

TYOLOGY AND PRIORITISATION SYSTEM FOR THE PLANNING AND DEVELOPMENT OF VIABLE CORRIDORS

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1. INTRODUCTION

The corridor concept has been incorporated as the spatial framework for implementing the IDP in the eThekweni municipal area. However, resources do not allow for the development of all corridors to the same level. Thus the evaluation and classification of the different corridors with respect to sustainable future development and growth was essential. This would contribute to an integrated growth management and land-use plan for the high-priority nodal precincts and corridor segments, in keeping with the vision of the IDP.

In South Africa, the concept of using land-use corridors as a 'tool' for spatial economic and social restructuring emerged in the late 1980s. The concept gained support over the years and culminated in the former Central Councils' Integrated Development Plan (IDP). This plan proposed a spatial system of development corridors and activity spines as a means for addressing a host of urban, economic, social and land-use distortions and spatial inefficiencies.

The project that is the subject of this paper was commissioned to achieve a greater understanding of the growth opportunities, potentials and constraints of the corridors and nodes, to formulate development guidelines for corridor types and to develop a methodology for prioritising public sector investment in the corridors.

The recommendations from the study and the corridor and node structure that were defined, form the basis of the current IDP process for the eThekweni Municipality.

2. CORRIDOR CONCEPT

Understanding the corridor concept and its possible forms was important for the definition of the typology and the formulation of the development guidelines. It was also essential that all stakeholders shared a common understanding of the concept.

The principal economic objectives of corridors are intended to be:

- the integration of the economic activities of adjacent communities at a sub-regional level to create the necessary thresholds and greater level of economic activity; and
- the establishment of better metropolitan-wide economic linkages.

The project reviewed the development of the corridor concept in South Africa, culminating in the most recent trends in the use of corridors to promote and implement the fundamental restructuring of public transport. It was found that the Main Road model has

remained the dominant view on the subject of urban corridor development. Other concepts, including the “Curitiba model”, “Transit Friendly Land-use” development and the “Super-Street” concept were considered for formulation of development guidelines for the corridors.

A key issue that emerged during the study is that many professionals had a narrow perspective of corridors, and saw only a single possible end stage for all corridor development. The truth is that not only should a wide range of different corridor types be developed and encouraged, but a broad spectrum of road and public transport options should also be considered to support the implementation of corridors. Not all corridors will have a similar density, land-use mix, scale and nature when they mature. Thus a flexible land-use policy is needed in conjunction with the channelization of flows, especially of public transport. It is also important that the movement infrastructure and the access policy in the corridor be appropriate to the local environment. Figure 1 illustrates the road options that may be used for different types of corridors.

