

IX.5 Qualitative Benefit

As the qualitative benefit, indirect benefit and the items which are not included in the benefit calculation in IX.2.4 because of the difficulty of quantifying direct benefits are to be discussed here.

Indirect benefit, which is defined as the benefit of secondary effect with additional capital investment following the said investment thereof can be listed for the Project as follows:

a) Economic Development Effect

Transport infrastructure investment aims at the escalation of economic activity. The Bypass is the trunk route of Kenya's Corridor where the capital has intensively accumulated. The level up of trunk roads makes total economic productivity higher. As the access road to Industrial District in Nairobi, the Project road has a vital position in improving the accessibility with smooth flow and cheaper transport cost.

b) Transport Network Improvement Effect

The project road is the part of the Mombasa-Lagos Trans-African Highway extending to Uganda and Zaire. The construction of truck terminal near the Mombasa Junction coordinates the effect of Project road to improve the transport network in Nairobi, which makes the conversion of a substantial amount of traffic passing through the C.B.D. of Nairobi because of network structure.

c) Introduction of Highly Sophisticated Transport Infrastructure

After the completion of the Project, the Bypass will become one of the most sophisticated roads in Kenya with the latest engineering standards and grade separated junctions aiming at the first freeway style urban ring road construction.

d) Regional Development Effect

Analyzed in IX-2, the population and area of the zone of influence are about 50,000 persons and 25 km², respectively. Especially, around Kikuyu Village near the Bypass terminal area, which is famous as a high income district, available to purchase the vehicle, induced and developed traffic can be expected in the future. The project road contributes to easy access to the City Centre, therefore above inhabitants alongside the Project road can enjoy the fruit of capital accumulation of culture, economy and medical facilities.

Direct benefits which are not included in the benefit calculation are as follows:

a) Direct benefits which are not included among the benefit items listed in IX.2.1.

- The reduction of maintenance cost of A104, due to the conversion of traffic, especially heavy commodity vehicle to the Bypass
- The reduction of cost, based on the difference of using brake, speed change and start between the traffic of Bypass converted from A104 and using A104
- The benefit accruing from induced traffic, based on the level of service on the Bypass construction
- The benefit related to the changing traffic pattern of specified O-D, due to the level of service on the Bypass construction

b) Decrease of Traffic Accident in Nairobi

Traffic accidents due to the passing of heavy and medium commodity vehicles through Nairobi can be expected to decrease with compulsory diversion to the Bypass. The speed up due to the diversion of heavy vehicle and tank-lorry, which do not have enough power to climb the A104 to the northwest, makes a smooth flow of the traffic.

c) Others

The promotion of comfort, the decrease of fatigue from driving and economization of package costs are expected from the Project road as well.

The diversion of through-traffic by means of a Bypass construction becomes a long overdue problem having been considered by the Government of Kenya.

A Nairobi Bypass may offer significant improvement in the urban traffic conditions by keeping through-traffic off city roads. It would also provide a future frame for the Nairobi Metropolitan area.

IX.6 Comment of Economic Vaibility

It is considered that the figures of N.P.V., B/C ratio and I.R.R. as well as sensitivity analyses are highly reliable as the benefit calculation has been implemented, based on only the logically quantified benefits among the direct benefit following a conservative standard.

It is necessary to understand that the figure of Cost-Benefit analysis is generally lower as the road construction's most important target is the economic development effect, which is neglected for benefit calculation.

Potential reasons why the figures remain at the level besides forecasted traffic volume are to be considered as follows:

- a) Longer the distance of Bypass as 3.82 km offsets the effects of higher speed and lower V.O.C.
- b) Unit benefit, adopted to the converted traffic at Bypass from other roads except A104, ought to be lower than the real figure as the Study started for the Bypass of A104, therefore being not fully assessed for the characters of the traffic thereof.

As for the figures of sensitivity analyses, it is considered that Project feasibility is verified through the examinations of further critical conditions.

It is recommendable that the legal speed limit for city road of 50 km/hr not to be applied to the Bypass and the specification of Bypass ought to be high grade so as to supply the higher service level.

