

PRIORITISATION OF NON-MOTORISED TRANSPORT PROJECTS (A SYSTEMATIC APPROACH TOWARDS A SUSTAINABLE NON-MOTORISED TRANSPORT NETWORK)

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ABSTRACT

Governments in both developed and developing economies are beginning to realise the importance and the benefits of an effective Non-Motorised Transport (NMT) network. Identifying deficiencies in their respective existing transport systems and consequentially undertaking effective planning and realisation, are essential elements towards a sustainable NMT network.

SSI Engineers and Environmental Consultants (SSI) has pioneered a systematic, easy-to-implement approach to prioritising NMT projects which is sympathetic to the needs of citizens but is founded on rational engineering criteria. This paper describes the approach, based on successful Dutch (Jacqueline Mouws worked for 17 years as traffic engineer in the Netherlands) and South African (in Msunduzi Municipality) experiences.

The approach consists of the following steps (after identifying an appropriate and attainable NMT network):

- Identify and describe potential projects in terms of requirements and constraints.
- Identify criteria and establish rationale for weighting of relevant elements.
- Discuss the projects and the assessment criteria with as many stakeholders as practical, let them have input and don't be afraid to adapt accordingly.
- Use the criteria and weighting system to rate, rank and prioritise potential projects.
- Aid government officials by constructing a prioritised project list as a basis for directing available implementation funding in a justifiable and systematic manner.

The paper will also address variations encountered and highlight success factors as well as adaptability of this approach towards the creation of sustainable transport networks in South Africa.

1 INTRODUCTION

Non-Motorised Transport (NMT) includes all means of transport that are human- or animal-powered. Examples of NMT include walking; cycling; rollerblading; skateboarding; push-scooters and wheelchair travel.

The *Draft National Non-Motorised Transport Policy (December 2008)* articulates the following vision, mission, strategic objectives and guiding policy principles:

1.1 Vision

Non-Motorised Transport will be a sustainable and stimulating mode of transport for social and economic development within an integrated efficient transport system.

1.2 Mission

The mobility needs of marginalised communities and NMT users shall be met through the provision of a safe, secure and reliable transport system.

1.3 Strategic objectives

The objectives of a NMT Policy include, inter alia:

- Integration of NMT into the transport system including transport and spatial planning;
- Endorsement and facilitation of the use of NMT modes;
- Development of infrastructure and maintenance standards that recognise NMT as an essential mode of transport;
- Enhancement of traffic legislation that recognises NMT as an alternative transport mode;
- Facilitation of NMT as a feeder system to other modes of transport;
- Empowerment of the marginalised groups through NMT;
- Allocation of adequate and sustainable funding for promotion and development of NMT;
- Promotion of NMT as a reliable, healthy and safe transport mode;
- Reduction of the number of traffic fatalities of vulnerable Non-Motorised road users; and
- Facilitation of research and new initiatives to improve NMT performance.

1.4 Guiding policy principles

In striving to meet the NMT policy objectives, the national government will be guided by the following broad principles:

- To integrate Non-Motorised transportation into the transport system.
- The need to improve the **quality of life** of marginalised people.
- To adhere to the principle of **environmental protection, and energy conservation**.
- The integration and connectivity of the first and second economies and the connectivity and integration of the rural and urban areas.
- The need for economic revitalization of the rural areas.
- The promotion of **safety** as a critical facet of public and freight transport.
- The need to increase accessibility and mobility

1.5 Purpose

This paper describes a systematic and pragmatic approach to NMT planning and project prioritisation based on successful Dutch and South African (Msunduzi Municipality) experiences. This should demonstrate how municipalities can practically plan; design; construct and maintain NMT facilities.

NMT planning is crucial and includes significantly more than infrastructure provision. Inadequate planning could result in insufficient allocation of resources which ultimately result in ineffective implementation of NMT programmes and initiatives. Despite the strong motivation for NMT in policy and legislation documents, implementation of projects is inconsistent. This calls for adequate NMT implementation strategies and plans across government spheres. Local governments have to ensure appropriate and adequate NMT facilities are provided to encourage NMT use as modal choice.

2 METHODOLOGY FOR NMT PLANNING

A systematic, easy-to-implement approach to the prioritisation of projects is part of the methodology for NMT planning. The method of NMT planning and the information that should be collected in the different steps is described in the following paragraphs.

