

# CHAPTER 8



**MONITORING AND EVALUATION  
OF NMT PROJECTS**



## 8. MONITORING AND EVALUATION

### 8.1 Introduction

Key lessons from literature are that it is difficult to attribute an increase in cycling solely to the creation of bicycle infrastructure. Infrastructure is helpful in increasing cycling and safety, but plays only a part alongside other key factors.

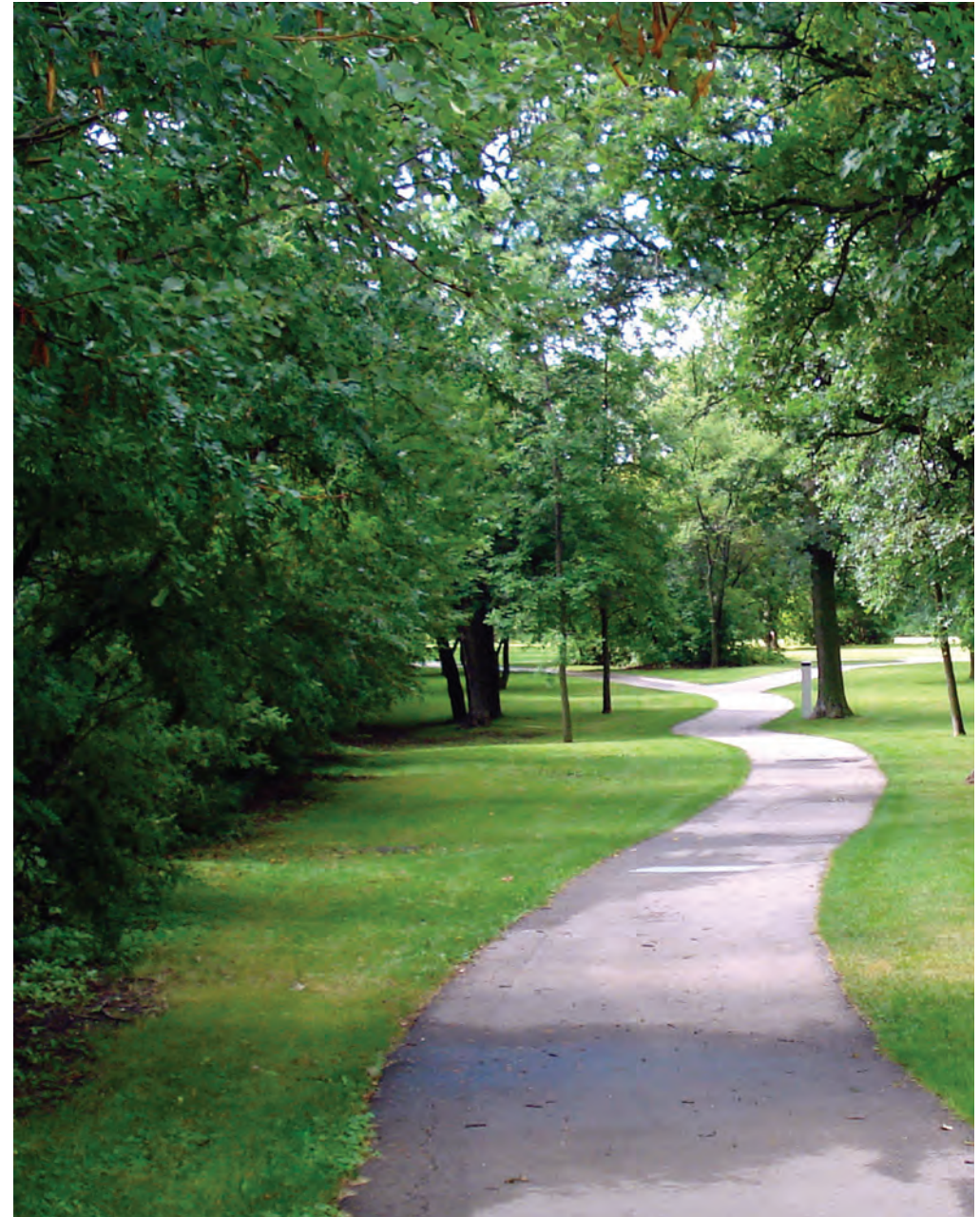
In their paper, *“Making Cycling Irresistible”*, Pucher and Buehler (2008) suggest key policies and innovative measures that promote safe and convenient cycling. These are:

- A) Well-maintained, extensive systems of cycling facilities;
- B) Intersection modifications and priority traffic signals;
- C) Traffic calming;
- D) Bike parking;
- E) Co-ordination with public transport;
- F) Traffic education and training; and
- G) Bicycle-friendly traffic laws.

