

CHAPTER 12:

FINANCIAL AND IMPLEMENTATION PLANNING STUDY

12.1 Introduction

The prime objective of the financial and implementation planning¹ study proposed here is to outline a down-to-earth blueprint for the timely realization of the KG-GM Expressways in India's National Capital Region (NCR), to be opened for traffic in 2006. Such blueprint must in the first place be realistic and, therefore, fully compatible with the prevailing Indian realities, and it would typically also provide for the underlying rationale and justifications. The blueprint may serve as a point of orientation in the planning and implementation of other expressways planned for the NCR (see footnote 4).

The Government of India (GOI) pursues since the early 1990s two important objectives, namely integration of the Indian into the global economy, and full private sector leadership and/or participation in infrastructure, including expressway and national highway development. Many potential projects have been identified in this context². However, there are still many uncertainties and difficulties in the realization of private sector led infrastructure development in general and highway/expressway development in particular. Only one highway upgrading project in the State of Gujarat, namely the 35 km Vadodara - Halol Highway has seen recently financial closure under what appears to be a true BOOT concept³.

It is a common position that the KG-GM Expressways are, in combination with the

¹) This Draft Final Report builds on the results and recommendations of Progress Report (1), the Interim Report and Progress Report (2), all of which have been submitted to and accepted officially by the Government of India. If and when necessary, reference will be made to the relevant Sections in these documents.

²) The details were presented and discussed in Section 10.4 of Progress Report (1).

³) This project, the cost of which are about US \$ 41.2 (in 1999 dollars), is considered as an interesting perhaps "model case".

FNG Expressway and other expressways under consideration in the NCR⁴, needed regardless of their financial viability, in order to (a.) relieve traffic congestion to the north-east and east of Delhi, and (b.) reduce traffic inflow, which is now forced through Central Delhi.

The financial and implementation study adopted a combination of a holistic and a step-by-step case-specific approach, in order to address the simple but central question on how to realize the important KG-GM Expressways. The major steps are illustrated in the self-explanatory Figure 12.1.1. Center-stage in this approach is the calculation of four “case studies”, which reflect different potential project structures⁵ for the KG-GM Expressway. The individual calculation of the four case studies established numerical evidence with a view to eliminate un-feasible cases and define potentially feasible “base cases”. Such base case in turn could constitute the major input into real negotiations with financial institutions, potential BOOT operators and relevant Government entities.

The financial and implementation planning study is structured along seven major lines of argumentation. Sections 2 to 9 summarize the conclusions drawn from the analyses of the overall enabling environment and provide recommendations on needed reviews and/or adjustments in the areas of policy objectives, the incentive system, the model concession agreement at-hand, and the overall institutional set-up. Section 10 presents the conclusions and recommendations resulting from the calculation of the four case studies and the selected potential base case. The Section discusses, after having introduced the fundamental assumptions, project cost considerations, revenue stream projections and the resulting financial performance appraisal. Section 11 presents the conclusions and basic recommendations for the implementing entity assumed for the realization of the base case. Basic requirements and implications for realization are then discussed. Section 12 finally presents the recommended implementation plan and timetable. The Draft Final Report cannot repeat in every detail the vast amount of data and information provided already in the previous official reports⁶. Readers interested in such a level of detail should consult directly these reports, to which reference is made where and when appropriate

⁴) Such as the DSP and DNK planned for implementation in 2016 and 2026, respectively.

⁵) The term “project structure” refers to the debt to equity ratio, as well as the equity and debt structures.

⁶) Progress Report (1), the Interim Report, and Progress Report (2).