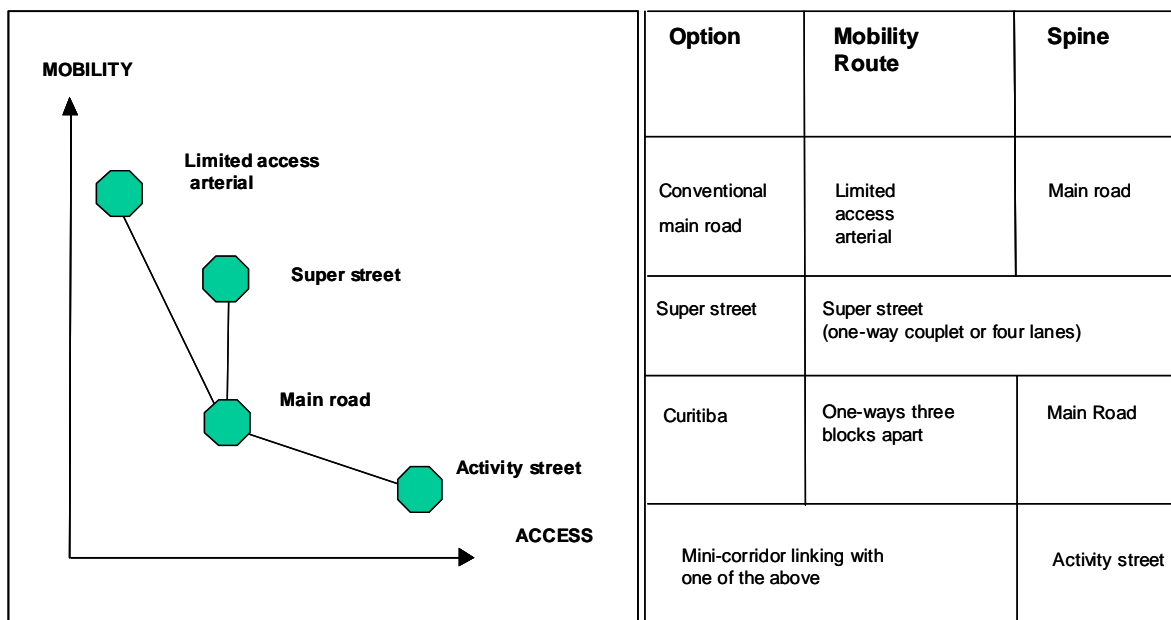


Figure 1: Corridor Road Options

Furthermore, corridors evolve at different rates and in different ways and their nature is often dictated by historical factors such as time of inception and prevailing social and economic growth of the city. Figure 2 illustrates the various evolutionary paths corridors follow.

3. CORRIDORS WITHIN THE CITY CONTEXT

3.1 Economic Trends

An analysis was made of metropolitan trends in population growth, economically active persons and employment figures using the 1991 and 1996 censuses. Trends must be viewed with care because of data limitations, but it appears that there is a very high population growth compared to economically active persons. Up to 1994 formal employment grew at 1,4% p.a., but the rate is probably much lower now.

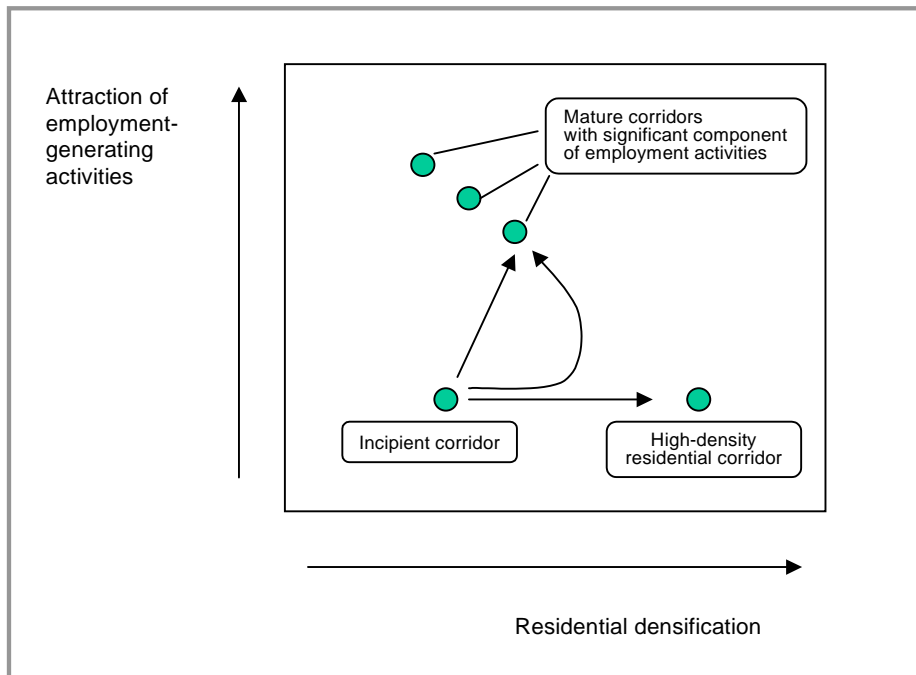


Figure 2: Possible evolution of corridors.

Manufacturing remains the largest employment sector, but grew much slower than the tertiary sector. A similar picture is obtained from an analysis of GGP. The performance of the sectors has implications for corridor and node planning that until now has emphasised manufacturing activity and locations close to centres of poverty.

In the office market, the CBD remains the dominant location, but is facing a strong challenge from decentralised nodes, particularly the La Lucia Ridge area. Up to 1998 the CBD continued to grow, but at a slower rate and with higher vacancies than other areas. The relatively high growth of decentralised offices is important for the planning of corridors and nodes as they serve as important centres of employment for all income groups, particularly as the tertiary sector of the economy expands relative to the secondary sector.

