal Systems Act, the Removal of Restrictions Act, the Less Formal Townships Establishment Act, as well as a plethora of Provincial Ordinances and legislation).

Key legislative issues impacting on land-use restructuring are from the NLTTA:

- the national importance of the integration of land-use planning in the development process. This is borne out in clause 4(1)(j) which states that “land transport functions must be integrated with related functions such as land use and economic planning and development through, among others, development of corridors, densification and infilling, and transport planning must guide land-use and development planning”;

⁴ NDoT (1999: 18).

⁵ NDoT (1999: 21).

⁶ Ibid.

⁷ NDoT (1999: 28).

⁸ Ibid.

- land-use planning as a development tool

Clause 18(3) illustrates this by stating:

“Transport plans must be developed so as to -

(a) enhance the effective functioning of cities, towns and rural areas through integrated planning of transport infrastructure and facilities, transport operations including freight movement, bulk services and public transport services within the context of those integrated development plans and the land development objectives set out in terms of Section 27 of the Development Facilitation Act, 1995 (Act No. 67 of 1995) or, where applicable, land development objectives of that nature set out in terms of relevant provincial laws;

(b) direct employment opportunities and activities, mixed land uses and high-density residential development into high-utilisation public transport corridors interconnected through development nodes within the corridors, and the discouraging of urban sprawl where public transport services are inadequate;

(c) give priority to infilling and densification along public transport corridors;

(d) give higher priority to public transport than private transport by ensuring the provision of adequate public transport services and applying travel demand management measures to discourage private transport;

(e) enhance accessibility to public transport services and facilities, and transport functionality in the case of persons with disabilities; and minimize adverse impacts on the environment.”

This Act also provides for the establishment of Transport Authorities that will be responsible for the planning, integration, implementation and law enforcement in a “Transport Area”. In terms of the planning function, this will entail the preparation of Integrated Transport Plans (ITPs) with a twenty-year time horizon. The ITP, however, is one of five local land transport plans that link both individually and corporately to both the key municipal plan, the Integrated Development Plan (IDP) and the Provincial Land Transport Frameworks (see Figure 1). These plans must include spatial development strategies aimed at minimizing travel distances, costs and times. Guidelines and requirements for Integrated Land Use and Transport Planning will also be drafted in joint ventures between national and provincial governments. These guidelines will favour investment in activity corridors through the promotion of nodal development, in-filling, densification and the mixing of land-uses in such corridors.

3. DEFINING PUBLIC TRANSPORT AND LAND USE CORRIDORS

In this section, both local and international definitions of the corridor-concept, a conceptual frame in which a certain desired relationship between land use, economic activity and transport is articulated/postulated, are provided.

3.1 Definitions in the local literature

Most of the definitions in the South African literature have their origin in the definition put forward by **Derek Chittenden and Associates** in 1990, who defined an activity corridor as follows:

“A metropolitan scale, linear zone or area (approximately 2 kilometres wide) surrounding a major high street (or activity spine), containing high concentrations of transportation, land-uses and densities. It can be likened to a major services duct that accommodates a number of different engineering services within the one channel, or a human arm containing veins and arteries, or bones (“spines”), and elbow and hands (“nodes”). ... Activity corridors will accommodate major linear transport routes like heavy and light rail and freeways, large shopping concentrations, social, cultural, and sporting facilities as well as a large amount of residential accommodation”⁹.

Other local definitions, showing very definite similarities to that of Derek Chittenden and Associates are the following:

- the definition offered by **Andersen and Burnett** which states that an activity corridor is *“... a linear strip of land or area, connecting large activity nodes, traversing urban or inter-urban areas, surrounding a major transport facility or facilities providing an appropriate regional level of mobility and accessibility to adjacent areas, and containing a high concentration of population and mixed land uses”¹⁰*. Such a corridor will typically *“... accommodate major linear transport routes like heavy and light rail and/or freeways, large shopping concentrations etc., social, cultural and sporting facilities as well as a large amount of residential accommodation”¹¹*. A combination of so-called *“activity spines and streets”* assists in the access function of the concept, while the major routes ensure and/or sustain mobility. The activity spines/streets refer to *“... major roads or railway line(s) accommodating mixed land uses and high density development immediately adjacent to the facility”¹²*. The *“activity street”* being a *“lower order”* version of the *“activity spine”*.
- **MSA’s** definition, in which a *“corridor”* is defined as: *“A high volume transport route that links major activity centres. Corridors and the nodes that they connect are areas of highly concentrated passenger and freight customer demand and therefore require relatively large-scale investment in infrastructure and services. Corridors generally consist of a simple core route structure (which allows for higher speeds and frequencies), supported by an accessing system of feeder routes”¹³*. *“Feeders”* are defined as *“the lower-volume transport routes that provide access to the primary transport network (e.g. secondary roads with minibus taxi services which link to a high volume, express corridor via a transfer node”¹⁴*).