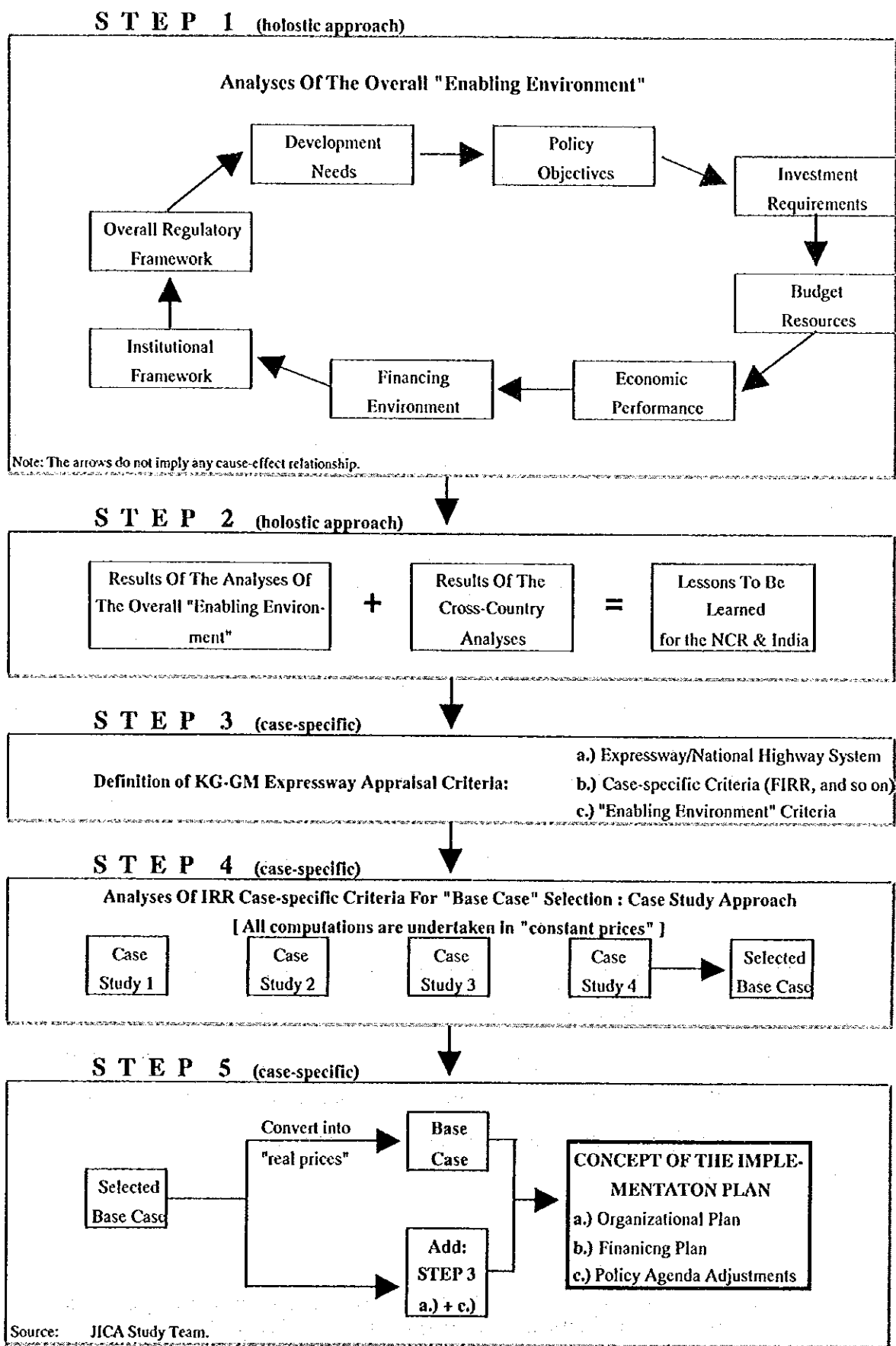


Figure 12.1.1 General Schematic Step-by-Step Approach

12.2 Policy Objectives Framework And Strategy At National Level

India's⁷ ninth plan development strategy stipulated in the "Ninth Five Year Plan 1997 -2002" the general approach for transport sector and road development over the planning period and beyond. There is general agreement among policy formulators and decision takers on the need for accelerated transport sector infrastructure development, in order to support the desired economic growth path of the country, which is estimated at between 7% to 7.5% over the coming years. Figure 12.2.1 summarizes the general approach for road development at national level.

- 1.) There is a need for the country to evolve an approach by which traffic would be diverted to so called "high level of service" corridors and then distributed to other roads with lower levels of service. Hence, the objective of the ninth plan is to develop major national highway (NH) corridors with a view to manage traffic in such a way that traffic flows are diverted on a nation wide grid network
- 2.) The selected corridors are to be developed ultimately into 6L to 8L facilities with access control. The NH grid network should be formed by 100 km square grids.
- 3.) Four major corridors are earmarked for priority development, namely the corridors linking New Delhi, Mumbai, Chennai and Calcutta (referred to as the "Golden Quadrilateral")
- 4.) Furthermore, there is a program announced by the Prime Minister (PM)⁸ for widening of north-south and east-west corridors of the NH network. This will include a central spine connecting Kanyakumari to Srinagar, and a lateral spine connecting NE to the Sourashtra region.
- 5.) The idea is, that with the 100 km grid system and the north-south and east-west spine system, priority will be attached in future to the missing links within the 100 km grid system. It would be possible, in theory, with this approach to ensure easy accessibility to any point providing a maximum of 50 km distance to reach the grid system. It is also assumed that such an approach would provide a somewhat uniform base for economic development over all the country's regions.