Retail growth has been low since 1996, due to poor national economic conditions. Expenditure was largely from the formal sector (92%), with only 8% from the informal sector (BMR). This split needs to be taken into account when developing planning policies for the corridors and nodes.

In order to ascertain the investor climate for the corridors and nodes, a workshop was held for selected investors, developers, retailers and other property experts. The workshop identified strengths and weaknesses of the corridor development concept against the background of metropolitan economic potential. There is weak demand for industrial and office space and a plentiful supply of land. Thus for these sectors, weaknesses of the corridors are likely to play a greater role than strengths, and only selected strong areas are likely to benefit from private sector investment. Retail developments are more likely to take place in the corridors, but there will be competition from sites well located in the centre of residential areas. The local authority will need to be selective in its choice of corridor investment programmes and must ensure that development applications are handled speedily.

3.2 City Structure

The development of corridors must take place within the context of the development of a city as a whole. Durban is still a relatively centralised city and the CBD and nearby industrial and transport concentration remains the dominant node in the sub-region with no close rival.

The decentralisation of major retail outlets and offices to Westville and La Lucia / Umhlanga is a very recent phenomenon compared to the trend in Cape Town, Pretoria and Johannesburg. The attractiveness of the beachfront for tourism serves to strengthen the CBD. The city has a strong port orientation and is characterised by a very strong, highly industrialised North-South corridor. Employment in Durban is also highly centralised with the vast majority of public transport trips ending in the CBD and the South Industrial Basin. The established areas must be maintained and protected to avoid an inefficient dispersal of public transport trip ends.

The lack of major attractors in some of the identified corridors (especially in Umlazi, Phoenix and KwaMashu) limits the development of activities serving metropolitan or even sub-regional catchment areas. Development for such areas will thus have to focus strongly on servicing more local needs. A greater emphasis should be placed on the development of nodes located between existing well-functioning areas or commercial concentrations and poor residential areas, rather than on leap-frogging development to peripheral locations.

3.3 The Relationship of Corridors to the CBD

A qualitative assessment was made of the connector routes in the Durban and Pinetown CBD nodes vis-à-vis their role with regard to corridor development. In most cases the economic activities in the Durban CBD are much higher-threshold activities than in the adjacent corridors. Office activities in the CBD generally serve a much greater area and population than those in adjacent corridors. The same is true for the retail activities in the CBD that generally serve large parts of the metropolitan area in contrast to the more localised markets in adjacent corridors. Adjacent corridors will generally not be able to serve the same thresholds as the CBD and thus the extension of the CBD into those corridors is not likely. This is especially the case for offices where there is a large supply of vacant office space. In the case of retail, most adjacent corridors will not be able to provide the intimate connections to major public transport termini and the close proximity to large numbers of office workers.

The problems facing the CBD office sector are likely to spill over into the adjacent corridors unless revitalisation efforts are made in the corridors as well. Some of the CBD corridors and sections present a congested and unsafe (real or perceived) environment, especially for private vehicles. This is likely to work against the CBD office sector and favour decentralisation. In order to maintain CBD vitality and provide a strong office node readily accessible to public transport users, attention must be paid to satisfying the needs of private vehicle users and addressing problems of congestion and security.

4. CORRIDOR TYPOLOGY

4.1 Demarcation of Corridor Segments and Pattern Analysis

The starting point for the demarcation of the corridors was the High Priority Public Transport Network (HPPTN). The extent (width) of each corridor was determined by the extent of current intensive development, especially non-residential uses; physical barriers to expansion; and initial perception with respect to future growth prospects.

The demarcated corridors were divided into segments for the purpose of more detailed analysis. Each segment was to some extent homogeneous in character and formed a unit that was distinct from any adjacent or connecting segment. Based on a land-use and transportation pattern analysis of each segment, adjustments were made to the size and shape of the segments.

The land-use analysis was based on GIS data captured at a 1:10 000 scale and included the following factors: development stage of the corridor (mature or developing); intensity and continuity of development (intense or intermittent); grain of development (fine or coarse); mobility profile of corridor (rail, other public transport use); hinterland characteristics (income and density); barriers to development; and density of persons and income within the corridor.

Factors included in the transportation and traffic analysis were: road class; road function; access type; traffic type using the road; flow conditions during peak and off-peak periods; and the presence of any route in the corridor parallel to the spine road and the class of any such road.