Other key factors that contribute to an increase in the bicycle mode share include:

- A) Public attitude, custom, and habit;
- B) Public image of cycling;
- C) City size and density;
- D) Cost of car use and public transport;
- E) Income;
- F) Climate;
- G) Danger; and
- H) Cycling infrastructure.

Thus it was important to determine key factors that caused people to cycle/walk in the pilot cities, and see the uptake of cycling and walking along the NMT infrastructure, once this had been implemented.





## 8.2 Conducting surveys for the NMT pilot projects

Currently there is only a limited understanding of travel behaviour and choice. The monitoring and evaluation of the eThekweni, Johannesburg and Polokwane Pilot projects aimed to conduct before and after studies in investigating the role of improved and new cycling infrastructure in encouraging cycling and increasing its mode share.

### 8.2.1 BRANDING AND MARKETING

It is imperative to brand the survey point/location which has been chosen. When the surveys were undertaken, banners were provided at each survey point / location. The banners serve as identification of the survey stations which assisted cyclists to stop when conducting surveys of this nature.

### 8.2.2 SEASONAL VARIATION

When conducting surveys for the pilot city, Ethekewini Metro, seasonal variations were catered for, as the counts were undertaken for the baseline and at interim points of 3, 12 and 24 months after completion of the pilot projects. These were done to compare the initial findings and assess the seasonal fluctuations and its effect on cycling.

### 8.2.3 SURVEY TIMES

The surveys for Ethekewini Metro were conducted over an 8 hour period, between 07h00 to 15h00, on a Tuesday, Wednesday or Thursday for week-day counts, and separate count for weekends. It is important to note that the surveys needed to be conducted outside of the school vacation periods. The surveys should capture the peak walking and cycling periods.



### 8.2.4 SURVEY FORMS

Survey forms and questionnaires were specifically compiled for the investigations. Each survey location consisted of two enumerators, one to conduct the NMT count and the other to undertake the cyclist surveys in accordance with the allocated forms.

### 8.2.5 QUALITY CONTROL

Quality controllers conducted spot field checks on site, verifying that renumerators were at the correct locations and collecting the correct information. The data was uploaded, reviewed and verified to identify discrepancies.



**EXAMPLE: QUESTIONNAIRE FOR DURBAN PILOT**



**environmental affairs**  
 Department:  
 Environmental Affairs  
 REPUBLIC OF SOUTH AFRICA



On behalf of  
 Federal Republic of Germany  
 The Federal Government

Date	
Time started –	
Respondent M/F	
Respondent resident / non-resident in Durban	
Interviewer name	
Location of interview	
Time ended -	

In the last 6 months, eThekweni has built new bicycle lanes and sidewalks, and put up new road signs, road crossings and road markings about cycling. Your participation in this survey will help us monitor this new bicycle infrastructure and find out whether or not it meets the needs of people who ride bicycles in Durban.

1. People ride a bicycle for many different reasons. What was the reason for your bicycle ride today? Answer 'yes' to all of the answers that apply to you.

	YES	NO
To train for a race		
For fun and recreation		
To visit friends or family		
To go shopping		
To go to work		
To go home from work		
I ride a bicycle as part of my work		
[what work]?		
A different reason		
[what reason]?		

2.a What part of the city did you start riding from?  
 2.b What part of the city or building are you going to?