2.1 Status quo analysis

Using the information available as well as from meetings / interviews with relevant officials and stakeholders the status quo of the NMT situation is analysed. This analysis includes both the state of affair from a planning point of view as well as an assessment of the currently available NMT infrastructure, analysing its adequacy and quality. The main aspects identified include important NMT routes, taking cognisance of strategic locations within the municipality, such as public transport facilities, educational precincts, commercial facilities, health centres and sporting facilities. Other factors include traffic (vehicle and pedestrian) volumes, accident hot spots and the function of a section of road and major intersections. As part of the status quo process, public consultation sessions are also important.

2.2 Strategic NMT planning

A strategic network of NMT connections is developed. The strategic NMT planning is aligned with other transportation planning documents, urban planning and new developments. The strategic NMT network links destinations that are important to NMT users. The main routes are links between residential areas and destinations such as schools, hospitals, public transport hubs etc. This results in a strategic map of the NMT network and a description of the main goals for NMT.

2.3 Design guidelines and standards

Based on the strategic objectives and the general approach developed in the strategic planning, the type of NMT infrastructure and facilities required to meet the objectives are determined. There are standard design guidelines available from NDoT. Reviewing these national guidelines will result in the setting of general NMT infrastructure design guidelines, which will be applicable throughout the municipality, as well as road infrastructure design standards.

2.4 Infrastructure improvements programme

The strategic objectives, the NMT network connections and the design guidelines provide a vision of the desired NMT infrastructure. Comparing this vision with the results of the status quo analysis identifies the locations where infrastructure or other improvements are needed. In conjunction with existing projects and programmes, this will lead to a wide NMT infrastructure improvement programme.

2.5 Implementation plan

Broad financial estimates for the projects that are included in the NMT improvement programme are produced. SSI has developed a prioritisation model, based on their attributes, to reach the municipality's objectives.

3 ASSESSMENT

In order to assist in the rating and ranking of upgrade needs of the primary road network, an objective assessment process is developed. In the formulation of an assessment process the following criteria are used:

- User-friendliness of assessment system (objective, simple, understandable, accessible);
- Inclusive of all major influences;
- Easily updated (related to tangible aspects);
- Applicability (should correspond to significant factors).

3.1 Class of NMT facility needed

The adopted guidelines should always be consulted and referred to during the NMT planning and design processes. However, in particular situations, different classes of NMT facilities may be desired or necessary. The necessity of a facility depends, among other things, on the speed of the motorised traffic, the volume of the motorised traffic and the volume of NMT users. In most residential areas the speed and volume of the motorised traffic is low which makes it safe for NMT users to share the road with the motorised traffic. In addition to the transport planning elements, considerations such as completing a route or the presence of a special destination like a school or clinic can make a NMT facility desirable.

The first assessment of the need for an NMT facility is carried out on the basis of the traffic indicators, speed and volume of motorised traffic in combination with the use by NMT. The decision-tree is shown in Figure 1, commencing with the speed of motorised traffic, via the volume of motorised and Non-Motorised traffic, guides to the type of facility desired.