4.2 Typology and Classification of Corridors

The typology that emerged was based on a combination of characteristics that define different corridor types with respect to development objectives. This is different from a typology based purely on a perspective of public transport operational issues. The criteria that were considered to have overriding significance in the development of the typology were:

- land-use type, grain and mix;
- maturity of corridor and likelihood for change;
- road function, access, public transport use and availability of rail.

The typology described for Durban contains corridor types not previously identified and defined in previous research. The typology has six main categories with sub-categories representing typical corridors as presently manifested and their likely future development. The corridor types are listed in Table 1 and displayed on the Map 1.

In the search for a balanced approach to development, further analysis was done for economic and environmental factors.

5. ECONOMIC FACTORS AND PRECINCT EVALUATIONS

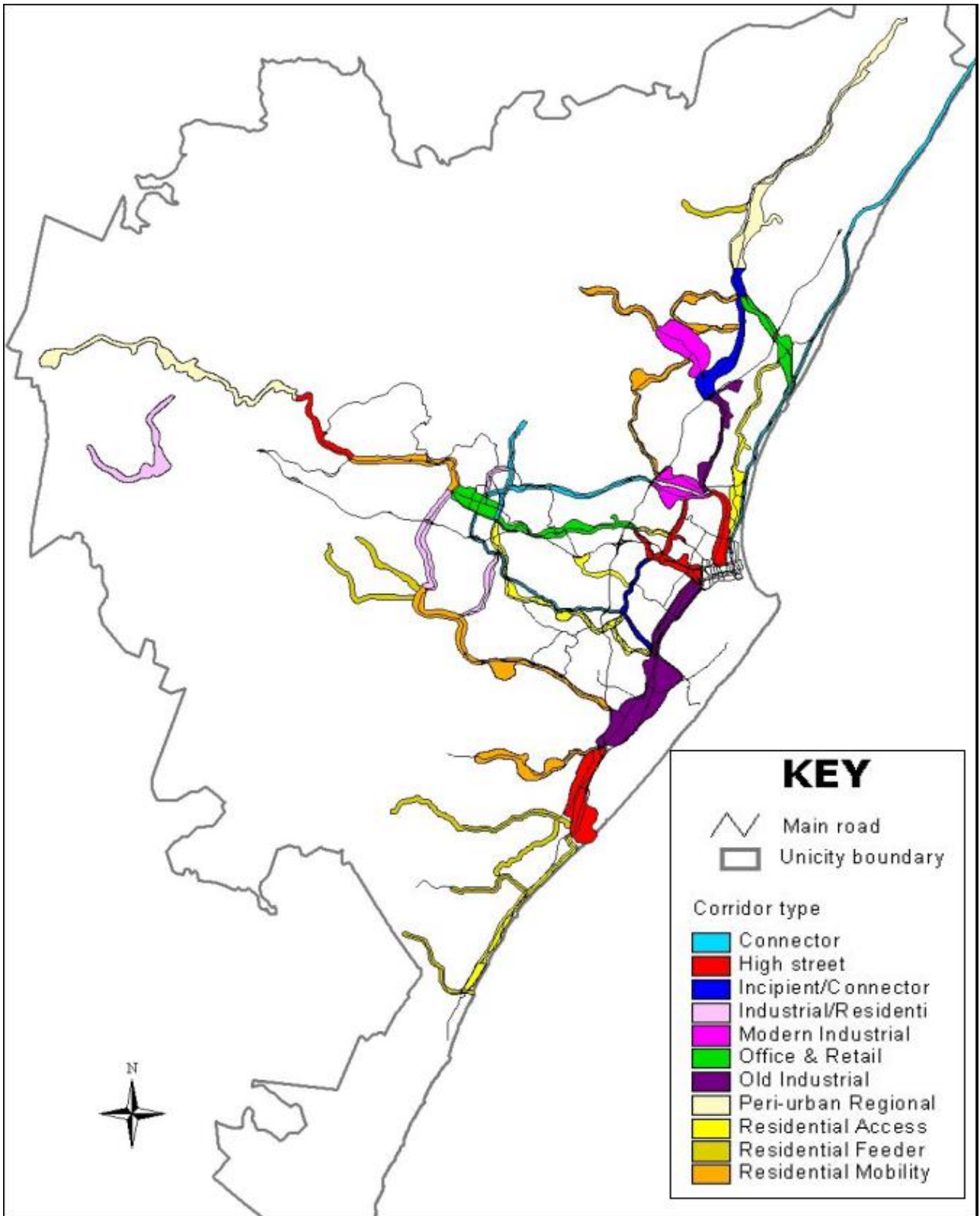
Economic factors considered included market perceptions (tenants, developers and investors); the extent of the market; logistical, physical and environmental attributes; and competing and alternative locations. The corridor segments were further divided into economically functional zones and nodes. Activity nodes (defined as a place of highest accessibility where both public and private investment tends to concentrate) were differentiated from other parts of the corridor. An activity node offers the opportunity to locate a range of activities from small to large enterprises, and is often associated with mixed-use development.