3. About how long (in terms of time) does this trip take you, one way?

	YES	NO
Less than 10 minutes		
Between 10 and 20 minutes		

Between 20 to 30 minutes		
About ¾ hour		
An hour or more		
Don't know		

4. On how many days did you ride your bicycle during the last week?

	YES	NO
1 day		
2 days		
3-5 days		
6-7 days		
Don't know		

5. On how many of those days [in the week that we are referring to, above] did you ride your bicycle in this area?

	YES	NO
1 day		
2 days		
3-5 days		
6-7 days		
Don't know		

6. For how long have you been riding a bicycle in this area?

	YES	NO
More than 5 years		
Between 5 years and 2 years		
Between 2 years and 1 year		
Less than 1 year		
Less than 1 month		
Don't know		

7. For how long have you been riding a bicycle in another part of Durban or another part of the country?

	YES	NO
More than 5 years		



**EXAMPLE: QUESTIONNAIRE FOR DURBAN PILOT *continued***

	YES	NO
Between 5 years and 1 year		
Less than 1 year		
Less than 1 month		
I have only been riding a bicycle in this area		

8. This is a question about the bicycle lanes, signposts, parking racks, road crossings and road markings – in other words, about eThekweni’s bicycle infrastructure. Please tell me whether you strongly disagree, disagree, don’t know, agree, or strongly agree, with the following statements:

	Strongly disagree	Disagree	Don’t know	Agree	Strongly agree
When I ride on a bicycle lane I am safe from collisions with cars, buses or taxis					
When I ride on a bicycle lane I am safe from collisions with pedestrians					
A bicycle traffic light makes it easy to cross the road					
The bicycle lanes in Durban make it quicker to get to where I am going					
I do not ride a bicycle in the traffic with cars, buses or mini-bus taxis					
Children are safe riding on the bicycle lanes					
I plan my bicycle trips so that I use the bicycle lanes					
The bicycle lanes in Durban make cycling more enjoyable					
My bicycle is safe where I lock it					
The street lights give me enough light to see the road					
Sometimes I avoid riding a bicycle because I do not want to get a puncture					

9. Below is a list of types of bicycle infrastructure. Which is not important, of low importance, of some (moderate) importance, and the most important to you, when you are riding.

	Not important	Low importance	Don’t know	Moderate importance	Most important
A lane painted on the road, reserving the bicycles only					
A traffic signal at intersections that is specifically for bicycles					
A road sign that says for bicycles-only					
A bicycle-only ‘sidewalk’					
A bicycle- and pedestrian-only sidewalk					
A map that shows the bicycle lanes					
Shortcuts for bicycles only					
Safe lockers to store my bicycle					
Bright lights on the road or sidewalk					
A place to ride that is clear of glass and litter					

10. Is there anything you would like to add?

- [You might like to tell me what you like or do not like about riding your bicycle in Durban? ]
- [What about your favourite place to ride in Durban?]
- [What do you like the most about the new infrastructure in eThekweni?]
- [What do you like the least about the new infrastructure in eThekweni?]

Thank you for your time.

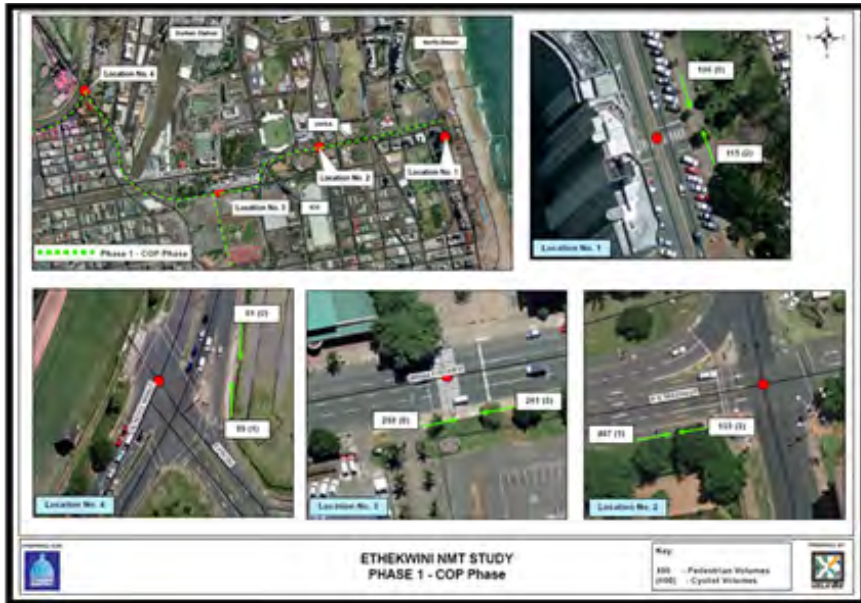


Figure 8.1 Survey locations in Ethekwini



Figure 8.2 Survey locations in Orlando, Johannesburg

## 8.3 Key indicators used to monitor the Johannesburg project

Indicators used to monitor the Johannesburg project as are as follows:

- Integration of NMT planning into planning departments;
- Maintenance of NMT infrastructure;
- Accident statistics; and
- Cost comparison among modes of transport.