⁹ Derek Chittenden and Associates (1990: 5).

¹⁰ Andersen and Burnett (1998: 2).

¹¹ Ibid.

¹² Andersen and Burnett (1998: 3).

¹³ NDoT (1999: 84).

¹⁴ NDoT (1999: 85).

- the **CSIR's** definition of a corridor¹⁵ as *“a linear mixed land use element of urban structure which occurs on a series of transportation routes working together. The sphere of influence stretches in a wide band and is characterised by areas of agglomeration”*.

3.2 Definitions in the overseas literature

While not distinctly referred to as “activity/development corridors”, the concepts of *“Joint Development”*, *“Transit-Oriented Development/Planning/Housing (TOD)”* and *“The New Urbanism/Neo-Traditionalism”* in North America and Europe can be regarded as being based on the same principles and dynamics. This becomes apparent from the following definitions for these terms:

- **“Joint Development”** is defined as the *“... concurrent or sequential investment in facilities and operations”* in both *“transportation facilities and high activity nodes”* in such a way that *“... it will be beneficial to both”*¹⁶. As Roeseler and von Dosky suggest, in terms of this concept *“urban rapid transport is not viewed merely as a transportation provider, but also as a catalyst of goal-oriented, integrated, high-intensity real estate projects that would not have occurred without it”*¹⁷. While the nodes, so created, lead to the creation of high value land in and around such nodes, they also tend to induce high volume transit ridership¹⁸.

The Urban Land Institute (ULI) defines **“Joint Development”** as *“... real estate development that is closely linked to public transportation services and station facilities and relies, to a considerable extent, on the market and locational advantages provided by the transit facility”*¹⁹.

- **“Transit-Oriented Development/Planning”** (TOD/P) and **“Transit-Based Housing”** (TBH) are in reality just new names for *“Joint Development”*²⁰. As Boarnet and Crane write, *“In the broadest sense, Transit-Oriented Development (TOD) is the idea that land near rail transit stations should be developed or redeveloped in ways that encourage the best use of the transit system and that leverage the public investment in rail transit”*²¹. Ways of ensuring this include public-private partnerships to develop the land near stations, the construction of higher density housing near stations, using stations as a focus for office development and building pedestrian-oriented neighbourhoods near rail transit stations²².
- **“The New Urbanism/Neo-Traditionalism”** is an umbrella **“movement”** closely linked to TOD/P, the proponents of which *“... seek to reconnect transport with land use and, in particular, to establish transit-oriented development where higher-density, mixed use areas built around high-quality transit systems provide a focussed urban structure that can help loosen the grasp of automobile dependency”*²³.

¹⁵ CSIR (1999b).

¹⁶ Roeseler and von Dosky (1991: 325-6).

¹⁷ Roeseler and von Dosky (1991: 326).

¹⁸ Ibid.

¹⁹ From Roeseler and von Dosky (1991: 328).

²⁰ For a discussion and case studies of the concept see Boarnet and Compin (1999), Boarnet and Crane (1997 and 1998), Bertolini and Spit (1998) and Pharoah (1995).

²¹ Boarnet and Crane (1997: 191).

²² Ibid.

²³ Newman and Kenworthy (1996: 1).

3.3 The definition used in this study

For the purposes of this study, or as a summary to the above view point, a corridor is defined as a linear spatial element consisting of **two outer nodes** and **strips** and/or **inner nodes** of high intensity non-residential and/or high density residential land use that are connected by at least one **mass public transport route** which may be fed by supporting feeder routes.

4. THE PRE-CONDITIONS FOR CORRIDOR DEVELOPMENT

The following, clustered together under headings, are regarded as the most important requirements/conditions under which corridor development can take place. Some implications of the conditions for the task at hand, i.e. that of operationalising activity/development corridors in South Africa, are sketched at the end of the section.

4.1 Economic requirements/conditions

- **Pre-existence of economic viability:** Research conducted in the USA, Canada and France, as well as local sources, suggests that the area in which a corridor is to be developed must show (1) a pre-existence of strong economic growth, (2) a natural propensity and strong effective demand for further mixed use development and (3) be free of inhibitors²⁴. As argued by Roeseler and von Dosky, *“Heavy subsidies and concessions do not offset poor market conditions”* and corridor-type development does not *“... create economic strength, but channel(s) and focus(es) economic growth”*²⁵.
- **Economic sense:** Quite simply, if corridors are not economically feasible and do not offer investors a *“satisfactory cash return”* on their investment, especially if weighed off against other competing opportunities, they will not become a reality²⁶.
- **Critical [competitive] economic mass:** Corridor-locations must have the necessary critical [competitive] economic mass which will, of course, vary from one metropolitan to another, to be able to compete with other potentially more favoured locations²⁷. According to Simmons, a corridor must either match the other localities' attributes or provide an *“absolutely overwhelming”* other attribute, like *“fast international rail services”* in the case of London's East Thames Corridor²⁸.