Table 1: Summary of Corridor Typology

| Main type | Sub-type | Key features |
|---------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High Street | Service industry focus | Fine-grained commercial strip mixed with service industry. |
| | Retail focus | Fine-grained commercial strip close to classic High Street. Spine road with access and mobility. |
| Industrial | Modern Industrial | On main mobility routes but no direct road access. Commercial nodes and rail may be present. |
| | Old Industrial | Large properties on main mobility routes but with direct access. Rail an integral part of corridor. |
| | Industrial/ Residential | Prominent industrial development close to residential areas, away from mature industrial core. Coarse-grained development around mobility route. |
| Residential | Residential Mobility | Low to middle income residential development based on neighbourhood planning concepts, adjacent to limited access route. Commercial or public sector nodes with indirect access to spine road. |
| | Residential Access | Typically in older residential areas and resembles traditional corridor in early stages. Direct property access. Limited non-residential development at discrete nodes. Limited potential for non-residential development. |
| | Residential Feeder | Within emerging low-income residential settlements at the extremities of the city. Low traffic volumes on mobility/access routes with public transport commuter flows. |
| Office and Retail | | High-income office blocks and retail nodes in green field or higher-income residential areas. Spine routes mostly mobility routes with only indirect property access. |
| Incipient/ Connector | | Corridors that complete transport network / urban structure but likely to remain as pure connectors with little development potential. |
| Peri-urban/ Inter-regional Connector | | Not corridors in the true sense, but serve to connect nodes or towns through agricultural areas. Some connect tourist attractions but intensity is intermittent. The spine road serves mainly as a mobility route, except within the nodes. However, direct property access is provided. |

In order to assess the attractiveness of different corridors and nodes for the growth of economic activity, precinct evaluations were carried out using a proprietary methodology developed by Douglas Parker Associates called the Precinct Evaluation. This methodology rates an area in terms of the key factors determining the economic development potential for retail, office and industrial activity, which are weighted to derive an overall weighted rating for the precinct.

The evaluation is primarily an indication of the perceptions, needs and requirements of investors, developers and tenants. The ratings largely reflected the existing state of affairs in order to focus on the current weaknesses of the nodes and the required ameliorative actions. The results of the evaluations were included in the profile of the relevant corridor segments. Owing to budgetary constraints, precinct evaluations were done for selected corridor segments, but these were typical enough to enable some overall conclusions to be made and to generate rating of other corridor segments based on local knowledge and other broader factors.



Map 1: Corridor typology

6. ENVIRONMENTAL FRAMEWORK

A framework was developed to consider environmental issues in future corridor planning processes. The methodology that was developed supports the concept of generic regional environmental assessment. In this methodology, regional environmental features are evaluated against the basic typologies that differentiate the corridor types. Aspects include: air quality; surface water quality and quantity; groundwater quality; ecology; noise; and waste.

A pilot study was undertaken to assess one corridor segment and test the framework. The test case used was KwaMashu Highway East (incorporating Bridge City), which is classified as a Modern Industrial Corridor.

The environmental assessment, conducted at a desktop level, suggests that the corridor will have limitations with respect to industrial development due to the proximity of both formal and informal residential areas adjacent to areas zoned for industrial expansion. At a strategic level, the information required to make this assessment is adequate, although limited in terms of specific air quality, noise and aesthetic data. In this case, however, land-use data are adequate to determine potential impact. Similarly, the information necessary to establish open space importance is adequate to identify that the demarcated open space areas in the area are to an extent a limiting factor for industrial development.