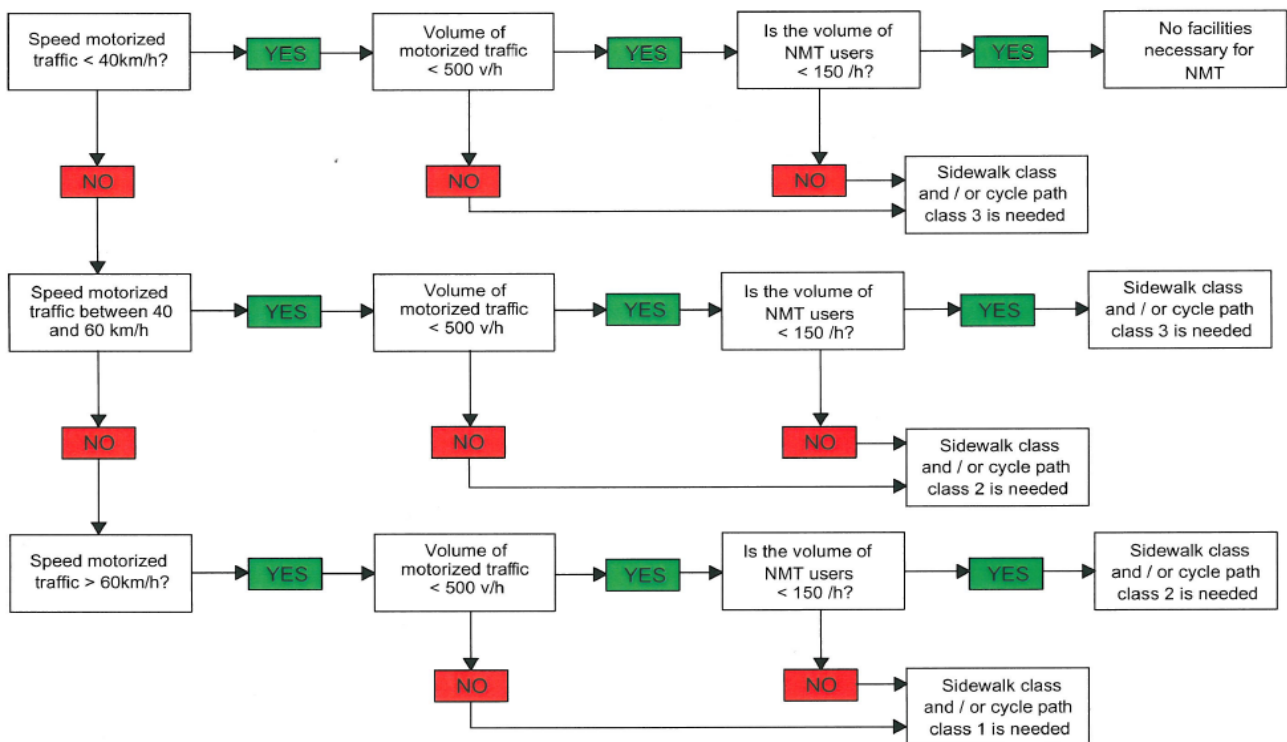


Figure 1: NMT facilities decision tree

A second important reason to include NMT facilities can be the completion of a route. Sometimes sections of a route pass an area or street where, based on the indicators as per Figure 1, NMT facilities are not required. In order to ensure that users will recognize routes and to make the entire route more attractive, these short sections should be upgraded and aligned in appearance with the adjacent sections of the route.

A third reason to incorporate NMT facilities is to promote the destination itself. As an example, a botanic garden can be important as a tourist destination. Therefore, in order to promote the botanic garden and the use of NMT to get there: an extra route can be added in the network.

3.2 Ratings

NMT routes are evaluated and, based on their current status, rated on current facilities. As an example, Moses Mabhida Road (photo 1, below) was evaluated on factors which included road safety, present NMT facilities (cycle lane, sidewalk, lighting of the road, possibilities to cross the road, speed calming) etc.

The criteria are scored and points awarded in terms of importance of each aspect. The points for each aspect are then weighted to achieve a more balanced quantification of the relative significance of each road.



Photo 1: Moses Mabhida Road

3.3 Rankings

NMT routes are evaluated, based on their possibilities/ need for NMT facilities. The ranking puts a value to the facilities or destinations for NMT users along a road section or intersection. For example, Moses Mabhida Road (photo 1, above) was evaluated on factors which included distance to public facilities (e.g. schools; hospitals; public transport hubs) etc

The ranking (need for a facility) minus the rating (quality of the present facility) will indicate the priority.

4 **PRIORITISATION OF PROJECTS**

4.1 Top projects

In order to prioritise the road section / intersection projects, a list is compiled. This is carried out using the following process:

- The necessity of a type of NMT facility is assessed (refer 3.1)
- The warranted type of facility is compared with the existing type. (refer 3.2)
- The projects where an upgrade is desirable are ranked according to the ranking system. (refer 3.3)
- The current rating is deducted from the ranking so it will be clear that those road sections / intersections that need upgrading according to the ranking system will be on the top.

Table 1: Example 1 of prioritised intersections

NAME1	NAME2	Road safety	Vehicle Volume	NMT Volume	School	Hospital Clinic	Public facility	PT HUB	ranking score	ranking	rank - rate	prio
HOUSEN HAFJEJEE	MASUKWANA	8	2	6	4	0	2	10	32.0	3	29	1
F.J. SITHOLE	SUTHERLAND	6	2	6	16	2	0	2	34.0	1	29	2
F.J. SITHOLE	SINKWAZI	6	0	6	16	2	1	2	33.0	4	29	3
BUCHAMAN	SELBY MSIMANG	6	3	6	12	0	0	2	29.0	13	29	4
BAHAMBRA WAY	BOMBAY ROAD	6	2	6	16	2	1	0	33.0	2	27	5

In Tables 1 and 2 the columns 3 through 9 are scored based on the assessment of the element (as per the column name). If traffic safety is problematic the score is higher than when it is not a problem. If the data is available the columns should be scored with an appropriate interpretation of the relevant information. As an example, traffic volumes > 500 motorised vehicles in peak hour equals 3, whereas 200 – 500 motorised vehicles in peak hour equals 2, and < 200 motorised vehicles in peak hour equals 0. If there is no specific data available estimations can be made.