4.2 Organisational/institutional requirements/conditions

- **Integrated and co-ordinated governance:** Integration and co-ordination between
 - the actions of sectoral agencies/departments responsible for land use policy and management, transportation planning and infrastructure investment and maintenance;
 - other spheres of government; and
 - non-governmental role players,

²⁴ Roeseler and von Dosky (1991), Suchman and Sowell (1997: 40), GPMC (1997: 6) and Druce (1997).

²⁵ Roeseler and von Dosky (1991: 325 and 344).

²⁶ Roeseler and von Dosky (1991: 336 and 342) and Anonymous (1997e).

²⁷ Simmons (1990: 9 and 11).

²⁸ Simmons (1990: 11).

is imperative to ensure that actions are geared/aligned towards the realisation of the corridor-vision and that actions running contra the vision, such as the approval of development rights in non-corridor areas, are prevented²⁹. Institutional transformation may be necessary to achieve this³⁰, especially in local governments, as these are the bodies that will most intimately deal with the corridors,

- **Enforcement/implementation:** It makes little sense to prepare corridor plans and not enforce or implement them, or to hamper their implementation with unnecessary red tape³¹.
- **Capacity:** The bodies responsible for the planning and the implementation of the corridor-plans need the necessary capacity to be able to do so.

4.3 Physical and transport requirements/conditions

- **Connectivity between nodes in the corridor:** Strong functional links must exist between the nodes, which are to be part of the corridor as, without such links, there will simply be no reason for movement/interaction between the nodes³².
- **Existence of, or possibilities for, multi-modal transportation:** This is imperative if the corridor is to provide public transport choice to as wide a variety of users as possible and is to make each mode serve its most optimal function in the bigger [transport] picture³³.
- **An efficient feeder system:** A fully integrated system of feeder bus, taxi lines and pedestrian movement is necessary to provide the required public transport thresholds on the main routes in the corridor³⁴.
- **Regional/metropolitan focus and accessibility:** Corridors must house activities that will attract clients/customers from the wider metropolitan area, and be adequately linked by public transport to this wider area to enable movement to and from it³⁵. If non-corridor areas are not well-connected by public transport to corridor areas, it could lead to mass private car use, especially if curbs were to be placed on new developments in non-corridor areas, forcing all new development into corridor areas³⁶.

There is, of course, one danger to high accessibility much like the global economy-dilemma. In the case of corridor-areas struggling to build an economic base, high accessibility can see residents of that area opting to spend money elsewhere with little reverse expenditure from other more successful areas.

- **Land for low cost housing:** Publicly owned land must be [made] available for low cost housing, or acquired early on in the process, as land prices are sure to rise after “corridor-proclamation”³⁷.

²⁹ Roeseler and von Dosky (1991: 329), Kraay (1996: 325), Atash (1996: 49), Maunder (1991: 74) and see Haughton *et al* (1997).

³⁰ Hall (1983: 73).

³¹ Sin-Tang and Hing-Fung-Leung (1998: 153), NDoT (1999: 22) and Cameron (1998b).

³² See GPMC (1997: 5), Druce (1997) and Derek Chittenden and Associates (1990: 13).

³³ Druce (1997) and GPMC (1997: 6).

³⁴ Roeseler and von Dosky (1991: 338).

³⁵ Roeseler and von Dosky (1991: 335) and Derek Chittenden and Associates (1990: 13).

³⁶ See Cervero (1986: 404) for a similar point of view.

³⁷ Roeseler and von Dosky (1991: 329 and 343).

The “right” land for economic activities: The required amount of land in parcels of the right size and serviced as required, must either be available or “easy to deliver”³⁸.

4.4 Behavioural requirements/conditions

- **A co-operative, constructive attitude by all role players and a culture of public transport use:** Given the magnitude of the intervention, all the parties involved must be firmly committed to the ideal and, to make it work, public transport must be widely used³⁹.

4.5 Political requirements/conditions

- **Political will:** Politicians in all spheres and in all sectors of government need to be fully committed to the corridor-vision. Without it, very little will come of it⁴⁰.

4.6 Perceptions

- **A favourable/good image:** International research points to the need for a favourable perception/good image among the broader public, the media and potential investors of both a corridor and the broader area in which it is located⁴¹.