Figure 12.2.1 The National Level Policy Objective Framework

The strategy adopted to achieve the above end rests on eight elements: (a) development of expressways; (b) four-laning; (c) strengthening of existing weak 2-lane pavements; (d) widening to 2-lanes; (e) implementation of road safety measures; (f) wayside amenities; and (g) broad participation of private sector interests in the development, operations and maintenance of the expressways. Figure 12.2.2 discusses key elements of the adopted strategy.

⁷) This Section draws to a large extent on the presentation made by the Director General (Road Development) of MOST, during the Congress on Expressway Highways Development in India, New Delhi, December, 1998.

⁸) The PM has also proposed to open up new areas by building new National Highways in the north-eastern region. However, this proposal is of less importance in the context discussed here.

Expressways. Expressways should provide rapid unhindered and safe movement of fast moving vehicles, leaving the existing National Highways (NHs) for normal traffic. It is anticipated that a total of 13,000 km of expressways will have to be constructed over the coming 20 years. It is also proposed to develop expressway, to the extent possible, through BOT, BOOT or similar schemes.

Four-laning. Four-laning is to concentrate on the above introduced quadrilateral and on the 7,000 km long north-south and east-west spines at all those road segments, which carry a traffic volume of over 35,000 PCU's/day. Four-laning of these segments and of the roads leading to ports (about 4,500 km length), for which a feasibility study has already been initiated, has been delegated to the "National Highway Authority of India -NHAI". *)

Strengthening existing weak 2-lane pavement. This measure is to be implemented for medium traffic corridors with a range in traffic demand of between 20,000 to 35,000 PCUs/day. Measures will include strengthening of the existing pavement (with or without paved shoulders), including cross drainage structures, drainage measures and so on. The basic idea is to optimize construction and maintenance cost over the pavement's life cycle.

Widening to 2L. This measure covers the road segments, in which traffic demand is below 20,000 PCUs/day. Measures include widening to 2L (with or without strengthening), construction of missing links, improvements for riding quality, construction/reconstruction/rehabilitation of bridges and other related improvement works. Some ten percent of the ninth plan outlay should be earmarked for this purpose.

Road safety measures. For the first time, some one percent of the ninth plan outlay are earmarked for expenditures in this area. This has been prompted by the increasing number of accidents.

Other items and measures. This refers to the 2,700 km of NH, which have been entrusted to "Border Region Development Board - BRDB" and other allocations, such as for wayside amenities; plantation of trees; environmental protection measures, and so on.

*) The corridors are defined as: High Density Traffic (HDT) = 35,000 PCUs per day and above; Medium Density Traffic (MDT) = 25,000 to 35,000 PCUs/day; and Low Density Traffic = up to 25,000 PCUs/day.

Figure 12.2.2 Highway Development Strategy Adopted At National Level

Public sector funds for road development have been in the past, and will remain in future grossly inadequate to address road sector development. The GOI is subsequently exploring possibilities for direct private sector involvement in National Highway (NH) development, operations and also maintenance. The major policy initiatives in this direction were so far:

- The road sector has been categorized as an "industry", in order to facilitate commercial borrowing
- Clearance from the Ministry of Environment and Forests is not required in cases of widening existing NHs, or four-laning of NHs along the existing center line
- Procedures for land acquisition have been simplified. In cases where housing and other development activities are an integral part of the highway project, land required for same would be treated like land required for public purposes
- The provision of tax and fiscal concessions

- The establishment of the “Infrastructure Development Finance Company (IDFC)”
- The establishment of the “National Highway Authority of India - NHAI”
- Profits from housing and other development activities, which form an integral part of the NH project, are eligible for tax deductions, provided the proceeds are channeled back to NH project development, and
- Finalization of a “model” concession agreement, which is to be applied uniformly to all BOT/BOOT projects.