The environmental framework is robust at a strategic level. At the development level, the framework calls for an EIA to be conducted for developments proposed for the open space areas and in cases where the proposed development is a listed activity.

7. DEVELOPMENT GUIDELINES AND INTERVENTION INDICATORS

In the development of the guidelines four areas of intervention were identified, namely urban structuring and land-use, transportation, economic, and environmental. These indicators were used to evaluate needs and prioritise actions.

7.1 Intervention Indicators

The urban structuring indicators were used to evaluate or prioritise the corridors in terms of social need or to indicate congruence with urban restructuring objectives. These included: the informal housing component; proximity to low-income areas; and density.

Transportation indicators included alignment with a rationalised public transport network; presence of commuter rail in the corridor; and linkage to major employment and services nodes.

Economic intervention indicators include exogenous factors that are largely outside the local authority's sphere of influence, i.e. sectoral growth; the extent of markets and location of the corridor segment or node in relation to such markets; competing nodes; and concentration of development. Economic factors that are subject to the local authority's influence are: accessibility and transportation infrastructure; parking; security; environment and image; land availability and facilitation; and the improvement of procedures.

Environmental factors such as air and water quality, ecology, waste, cleaning, greening and infrastructure maintenance were identified. Many of these factors can be influenced by or subject to controls of the Council.

Some indicators that can be used for monitoring policy effectiveness within corridors are: percentage of informal dwellings; average household income; number of formal dwellings constructed; dwelling unit density; number of employment opportunities per segment; daily public transport trips per corridor; average distance to work; and rateable value.

Development guidelines have been formulated for the corridors and can generally be divided into two broad categories, namely physical aspects, and institutional measures and incentives. They include general development guidelines that should be applied to all corridors as well as more specific guidelines for each corridor type based on the typology. specific guidelines for each corridor type based on typologyspecific guidelines for each corridor type based on typologyspecific guidelines for each corridor type based on typology.

7.2 Development Guidelines Applicable To All Corridor Types

Physical

- Higher standard of roads & utilities than other areas
- Focus bulk services in corridors
- Improve sidewalks and street environment
- Ensure well-maintained, visible public transport stops
- Identify and upgrade informal trading nodes
- Create identity for each corridor, including visual gateways, etc.
- Encourage high-density housing at transport nodes
- Identify uses for vacant land
- Locate essential services at interchanges

Institutional

- Appoint corridor managers to co-ordinate development
- Communicate efforts to private sector
- Steer major origins and destinations into public transport corridors
- Implement fast-track approvals for corridor developments
- Create a safe and secure environment
- Provide incentives for upgrading buildings if affordable

8. DATA COLLECTION ISSUES

In order to inform and revise growth management plans, monitoring and data collection are required. Currently, different sets of geographic information system (GIS)-based zones are used to collect data (e.g. cadastral, transport zones, river catchments, Magisterial Districts and Enumerator Areas). New analysis and planning zones have been defined by the Council, namely Planning Units and Development Areas. These zones reflect cohesive geographical areas and communities, rather than the corridors and nodes that integrate different areas. Many of these data sets or analysis zones do not correspond with the boundaries of the corridor segments or the functional zones within the corridors. Thus, in addition to identifying the data to be collected, guidelines are also provided on how data should be managed, tracked and collected to allow aggregation or disaggregation of relevant economic, transport, social and environmental factors at the corridor level.

9. METHODOLOGY, PROCEDURES AND TOOLS FOR PRIORITISING, MONITORING AND MANAGING SUSTAINABLE GROWTH

In order to prioritise, monitor and manage the growth of the corridors, a consolidated preliminary performance profile is used as a starting point and to highlight any key constraints or opportunities. As more data become available, this profile should be updated and expanded. This is especially true for environmental issues. The indicators included in the profile relate to: corridor extent; typology; barriers to development; social needs; transport functioning; public transport priority; and economic viability. Depending on the priorities of Council, the intervention actions can be focused on the extent of social needs, alignment with public transport restructuring, environmental sensitivity and the extent of opportunities for high return on investment through the economic growth of an area.