4.7 Plan and planning requirements/conditions

- **Integrated plan and planning:** In line with the requirement for co-operative and integrated governance, the plan, the planning process and the implementation of the plan must be integrated and coordinated. In such an integrated approach, land use and transportation aspects must be coordinated and full cognisance taken of socio-economic and socio-political realities⁴². Equally important is that the corridor-proposals are formalised during a metropolitan-wide integrated planning process by a body able to manage and ensure their implementation in an integrated fashion⁴³. The same metropolitan authority cannot pursue different objectives in the same transport system.
- **A “Total Onslaught”:** The full/total urban transport picture must be considered in the planning process. Isolated islands of public transport/new corridor development in a sea of unsustainable transport usage (e.g. public transport corridors versus other areas in metropolitan areas still being largely private motor car based) serves little purpose⁴⁴.
- **A broad mix of intensive land use:** In order to ensure customer choice, economies of scale, public transport thresholds, etc. a broad mix of intensive land use is required⁴⁵. Commentators on the Transit-Based Housing-initiative in the USA have postulated that local authorities there “... *desire to use rail transit stations as centres of economic*

³⁸ Roeseler and von Dosky (1991)¹ and Simmons (1990: 9).

³⁹ Roeseler and von Dosky (1991) and Kitamura *et al* (1997: 125). In a study done in San Francisco it was for instance found that “... *attitudes are more strongly associated with travel than are land use characteristics suggesting that land use policies promoting higher densities and mixtures may not alter travel demand materially unless residents’ attitudes also changed*” (Kitamura *et al*, 1997: 125).

⁴⁰ See *inter alia* Kraay (1996: 323), Roeseler and von Dosky (1991), NDoT (1999: 30) and Del Mistro (1999: 13).

⁴¹ Simmons (1990), Houghton *et al* (1997) and see Derek Chittenden and Associates (1990: 38).

⁴² Cullingworth (1995: 75).

⁴³ Hall (1983: 73).

⁴⁴ See Truelove (1995) for a similar perspective.

⁴⁵ Boarnet and Crane (1997).

*rather than residential development*⁴⁶. The point simply is that municipalities prefer commercial land use to housing as it provides higher tax revenues than housing, which has resulted in far more commercial land uses in TOD/Ps than housing⁴⁷.

- **An action plan with a time-frame:** A programme of action, in the form of an action plan with a definite time-frame indicating exactly when key transport and other infrastructural investments in the corridor will be made, is crucial in ensuring private sector trust and involvement⁴⁸.
- **Zoning stability:** Without certainty as to the medium to longer term zoning situation in a corridor, private investors will be hesitant to make investments in such an area⁴⁹.

5. THE ADVANTAGES OF LAND-USE TRANSPORT CORRIDOR DEVELOPMENT

The development of land-use transport corridors holds some very definite advantages, of which the following five are the most compelling:

- it is rational/makes sense to intensify, diversify and focus land use and economic activity in areas where bulk infrastructure and mass movement/transport channels/services (roads and rail) are available, not only as these uses require bulk/mass capital investments to function efficiently, but also as these kinds of investments require intensive land use to recover their costs;
- there is a good chance of reducing the demand for motorised transport and trip lengths in these corridors through the concentrated mixing of non-residential land-uses with high density housing, while at the same time making travel, where it is necessary, viable by public transport, as the enabling thresholds for public transport are very likely to exist;
- because a wide variety/mix of land uses is provided in close proximity of each other, “concentrated choice” is not only offered, but a wide variety of customers can be served, which creates the potential for, and choice of, a wide variety of public transport modes and a high frequency of trips;
- as high accessibility and mass exposure is “stretched” across the whole metropolitan area, opportunities are created for informal activities, small-scale operators and operations in peri-urban areas to “get into the economy”; and
- due to the fact that urban land use is concentrated and public transport is used, environmental impact will, in all likelihood, be smaller than in the case of low-density urban sprawl.

⁴⁶ Ibid.

⁴⁷ Boarnet and Crane (1997: 201).

⁴⁸ Simmons (1990: 11) and Roeseler and von Dosky (1991: 329).

⁴⁹ Roeseler and von Dosky (1991) and Oranje (1995).

6. LOCAL AND INTERNATIONAL EXAMPLES OF PUBLIC TRANSPORT – LAND USE DEVELOPMENT

Locally “**natural corridors**” have developed spontaneously over extended periods of time (50-200 years) in most of the major metropolitan areas of the country. Well-known examples of such corridors include:

- Main and Durban Roads in Cape Town;
- Jan Smuts Avenue, Rivonia Road and Oxford Drive in Johannesburg;
- Umbilo and Berea Roads in Durban; and
- Voortrekker, Paul Kruger and Michell Streets and Van der Hoff Avenue in Pretoria⁵⁰.

These corridors not only provide goods and services to passing traffic, but also act as attractors of activity and generators of passenger and freight trips in the broader metropolitan area in which they are located⁵¹. It is, however, not that clear whether these corridors have actually facilitated the utilisation of public transport.

As far as “**planned corridors**” are concerned, such projects were embarked upon in four of the major urban centres during 1995⁵², viz. the:

- Whetton-Lansdowne Road Development Corridor in Cape Town⁵³;
- Mabopane-Centurion Development Corridor in Pretoria⁵⁴;
- Germiston-Daveyton Activity Corridor in Eastern Gauteng⁵⁵; and
- Khulani Development Corridor⁵⁶ and Korsten-Kwazkhele-Motherwell Corridor in Port Elizabeth⁵⁷.