The stakeholders should be involved in assessing which elements are used and what does a rating mean, before scoring the columns. Stakeholders together with the municipality should discuss, by using examples that are very different from each other, the scoring. This will help to empower the stakeholders as they can influence and direct which criteria they perceive as most important.

The quantification methodology on Table 1 and Table 2 illustrates the flexibility of project prioritisation. It may and can be assessed and prioritised according to the criteria considered appropriate. For example, in Table 1 schools and clinics are given less weight relative to Table 2 and there are changes in the NMT project prioritisation. These tables also justify to stakeholders why certain projects were chosen in preference to others, should such questions arise.

The scoring makes it possible to translate the strategies and vision of the Municipality into objective values which in turn can be converted into a prioritised implementation programme. In this example the municipality has, if scored as in Table 2, a very firm policy to provide NMT routes to schools and hospitals. Whereas in Table 1 the NMT routes to public transport are of the same weighting/importance as routes to schools and hospitals. This results in a different priority.

Table 2: Example 2 of prioritised intersections

NAME1	NAME2	Road safety	Vehicle Volume	NMT Volume	School	Hospital Clinic	Public facility	PT HUB	ranking score	ranking	rank - rate	prio
F.J. SITHOLE	SUTHERLAND	6	2	6	16	10	0	2	42.0	1	36	1
F.J. SITHOLE	SINKWAZI	6	0	6	16	10	1	2	41.0	4	36	2
BAHAMBRA WAY	BOMBAY ROAD	6	2	6	16	10	1	0	41.0	2	34	3
BUCHAMAN	SELBY MSIMANG	6	3	6	12	0	0	2	29.0	10	27	4
HOUSEN HAFJEJEE	MASUKWANA	8	2	6	4	0	2	10	32.0	3	27	5

5 MONITORING AND REVIEW

Monitoring of the progress of implementation and usage of NMT is an essential aspect leading to the success of the project. The equally important review (and when necessary revision) of the infrastructural requirements, must be carried out and the prioritisation and programming be continually updated.

The aim of the monitoring and review exercise must be to provide information on the performance and development of the NMT network and to serve as a means of assessing the extent to which the implementation of the proposals are meeting the objectives of the Municipality.

5.1 Monitoring

The monitoring of the NMT Plan should supply information on how key characteristics of the system are performing. In order to achieve this, the following data has to be collected.

5.1.1 *Motorised traffic volumes and patterns*

The motorised traffic element should comprise the annual traffic counting programme, traffic intersection counts and the surveys connected with travel time and delays throughout the Municipality.

5.1.2 *Non-Motorised Transport volumes and patterns*

Surveys detailing volumes and traffic routes need to be carried out for NMT within the Municipality. These surveys should be undertaken both before and after the introduction of NMT measures and also where these are influenced by new commercial, industrial or residential developments.

5.1.3 *Road accidents statistics*

Comprehensive and accurate road accident statistics are essential if an effective Non-Motorised transport plan is to be successful.

5.2 Review

Transportation is a dynamic on-going process. Concepts and programmes need to be flexible enough to permit refinements to the system elements. The process undertaken in the compilation of an NMT Plan will be able to inform Municipalities as to the best way to proceed in undertaking their intention. The Msunduzi Municipality goal was to 'develop a

comprehensive NMT system, which will create safer and easier ways to walk and cycle whilst promoting NMT as an alternative means of transport’.

The review stage needs to analyse the monitored data and enable an assessment of the situation.

The review examines how projects which have been implemented meet the NMT Plan objectives and give direction as to the most appropriate way forward.

In the case of immediate and shorter term projects, generally there is sufficient motivation and supportive information to implement as soon as practicable. However, many of the concepts and projects identified in a NMT Plan require advancing to a detailed planning/design level with the necessity for suitably robust data.

6 CONCLUSION

NMT planning is crucial and includes significantly more than infrastructure provision. Inadequate planning can result in insufficient allocation of resources which ultimately result in ineffective implementation of NMT programmes and initiatives. Despite the strong motivation for NMT in policy and legislation documents, implementation of projects is inconsistent. This calls for effective NMT implementation strategies and plans across government spheres. Local government have to ensure appropriate and adequate NMT facilities are provided to encourage NMT use as a modal choice.

Geographic Information System (GIS) would be an ideal platform as bases for these analyses. Currently finding correct up to date databases to fill the GIS is very hard. Ideally a South African database on traffic would be set-up and monitored on a national level. Items such as traffic volumes, accident records and location of Public facilities should be available to everyone.

SSI has pioneered a systematic and pragmatic approach to NMT planning and project prioritisation based on successful Dutch and South African experiences. This demonstrates how municipalities can practically plan; design; construct and maintain NMT facilities.

REFERENCES

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