The following guidelines and/or principles are to be applied regarding the realization of BOT/BOOT schemes:

- Expressways bypasses, bridges, road over-bridges and four-laning of existing section of NHs, which are considered financially viable and bankable on basis of traffic demand as defined above, should be taken up through private sector participation. There are apparently some sixteen projects (as of middle 1999; bypasses, road over-bridges, and bridges in various States), which are under consideration for BOT/BOOT schemes
- Four-laning of the viable sections in the six major corridors indicated above should also, if and when realizable, be implemented under BOT/BOOT schemes.

12.3 National Level Development Needs And Investment Requirements

An ADB study prepared not so long ago identifies the priority segments within the National Highway network, which ought to be developed as Expressways (Figure 12.3.1 refers). Investment needs for removing only the deficiencies in the existing National Highway network, including the construction of 1,000 km of expressways along existing National Highway alignments is estimated at around Rs. 828 billion, roughly equivalent to a total of US \$ 20.2 billion⁹ (Figure 12.3.2 refers).

⁹ At 1996 prices.

EXPRESSWAYS TO BE DEVELOPED BY 2000	EXPRESSWAYS TO BE DEVELOPED BETWEEN 2001 - 2005	EXPRESSWAYS TO BE DEVELOPED BETWEEN 2006 - 2010	EXPRESSWAYS TO BE DEVELOPED BETWEEN 2011 - 2020
Length (km)	Length (km)	Length (km)	Length (km)
1.) Delhi - Ghaziabad 19	1.) Varanasi - Dhanbad 412	1.) Bombay - Nasik 193	1.) Ghaziabad - Gorakhpur 745
2.) Ghaziabad - Kanpur 414	2.) Dhanbad-Calcutta 313	2.) Belgaum - Bangalore 506	(via Lucknow)
3.) Kanpur - Varanasi 313	3.) Surat - Valsad 66	3.) Bangalore - Madras 340	2.) Agra - Hyderabad (via
4.) Delhi - Karnal 119	4.) Thane - Pune 140	4.) Nasik - Indore 408	Nagpur & Karimnagar)
5.) Karnal - Ambala 80	5.) Pune - Belgaum 333	5.) Indore - Kota 313	3.) Calcutta - Bhubneshwar 485
6.) Ahmedabad - Vadodara 120	6.) Madras - Trichy 204	6.) Kota - Jaipur 237	4.) Salem - Cochin (via
7.) Vadodara - Surat 159	7.) Delhi - Jaipur 265	7.) Madras - Guntur 401	Coimbatore & Palghat)
8.) Bombay - Thane 50	8.) Delhi - Agra 199	8.) Guntur - Vishakhapatnam 291	5.) Pune - Sholapur 242
9.) Thane - Nasik 145		9.) Ambala - Ludhiana 109	6.) Dhule - Nagpur 517
TOTAL 1,350	TOTAL 1,932	TOTAL 2,798	TOTAL 3,940

Notes: *) Feasibility studies have been carried out for the following routes : (a.) Bombay - Vadodara; (b.) Bangalore - Mysore;

(c.) Bombay - Pune; (d.) Faridabad - Noida - Ghaziabad.

Source: JICA Study Team compilation.

Figure 12.3.1 Expressways To Be Developed Up To 2020

(Unit:As indicated)			
Category of Work Required	Length to be Covered [km]	Investment Need Total [in Rs. Crore]	Investment Need per km [in Rs.]
1. Widening from 1L to 2L	5,500	4,800	8,727,273
2. Improvement of 2L Roads			
a.) Strengthening of pavement	17,500	15,400	8,800,000
b.) Widening from 2L to 4L	12,000	48,000	40,000,000
c.) Construction of Expressways	1,000	8,000	80,000,000
Sub-Total	30,500	71,400	23,409,836
3. Construction of Bypasses	50	1,100	220,000,000
4. Construction of missing links, improvement of low grade sections to 1L NH standards, road safety measures, drainage and other miscellaneous works	Lump sum	5,500	n.a.
TOTAL		82,800	

Source: Paper presented at the "International Congress on Express Highways Development in India"; New Delhi; 14-17 December, 1998.

Notes: 1.) Periods and base year are not indicated in the source.
2.) n.a. = not applicable.