As these initiatives are still in a very early phase, it is not possible to make any definite statements on the success of the concept. What has, nonetheless, emerged from assessments and critiques of these initiatives is the need for broader supporting metropolitan-wide strategies, as well as a greater awareness of the immensity of the task of [radically] altering existing land use patterns and land use-transport relationships⁵⁸.

In the **international** arena, the most famous of the corridor-initiatives is to be found in the internationally-acclaimed Brazilian city of **Curitiba**⁵⁹. Here integration between land use and transport has been almost perfected by making use of a bus-based corridor-system that has been in operation for more than twenty-five years⁶⁰. The replicability of the Curitiba model is, however, in doubt as it was set up with a very strong hand at a time of military dictatorship in Brazil and is, even today, in a more democratic environment, strongly controlled by the local authority⁶¹.

⁵⁰ Naude and Green (undated) and Green *et al* (1996).

⁵¹ Naude and Green (undated: 6).

⁵² NDoT (1998: 55).

⁵³ Fensham (1998).

⁵⁴ For a discussion and critique of this corridor see Oranje (1999c). More information on this corridor can also be found on the website of this corridor at <http://www.mcddc.co.za>.

⁵⁵ Eastern Gauteng Services Council (1998).

⁵⁶ See Cameron (1998b: 14-5).

⁵⁷ See Lamont (1999) for a discussion of this corridor.

⁵⁸ See *inter alia* Cameron (1998b) and Oranje (1999c).

⁵⁹ See Oranje (1999b).

⁶⁰ Ibid.

⁶¹ Ibid.

A case study that may have some use for South African practitioners is the **Thames Gateway** in London that also has the dual aim of improving public transport and regeneration⁶². After nearly a decade of limited progress with the implementation of the corridor proposal, it does seem that new transport and regional planning policy and institutional reforms by the Blair-government may turn things around⁶³.

7. DESCRIBING TRANSPORT-LAND USE CORRIDORS

7.1 “Forces of Attraction” as Structuring Device

As above, the activity/development corridor is a “conceptual frame” in which a certain desired relationship between land use, economic activity and traffic movement/flow is articulated/postulated. This desired land use-transport relationship is dependent on the existence or development of certain “forces of attraction” on a **micro-scale** in a corridor, but also on a more **macro-scale**, between a corridor and the rest of the urban area in which it is located.

In more detail, what is being argued, is the following:

- on a **micro-scale**, a corridor is dependent on the existence of forces of attraction drawing people from one point in a corridor to another. Without such interaction there can be no corridor. The more forces of attraction there are at work in a corridor, the more successful it will in all likelihood be;
- on a **macro-scale**, a corridor is dependent on the existence of forces of attraction drawing land uses into the corridor, which can ensure that it becomes a magnet for activities in the wider urban area. These land uses create/set in motion forces of attraction on a wider level, leading to movement of people and freight via feeder routes into the corridor. If land uses that can set in motion forces of attraction do not settle in a corridor, there can be no corridor. The more forces of attraction at work in a corridor vis-à-vis the wider urban area, the more successful it will in all likelihood be;
- the “forces of attraction” are set in motion by activities in one, more than one, or all of the following generic components of a corridor **connected by the spine/s**; (see Figure 2):
 - the two **outer nodes** at the boundaries of the corridor;
 - **inner nodes** in-between the two outer nodes;
 - the stretch of **land bordering directly on the spine/s** connecting the inner and outer nodes; and
 - the **land in-between** the inner and outer nodes and not bordering directly on the spine/s.

⁶² See Simmons (1990), Haughton et al (1997) and the UK Department of the Environment, Transport and the Regions (1999).

⁶³ See Haughton *et al* (1997) and UK Department of the Environment, Transport and the Regions (1999).