Given the inevitable constraints on funding and other resources, it is essential for the local authority to direct efforts and funding to those corridors whose development will have the greatest impact on urban restructuring, the use of public transport, economic growth, environmental improvement and the amelioration of negative environmental impacts. It is recognized that decisions on the allocation of resources are ultimately taken at the political level, but there needs to be appropriate technical analysis so that these decisions are taken within a rational and coherent framework which ensures appropriate trade-offs and maximizes the overall public good.

Furthermore, slow economic growth is likely to constrain the potential for infilling in corridors. Currently, there appears to be an oversupply of land for all types of non-residential development and it will be necessary to prioritise the development and promotion of the different corridor segments so as not to dilute efforts. Maintaining a balanced and sustainable approach to development of corridors requires a prioritisation system based on economic, public transport, environmental, spatial and social factors. A strategic level prioritisation system, which requires limited data input, was developed for use by the Council, and the need for prioritisation was a key recommendation.

The prioritisation scheme is proposed as a **first step analysis** in order to deal with the trade-offs between urban restructuring, a rationalised public transport network, economic development and environmental maintenance. Prioritisation factors must closely reflect the aims of Corridor development as well as the priorities of the Council. The factors need to be weighed up against one another for balanced development and to ensure that investment policy and practice support sustainable growth, that the local authority gets the biggest return on its investment when allocating funds and other resources, and that expenditure is not too thinly spread to prevent economies of scale from being realised. The scheme uses a weighting system for factors that can be changed depending on the priorities of Council. It is emphasised that the prioritisation scheme must be used in conjunction with the corridor profiles and other detail variables for adequate planning. Table 2 shows an extract of the preliminary prioritisation of corridor segments.

Once the objectives to support the development of a range of corridor types are set and key performance indicators (KPIs) have been identified, it is essential to measure the progress in meeting the objectives and monitor progress towards sustainable growth.

Table 2: Extract of suggested prioritization scheme (Segment No. order)

| No. | Segment name | Corridor type | Social need (Proximity to low-income areas) WEIGHT=1 | Public transport orientation WEIGHT=1 | Preliminary overall economic potential WEIGHT=1.25 | Environ- mental rating WEIGHT=1.0 | Priority rating |
|-----|--------------------------------|--------------------------|------------------------------------------------------------------|------------------------------------------------|----------------------------------------------------------------|--------------------------------------------|--------------------|
| 1 | Umgeni Rd South-R102 | High Street | L | H | M | 0.9 | 7.4 |
| 2 | North Coast Rd South-R102 | Industrial | L | H | M | 0.3 | 6.8 |
| 4 | Phoenix Highway | Residential | M | L | M | 1.1 | 6.6 |
| 5 | VerulamTongaath South-R102 | Incipient / Connector | M | L | L | 1.2 | 5.4 |
| 6 | La Lucia-Mt Edgecombe-M41 | Office & Retail | L | L | H | 1.2 | 6.9 |
| 7a | KwaMashu Highway East-M25 | Industrial | H | M | M | 0.3 | 7.8 |
| 7b | KwaMashu Highway West-M25 | Residential | H | L | L | 1.1 | 6.3 |
| 24 | Verulam-Tongaath North-R102 | Peri-urban | M | L | M | 1.2 | 6.7 |
| 25 | Verulam-Inanda (Inanda Rd) | Residential | H | VL | L | 1.1 | 5.4 |
| 26 | Springfield Flats-Pinetown-M19 | Incipient / Connector | L | VL | L | 1.2 | 3.5 |
| 27 | Sherwood-Pinetown-M13 | Office & Retail | L | L | H | 1.2 | 6.9 |

Note: H is assigned a value of 3, M is assigned a value of 2, L is assigned a value of 1, VL is assigned a value of 0.5

10. RECOMMENDATIONS

The study recommends:

- Strategic integration of corridor development with other metropolitan planning initiatives, including Fundamental Restructuring of Public Transport and the IDP and the implementation of development guidelines applicable to all corridor types. This should include direction of new growth into corridors by means of public investment and economic development promotion;
- Application and refinement of the prioritisation scheme to ensure appropriate use of public resources, particularly in terms of economic development but also in terms of public facilities in areas of high social need;
- Implementation of guidelines specific to individual corridors in terms of the corridor typology;
- Development of a public sector management structure for the corridors, including managers to focus on integration of different public sector activities; and
- Matching planned corridor developments to metropolitan demand.