### 8.3.1 INTEGRATION OF NMT PLANNING PRINCIPLES IN PLANNING DEPARTMENTS

The City of Johannesburg developed the City's Framework for Non-Motorised Transport in 2009. This framework identifies ten priority areas in the city which will be integrated with public transport planning.

### 8.3.2 MAINTENANCE OF NMT INFRASTRUCTURE

The City of Johannesburg Transportation Department took a strategic decision to budget **7% of the implementation costs** for all their NMT projects. This is quite a substantial amount and should be used adequately to maintain the NMT site, going forward. For the period ending 2011/2012, the City of Johannesburg and the Johannesburg Roads Agency had an overall roads infrastructure (including NMT) budget as shown below:

TABLE 8.1 SUMMARY TABLE OF BUDGET

Project	R mil
Total operational budget (JRA)	R548
DEA/KfW NMT implementation budget	R17
Maintenance cost of Pilot project	R1.10





**8.3.3 ACCIDENT STATISTICS**

The following accident statistics were obtained along the NMT network from the periods 2006-2011.

**TABLE 8.2 ACCIDENT STATISTICS ALONG NMT NETWORK IN CITY OF JOHANNESBURG.**

Pedestrians					
2006	2007	2008	2009	2010	2011
343	314	274	244	222	217

Cyclists					
2006	2007	2008	2009	2010	2011
12	14	9	8	8	15

The table illustrates that there has been a considerable decline in accidents affecting pedestrians between 2006 and 2011. The number of accidents affecting cyclists declined between 2008 and 2010 but spiked again in 2011.



**8.3.4 COST COMPARISON BETWEEN MODES OF TRANSPORT**

The City of Johannesburg’s Orlando NMT route, which has all the modes of transport running along it, was chosen to compare the cost of different modes travelling along the route based on a number of factors. These are indicated in Table 8.3 to illustrate that the costs of NMT are lower than alternative transport modes.

**TABLE 8.3 MODAL COST COMPARISON**

Mode	Speed (km/h)	Delay (min)	Travel time (min)	Daily one-way	Daily return	Weekly return	Monthly	Comments
Rea Vaya	60	3	6	R5.50	R11.00	R55.00	R220.00	Constant price all the way.
Taxi	60	6	9	R12.50	R25.00	R125.00	R500.00	Delays can be higher due to having to pick up passengers along the way.
Walking	5	1	34	R0.00	R0.00	R0.00	R20.00	One pair of shoes per year.
Cycling	20	2	10	R2.50	R5.00	R25.00	R60.00	(Initial cost R500 for bicycle and R220 maintenance every year.
Private car	60	2	5	R8.91	R17.82	R89.10	R356.40	Maintenance costs + Fuel consumption can be higher.



## 8.4 Key Indicators used to monitor the Ethekwini project

Indicators used to monitor the Ethekwini project as are as follows:

- Integration of NMT planning into planning departments;
- Maintenance of NMT infrastructure;
- Accident statistics; and
- Cost comparison among modes of transport.

### 8.4.1 INTEGRATION OF NMT PLANNING INTO PLANNING DEPARTMENTS

The Ethekwini Transport Authority recently completed its NMT Master Plan, which includes an NMT Strategy. In the Integrated Transport Plan (ITP) 2010-2015, NMT planning has been described as a focal area in the municipality. The plan describes the basic principles of NMT. It is stated in the ITP that the focus of the current strategy and programme is generally on the cycling and walking components of NMT and integration with the Integrated Rapid Public Transport Network.