GENERIC COMPONENTS

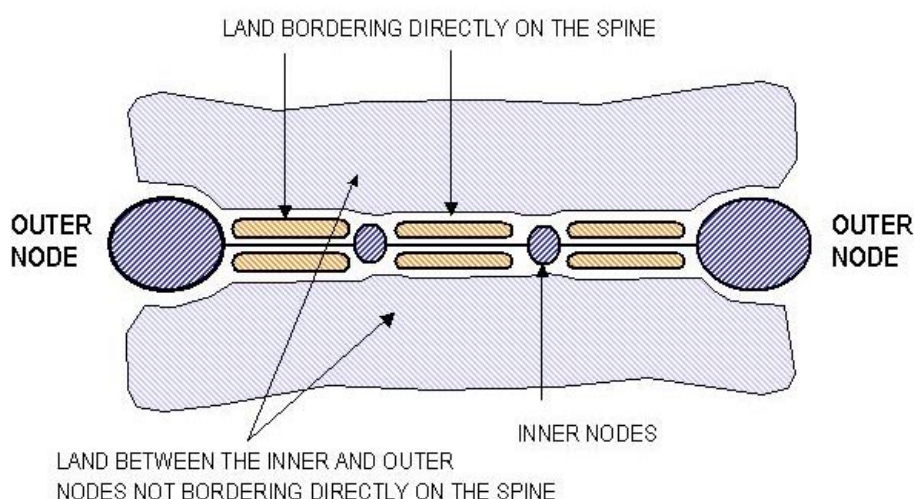


Figure 2: Generic components of a corridor

- Each of these components of a corridor acts at a given point in time as **either** an “**Attractor**” or “**Sender**” of people, **or both**. The key objective of public investment in corridors is to transform “Senders” into “Attractors”, or to further increase the attractiveness of existing “Attractors”. These acts of “making [more] attractive” require substantial, sustained and costly public intervention in the form of infrastructure investment and incentives in corridors for a prolonged period of time. At the same time, they may necessitate the imposition of tight controls/regulations on the location of activities in non-corridor areas of a particular settlement to ensure that enough development takes place in the identified corridors.
- Combinations of “Attractors” and “Senders” in corridors can be used to classify corridors into various idealised types that can then be used to measure/evaluate corridors, and to determine where strategic public interventions in the corridors are required. These interventions could be done in the generic components of corridors.

8. Soweto/Johannesburg Corridor:

The Government of the Republic of South Africa (through the Department of Transport) requested proposals in December 1999 for a study to provide a strategic overview and analysis of Land Passenger transport security with an emphasis on road and rail-based public transport security over the past three to five years. This request forms part of a series of research projects required by the Passenger and Transport Policy & Strategy Unit of the Department.

This document presents the proposal of CSIR, through their Transportek Division, and associated partners, in response to this request.

The high crime rate in South Africa has had a negative impact not only on national economic growth, investor confidence and tourism, but also on the safety and security of its citizens and residents. Sad testimony to this is the fact that public transport in South

Africa has become the only mode that is used by people who do not (in the majority of cases) have the choice of using alternative forms of transport, e.g. the private motorcar.

The White Paper on National Transport Policy envisions the total transport system (which includes public transport) as being one, which should:

“Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost, in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable.”

Clearly the above is an ongoing process for public transport operations/infrastructure in South Africa. It therefore is imperative that in order to provide an adequate and acceptable level of service that public transport passengers require, those factors that impede against this goal should be identified and resolved. The Department of Transport has identified that the security (personal and otherwise) of the public transport user as well as their perceptions thereof, as a strategic customer performance requirement of the Land Passenger transport system.

A limited amount of research has been conducted in the area of security and crime on-board public transport and at interchanges in a South African context. Such studies that have been done, noted that formal and informal crime prevention strategies could positively impact on improving the security of the public transport user. Despite some of these strategies having been implemented over the years, crime and the associated negative perception of crime/personal security continues to affect public transport commuters.

From a recent research project (focussing on crime at Modal Interchanges) conducted by Transportek/CSIR, it was found that hard data on security and crime related to public transport was scarce and therefore of limited use. Statistics and information from public transport operators, police dockets, private security firms etc. is collected on a different basis within each organisation and this therefore has diluted its effectiveness as required by transport analysts for strategic transport planning.

We have formed a multi disciplinary team of specialists from CSIR, supplemented with expertise from individuals with knowledge and specific skills required to meet the needs of this specialised study. Transportek is one of the few research divisions that have done studies on crime and security specific to public transport.

9. Khayelitsha/Cape Town Corridor:

Data and statistics on security and crime related to land public transport are very limited (in respect of its quantity, quality and availability). Possible sources that have been identified by Transportek (from previous studies) are Metrorail. The South African Police Services (SAPS) do record criminal incidents occurring on public transport, but such information is not put into the public domain nor is it captured in a way to immediately identify that the incident took place on public transport. There is also under-reporting (by victims and witnesses) of criminal incidents reported to SAPS or formal agencies. This questions the weight one can place on recorded crime statistics and their potential transport

consequences. Innovation in the gathering of available data and its subsequent analysis (to obtain strategic inferences) is therefore required.

The study will focus on an overview of security data associated with mass public transport. The data compiled and analysed will therefore include rail, minibus taxi and bus modes. Statistics from SAPS, private security firms, public transport operators and previous studies (of crime/security related to public transport) will be compiled and analysed. The advantages and disadvantages, quality of the data will be assessed, validated and briefly commented on.

Strategic performance indicators of security on public transport will be developed. A process of consultation with all relevant stakeholders will be conducted to develop the strategic performance indicators. Literature surveys, interviews with transport experts and transport providers, and formal stakeholders like SAPS and commuters of all relevant modes will provide the basis for the development of key performance indicators. Examples of possible indicators are; police efficiency, design of mode of transport, underreporting of criminal acts, nature of victims etc.