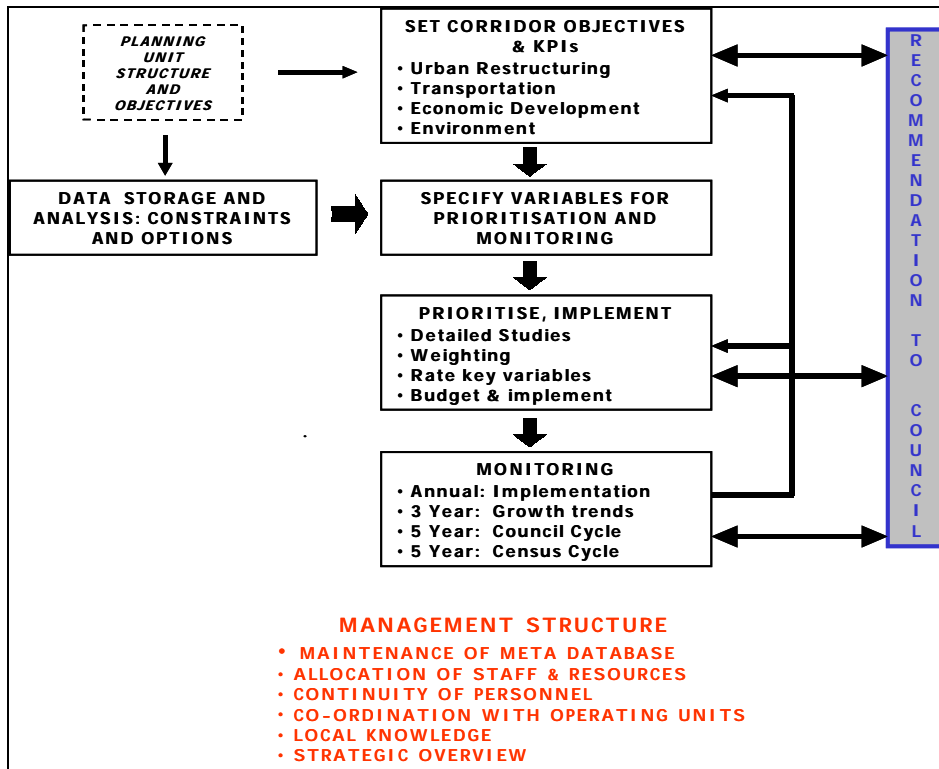


Figure 3: A Coherent Management Structure for Corridors

11. CONCLUDING STATEMENT

To successfully restructure the city will require the corridors and nodes to be a major focus, not only for urban restructuring and investment in social facilities, but also for implementation of a rationalised public transport network and economic development, while ensuring that the environment is improved or suffers no major negative environmental impact. This will require a sustained, integrated and prioritised effort on the part of the Council and may take some time before the results become apparent.

ACKNOWLEDGEMENT / COPYRIGHT.

We acknowledge the eThekweni Municipality for the use of data and findings from the studies commissioned by the previous North and South Local Councils. Copyright for the methods and procedures described rests with the authors and the CSIR:Transportek and is based on the following contract reports:

Green, CA, Aberman, L and Naudé, A. Land-use Corridors and Nodes Study: Phase1. Contract report No. CR-2000/25. Durban North Central and South Central Local Councils. April 2000.

Green, CA, Aberman, L and Morojele, N. Land-use Corridors and Nodes Study: Phase 2a and 2b. Contract report No. CR-2001/48. Durban Unicity. May 2001.

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Several of the projects she has been involved with have had a significant GIS component and she has been actively involved in the testing of new GIS analysis software. Recent projects have involved the development and implementation of a classification and prioritisation system for urban corridors that provide the main structural elements for future growth and development. To focus development suitable sites within the corridors have been identified for clustered facility investment. This has been done through the strategic identification of key facilities shortages using GIS-based accessibility analysis.

KEY QUALIFICATIONS

- Accessibility modelling / service access planning
- Research on activity streets and corridors
- Land use transport planning
- Environmental impacts of transport and urban development projects
- Public transport user issues: market investigation and analysis i.e., crime, environmental issues, affordability and subsidy

EDUCATION AND PROFESSIONAL STATUS

| | | |
|------------------------------------|------|-----------------------------|
| BA (Geography and African Studies) | 1978 | University of Stellenbosch. |
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