Figure 12.3.2 Investment Needs Into The National Highway Network, Including Expressway Development

12.4 The Structure Of The Overall Enabling Environment

There are eight closely interrelated key frameworks, which form the overall enabling environment for private sector driven infrastructure and highway/expressway development¹⁰. They play a pivotal role in determining the scope and depth to which private sector participation in road development and operations can be realized. These frameworks are (the listing does not imply any order of priority) :

- **Policy objectives.** They exist at national and individual state levels. In addition, the policy objectives of inter-state entities, such as the National Capital Region Planning Board (NCRPB) have to be taken into account here

¹⁰) Private sector driven development is in India not limited to highway and/or expressway development, but encompasses all infrastructure facilities. The terms highway/expressway and infrastructure development are

- **Investment requirements.** They indicate the resource allocations needed to realize the identified development needs. Such requirements are typically estimated under “unconstrained” conditions, i.e. under the assumption that there would be a perfect flow of public and private sector capital and resources into the identified development needs
- **Budget resources.** They are an indicator on the extent to which public funds can meet the investment needs for public goods, such as for example transport
- **Economic Performance.** Though it may be obvious, it cannot do any harm to recall that this framework is obviously linked closely to the policy & regulatory frameworks. It provides strong incentives and disincentives for private capital allocation and/or the use of surplus of private asset holders. High real economic growth at national, sector, sub-sector or line-of-business levels is the single most general indicator for potential high yields of private capital
- **Financing environment.** Its features are an essential ingredient in infrastructure development due to the long life-cycles and gestation periods of such projects
- **Institutional framework.** This framework provides the “channels & procedures” through which the principal actors interact with each other. Since this set-up provides for the basic communication channel, its efficient and impartial functioning (usually established through the elimination of unnecessary “red tape” and transparent procedures) is essential for the whole process to work smoothly
- **Overall regulatory framework.** Is essential, since it establishes the “rules of the game”, i.e. the roles the private and public sectors are supposed to play in principle. This framework is most essential due to its fundamental impact on the extent to which potentials can actually be realized in terms of land use, land acquisition, legal rights and obligations and so on
- **Development Needs.** In fact, the often considerable gap between those and the identified investment needs has triggered¹¹ the policy shift toward private sector

used interchangeably in this Draft Final Report.

¹¹⁾ This general indigenous trend was strengthened by domestic and/or foreign supplier interests, which recognized that public sector funds were for quite some time to come in no position to meet development needs, in particular in capital intensive infrastructure projects. In addition, it assumed granted that private capital in a market driven environment

involvement in the provision of public sector goods and services. The general function of transport sector development in general, and road development in particular, is to support growth. In other words, reduced levels of infrastructure investment will result in a negative impact on the level of real growth performance, which can be achieved under given circumstances

The conclusions of the analyses of key features of these frameworks and related recommendations are presented in the following Section. Emphasize is placed on those aspects, which have a direct bearing on the timely realization of the proposed KG-GM Expressway in the NCR and/or similar types of projects.

12.5 Summary Appraisal Of The Overall Enabling Environment

A qualitatively oriented point based appraisal scheme was employed for assessing the overall enabling environment from the perspective of substantive private sector participation and/or private sector led expressway development. It must be concluded in general that there still are many uncertainties and insufficiencies in the overall enabling environment impeding on the realization of private sector participation, not to talk about “full commercial” realization of expressway projects. In summary, the enabling environment in place in India today scores out of a possible maximum of 3,900 points (which would mean a somewhat perfect enabling environment) only 1,515 points, equivalent to 39 percent of the total. The score, which is illustrated in more detail in Figure 12.5.1, under the major four headings are:

- **Legal & regulatory frameworks.** 430 points out of a possible 1,100, equivalent to about 39 percent of the total
- **Policy Objectives and mix.** 385 points out of a possible 1,300 points, equivalent to about 30 percent of the total
- **Institutional set-up.** 410 points out of a possible 900, equivalent to 46 percent of the total, and

would provide such goods and services in a more cost-efficient basis.

- **Market/demand conditions.** 290 points out of a possible 600, equivalent to 48 percent of the total.