Transport-user focus groups will be conducted in selected areas of high public transport activity, i.e. Gauteng, Durban, Cape Town and PE/East London. A qualitative methodology approach to elucidate the experiences of commuters will therefore be undertaken. Commuter interpretation and experience on security strategies and issues will be tested through interviews (focus groups). The project team have developed excellent experience in conducting group interviews.

A broad level audit to reflect the status and nature (including photographic illustrations) of the physical security infrastructure on selected corridors/modal interchanges will also be provided. The basis of the audit will be determined by the data collected. The current security processes will be documented and analysed briefly. Security risk issues will briefly be determined, and potential risks will be identified and improved structures, support, processes etc. will be suggested.

It should be noted that our approach would include an assessment of security not just from the passenger (i.e. transport user) point of view, but also the transport provider, e.g. Metro rail. The two groups can have divergent views on public transport security, which will be identified in this study.

10. CONCLUSION

In order to effectively evaluate corridor development, and for the purposes of this study, various ideal corridor types were identified. The corridors in the Soweto/Johannesburg and Khayelitsha/Cape Town evaluated in terms of these types and appropriate strategies for public intervention proposed will lead to the identification of gaps between the status quo and the ideal. The strategies discussed in this paper are directed at the following four domains/areas, in terms of land use transport linkages:

- the *location* of land uses/economic activity;
- the *type* of land use;
- the *intensity* and *density* of land use; and
- the *design*, so as to influence functionality for public transport [users] and aesthetics.

The main transportation specific issues of mobility, accessibility, mode of transport and modal splits is suggested to follow the development philosophy of :

“The New Urbanism/Neo-Traditionalism’ – an umbrella movement that seeks to reconnect transport with land use and in particular to establish transit-oriented development where higher-density, mixed use areas built around high-quality transit systems provide a focused urban structure that can help loosen the grasp of automobile dependency” (after Newman et al, 1995, in Oranje et al, 1999:5).

REFERENCES

- Andersen, S J and Burnett, S L. 1998. *Activity corridors, spines, streets & nodes and access management*. Johannesburg: Gautrans.
- Anonymous. 1997e. Rebuilding Inner Cities Must Make Economic Sense. *ENR*, Vol 239(22): 74.
- Atash, Farhad. 1996. Reorienting metropolitan land use and transportation policies in the USA. *Land Use Policy*, Vol 13(1): 37-49.
- Banister, D et al. 1997. Sustainable cities: transport, energy, and urban form. *Environment and Planning B*, Vol 24: 125-43.
- Bertolini, Luca and Spit, Tejo. 1998. *Cities on Rails: the development of railway station areas*. London: E N Spon.
- Boarnet, M and Crane, R. 1997. LA Story: A reality check for transit-based housing. *Journal of the American Planning Association*, Spring: 189-204.
- Boarnet, M G and Compin, N S. 1999. Transit-Oriented Development in San Diego County. *Journal of the American Planning Association*, Winter: 80-95.
- Boarnet, M G and Crane, R. 1998. Public finance and Transit-Oriented Planning: New evidence from Southern California. *Journal of Planning Education and Research*, Vol 17: 206-19.
- Cameron, J W M. 1998a. Transport contribution to urban restructuring. Paper presented at *CODATU Conference*, Cape Town, 21-24 September 1998.
- Cameron, J W M. 1998b. *Draft report on the study tour of South African Urban Spatial Development Initiatives*. TRC Africa, Pretoria.
- Cervero, Robert. 1986. Unlocking Suburban Gridlock. *Journal of the American Planning Association*, Autumn: 389-406.
- CSIR (Boutek). 1999a. *Travel demand management – economic measures project for Midrand Metropolitan Council*. Pretoria.
- CSIR (Transportek). 1999b. *Node Planner: travel Demand Management Project: land use location and density management system – developed for the Midrand Local Council Area*. Pretoria.
- Cullingworth, Barry. 1995. Bookwatch: Transport and Planning. *Cities*, Vol 12(1): 75-77.
- Davies, H W E. 1993. Europe and the future of planning. *Town Planning Review*, Vol 64(3): 235-49.
- Del Mistro, Romano. 1999. *Travel Demand Management*. Copy available from the author at Department of Civil Engineering, University of Pretoria.
- Department of the Environment, Transport and the Regions. 1999. *Revision of PPG 13: Transport Public Consultation Draft*. Available at <http://www.planning.detr.gov.uk/consult/ppg13/index.htm>.
- Department of the Environment, Transport and the Regions. 1998. *A New Deal for transport: Better for everyone*. Available at <http://www.detr.gov.uk/itwp/paper.htm>.