### 8.4.2 MAINTENANCE OF NMT INFRASTRUCTURE

The maintenance for the Ethekwini Pilot NMT project has been budgeted and maintained as part of the overall NMT maintenance budget. Based on the R150 million allocated to maintain all 9800km of eThekwini roads, maintenance is R15,000.00 per kilometre of road including infrastructure within the road reserve. Therefore, the budget for the first phase, which was approximately 5 km, was R75,000.00. Each asset that the municipality creates goes onto the municipal assets data base (asset register). Maintenance is undertaken on all the assets. The NMT infrastructure falls under Roads Maintenance. Thus the municipality takes maintenance very seriously, and all assets are maintained accordingly.





### 8.4.3 ACCIDENT STATISTICS

The Ethekwini NMT project is located within the CBD of Durban. The municipality keeps a record of all accident statistics. As mentioned in the key indicators report from January 2013, these accident statistics include those of pedestrians and cyclists. Table 8.4 illustrates the accident statistics on the roads where the first phase of the NMT project was implemented in the run up to the hosting of the UNFCCC COP17 as part of the DEA/KfW NMT Greening Programme's pilot project. The statistics indicate that 12% of all accidents involve pedestrians and 0.2% of accidents involved bicycles for 2011. The statistics further indicate that along the completion of the first phase, there has been an improvement in the rate of bicycle (0.1% reduction) and pedestrian accidents (1% reduction).

**TABLE 8.4 ACCIDENT STATISTICS IN THE CENTRAL BUSINESS DISTRICT**

Category	2011	2012
Total accidents	8365	7950
Vehicles per pedestrian	1007	858
Vehicles per pedestrian as a percentage	12%	11%
Bicycles	16	7%
Bicycles as a percentage	0.2%	0.1%

More detailed accident statistics on the streets along the Phase 1 and Phase 2 NMT pilot project in Ethekwini were undertaken. One fatal accident involving a pedestrian was recorded in 2011 (i.e. prior to the implementation of Phase 1). In 2012 and 2013, no fatal pedestrian accidents were recorded, only serious and slight accidents. Twenty-three bicycle accidents were recorded between 2010 and 2013.



### 8.4.4 COST COMPARISON AMONG MODES OF TRANSPORT

The NMT route, which has all the modes of transport running along it, was chosen. The distance of the route was estimated to be 2.75 km. The cost of different modes travelling along the route was calculated based on a number of factors. These are shown below to illustrate that the costs of NMT are lower than for alternative transport modes.

**TABLE 8.5 MODAL COST COMPARISON**

Mode	Deposit	Hire Cost / Hour	Far (Single trip)	Daily Trip	Weekly (5 days)	Month (20 days)	Comments
NMT – Bike Hiring	R550	R55	R55	R55	R275	R1 100	Cost based on hire / park and ride within CBD
NMT – Walking	Nil	Nil	Nil	Nil	Nil	R22	Cost based on purchase of 1 pair of shoes per year
NMT – Bike Purchase and Maintenance	R2 200	Nil	Nil	Nil	Nil	R110	Based on the average purchase price of a standard bicycle
Mini-bus Taxi within the CBD	Nil	Nil	R5.50	R11	R55	R220	
People Mover Bus Services within the CBD	Nil	Nil	R5.50	R16.50	R82.50		
Mynah Bus within the CBD	Nil	Nil	R8.80	R17.60	R88		
Private Vehicle (2.5km trip within the CBD)	Nil	Nil	Nil	Nil	Nil	<b>R130.90</b>	Based on distance of 2.5km, speed of 60km/hrs, delay of 2mins and fuel cost



## 8.5 Key lessons learnt

- The benefits of maintaining **NMT data** is that it enables the identification of hazardous zones and interventions that can reduce the risk of accidents. There remains an inconsistency in what data is maintained and how often it is collected.
- There needs to be a link between what data is collected and the indicators underpinning the NMT development. For example, if the commuter safety was a criterion, then the municipality needs to track accident data for pedestrians and cyclists to ensure that there is a reduction in accidents and where accidents continue to occur, to react accordingly.
- NMT Departments within cities need to take accountability for the infra-structure they implement and keep track of the **municipal budget for maintenance** and how it is utilised.



## 8.6 Concluding comments

*The value of developing indicators for the monitoring and evaluation of NMT projects and reporting against these will assist in amplifying the socio-economic impact of this investment and will help to ensure the longevity of the investment. By showing that there has been both an uptake in cycling and walking combined with a reduction in accidents and fatalities provides ample motivation for the expansion of the infrastructure.*