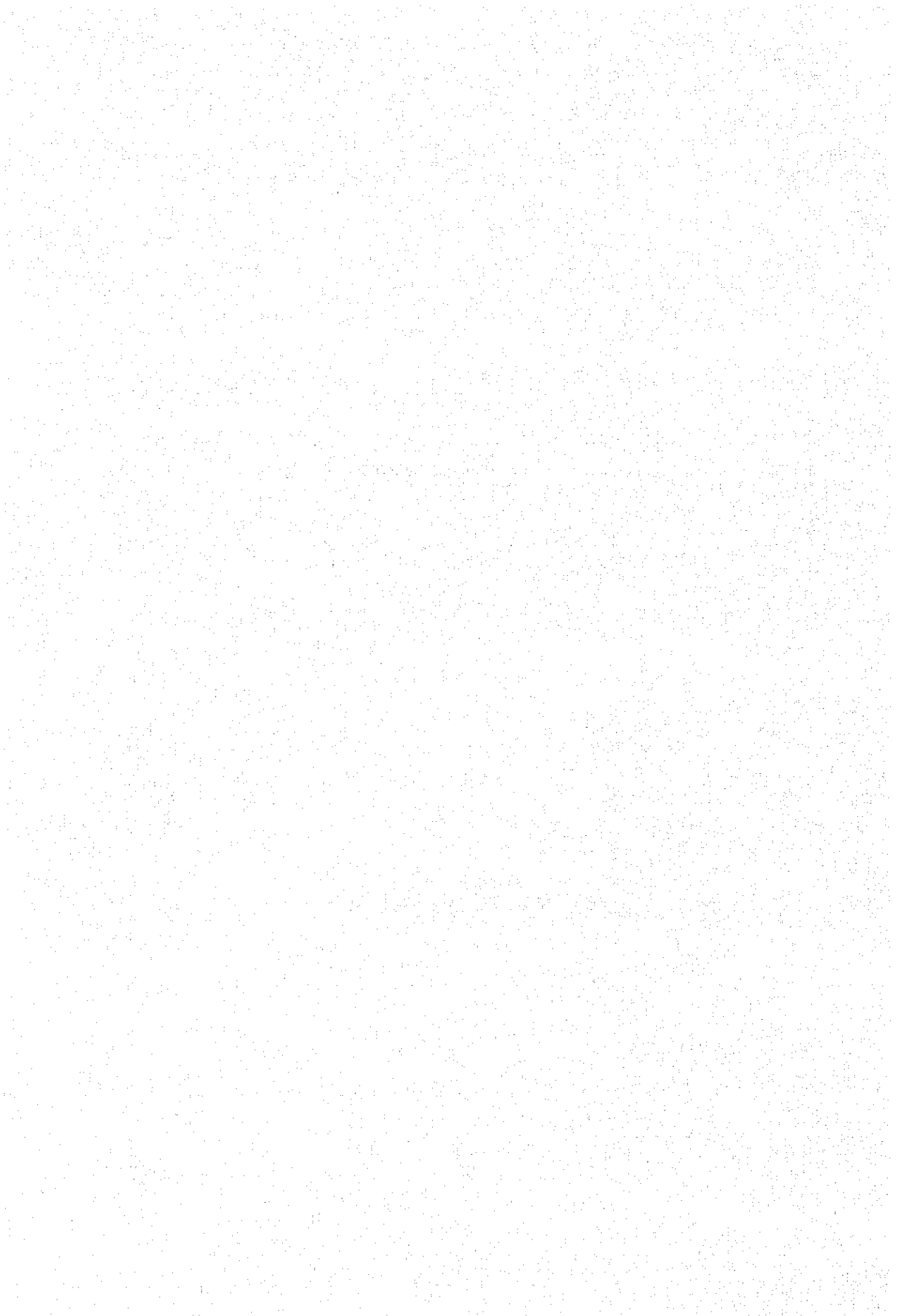
It can be concluded that the Project is firmly acceptable as the positive effect of congestion mitigation at A104 is clearly anticipated with the traffic diversion from A104 to the Bypass being 4,110 ADT and 6,282 ADT at 1991 and 2000 respectively.

Please refer to Table VI-4-6.

Considering those figures of I.R.R., N.P.V. and C/B ratio as well as qualitative benefit mentioned in IX.6, the Project is summarized as economically feasible.

I.R.R.	18.26%
N.P.V.	145,332 × 10 ³ Shill.
C/B ratio	1.52
Sensitivity Analyses (I.R.R.)	
(i) the cost of 20% increased	15.58%
(ii) the benefit of 20% decreased	14.86%
(iii) the case of (i) and (ii)	12.22%

X. Overall Evaluation



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1. As the project is justifiable technically, economically and socially, it is strongly recommended to take necessary actions so as to implement the project as schedule.
2. The project is firmly acceptable as the positive effect of congestion mitigation at A104 is clearly anticipated with the traffic conversion from A104 to the Bypass being, 4,110 ADT and 6,282 ADT at 1991 and 2000, respectively.
3. In case of not constructing a Bypass, according to a future traffic assignment estimation, the congestion rate (traffics/traffic capacity) as of 2000 year, will become 2.30 on A104 at City Centre and 1.29 on Ngong Road and 1.18 on Langatta Road; therefore it would be quite necessary for the City to commence Bypass construction.
4. In accordance with the economic assessment for the project, the Internal Rate of Return of 18.26% is calculated based on Cost and Benefit Stream, which is considered an acceptable figure for the project.
5. The alignment and the design of the proposed road involves many problems which require a high engineering level to solve them. On the other hand, it does not seem that a special technique or a special type of equipment would be required for construction; therefore construction execution by joint venture of local and foreign contractor is reasonable.
6. The detailed design work of the project would involve highly complex engineering problems, especially for the Junction with a different class of road, so it is desirable to employ qualified and experienced consulting engineers for the detailed design work.
7. The massive amount of funds are required for the development of the project, it will be one of the possible measures for arranging with an external source for financing the project.
8. The construction cost of 266 million K.Shs is to be invested for 4th year construction cost in this project, which would be specially appropriated in the Government budget as the amount will occupy a high percent in it.

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