- Derek Chittenden & Associates. 1990. *A preliminary investigation of "activity corridors" as an urban strategy: A case study in Cape Town's South East*. Cape Town.
- Druce, Lloyd. 1997. Unpublished notes on corridor development.
- Eastern Gauteng Services Council. 1998. *Germiston-Daveyton Activity Corridor*.
- Fensham, John. 1998. Wetton Corridor Project. *Urban Management*, February: 21-2.
- Fyson, Anthony. 1999. Draft PPG13 guidance on transport. *Planning*, 29 October: 6.
- GPMC. 1997. *Mabopane-Centurion Development Corridor: Integrated Growth and Development Implementation Strategy, 1997*. Pretoria.
- Green, Cheri et al. 1996. *Short- to medium-term accessibility improvement strategies for low- income areas*. Department of Transport: Pretoria.
- Hall, Peter. 1983. Land-use change and Transport policy. *Habitat International*, Vol 7(3/4): 67-77.
- Houghton, Graham et al. 1997. The Thames Gateway and the re-emergence of regional strategic planning. *Town Planning Review*, Vol 68(4): 407-22.
- Kitamura, R et al. 1997. A micro-analysis of land use and travel in five neighbourhoods in the San Francisco Bay Area. *Transportation*, Vol 24: 125-56.
- Kraay, Joop H. 1996. Dutch approaches to surviving with traffic and transport. *Transport Reviews*, Vol 16, No 4: 323-343.
- Lamont, Toni. 1999. Mdantsane-East London Development Corridor progresses in East London. *Housing in Southern Africa*, September: 10-1.
- Maunder, DAC. 1991. A new paradigm. *Cities*, February: 73-4.
- National Department of Transport. 1996. *White Paper on National Transport Policy*. Pretoria.
- National Department of Transport. 1998. *Business Plan 1998/9*. Pretoria.
- National Department of Transport. 1999. *Moving South Africa: The Action Agenda*. Pretoria.
- Naude, A and Green C. Undated. *Review of corridor concepts and definitions (Draft)*. Available from the authors at the CSIR offices in Stellenbosch.
- Newman, P W G and Kenworthy, J R. 1996. The land use-transport connection. *Land Use Policy*, Vol 13(1): 1-22.
- Minter, Sue. 1997. *Integrating transport and land-use: Lessons from the North and the South*. URPU: Cape Town.
- Oranje, M C. 1995. The need for an appropriate system of urban development control: Arguments and characteristics. *Town and Regional Planning*, No 39, September: 22-33.

TOWARDS A GENERAL THEORY OF CORRIDOR DEVELOPMENT IN SOUTH AFRICA

Brian Marrian (BSc TRP, MM LG&D)
CSIR Transportek, bmarrian@csir.co.za

For: Franco/South Africa Supervisors
Dr. P Freeman (South Africa) & Prof J.C. Ziv (France)

CURRICULUM VITAE:	BRIAN MARRIAN
Nationality:	South African (Indian)
Profession:	Town and Regional Planner
Career specialization:	Integrated Development Planning (IDP) & Integrated Transport Planning (ITP)
Position in firm:	Project Manager / Business Development Leader
Period with firm:	1999 to date

KEY QUALIFICATIONS

BSc (TRP)	University of the Witwatersrand (Wilfred Mallows Prize for Dissertation)	1994
MM (LG&D)	Masters in Management (Local Gov.& Dev.) Wits Graduate School of Management	2001

EMPLOYMENT AND EXPERIENCE RECORD

1999 to date	Division of Roads and Transport Technology, CSIR Transportation Programme Project Manager/Leader <ul style="list-style-type: none"> • Taxi Recapitalisation Business Process Project • Rural Access CD: A Guide to Coordinated nodal and linkage development • Midrand TDM Project – Parking Reduction Scheme Report • Land Transport Corridors in South Africa and France • Presented a Paper at CODATU IX in Mexico City on Corridor Development • Work on the IDP section of the Durban ‘Transportation Fundamental Restructuring’ project. • Research on the strategic relationship between the IDP and ITP planning processes in South Africa.
1997 – 1999	Department of Constitutional Development: Project Manager for the IDP and LED (Local Economic Development) Projects. <ul style="list-style-type: none"> • Departmental editor and producer of the IDP Manual. • Manager of a 21 IDP pilot project programme, funded by GTZ (German development Cooperation).
1995 – 1997	Division of Building Technology, CSIR Development Management Services (DMS) Programme. <ul style="list-style-type: none"> • Project co-coordinator for NSDF (National Spatial Development Framework) <ul style="list-style-type: none"> • IDP & Various development planning projects.
1992 – 1995	Lenasia Civic Association ANC office <ul style="list-style-type: none"> • Development Facilitator and Technical Advisor
1994 – 1995	Settlement Planning Services Inc.(Setplan) <ul style="list-style-type: none"> • Town & Regional Planner/Facilitator
1989 - 1992	Pintoroux - Town Planning Assistance