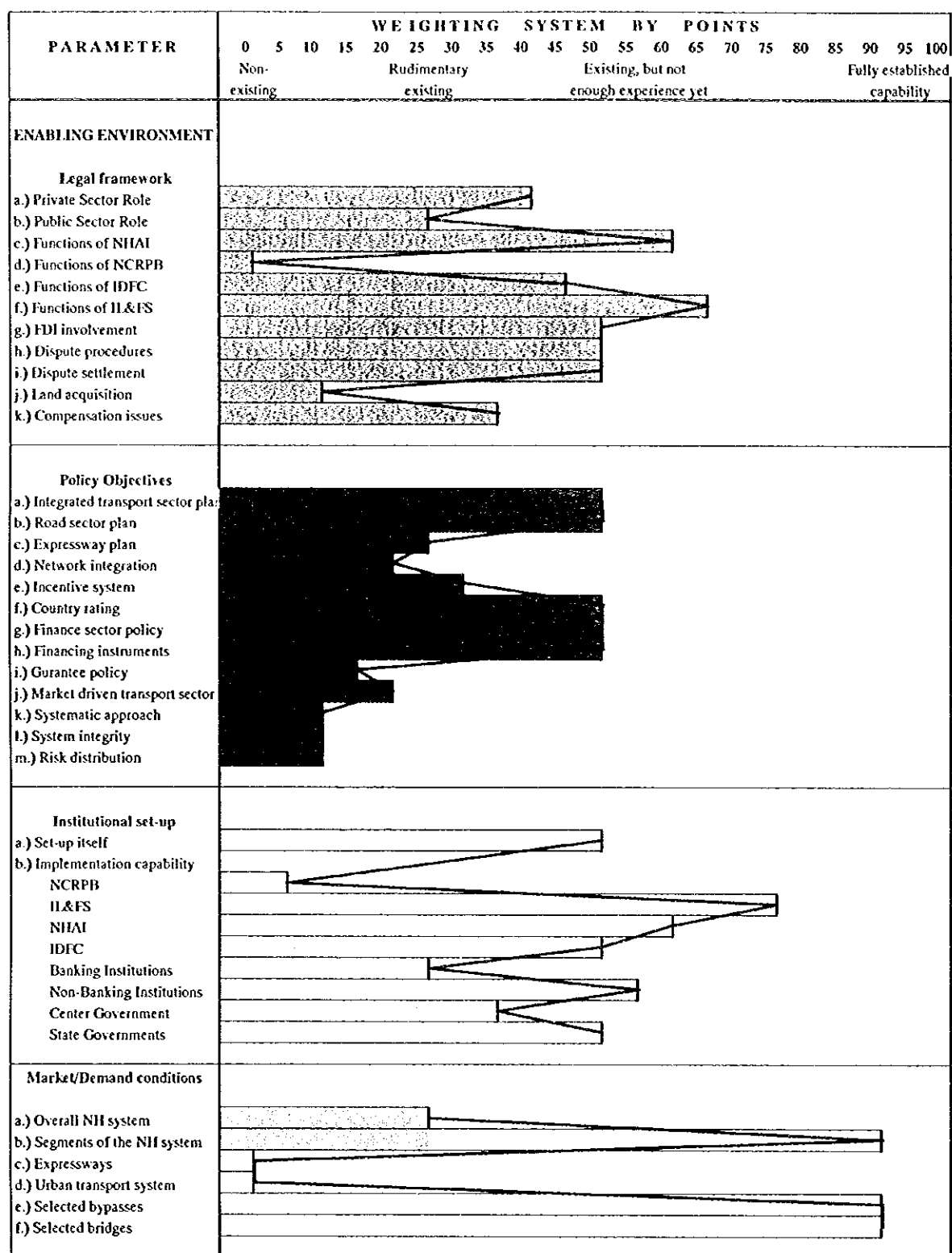
The overall situation as regards full private sector participation in road/expressway development in India is still in its infant stage, with system's elements still missing, or being not yet fully defined, or needing further fine tuning.

12.6 Summary Conclusions On And Recommendations For The Legal And Regulatory Frameworks

India is undertaking efforts since the late 1980s to modify, clarify and streamline her legal and regulatory frameworks covering National Highway and expressway development. Major steps in this direction have been the revision in 1988 of the "National Highway Act 1956"¹² the "National Highway Authority of India Act, 1988"¹³. In addition, a basic incentive system, the major elements of which are summarized in Figure 12.5.2, has been put in place to attract private sector participation, and positive adjustments have been undertaken with respect to foreign direct investment regulations allowing now 100% foreign direct investment through the "automatic approval route" of the Reserve Bank of India.

¹²) The fundamentals of this act were discussed in detail in the Interim Report.

¹³) The fundamentals of this act were discussed in detail in the Interim Report.



Source: JICA Study Team.

Figure 12.5.1 Point Based Appraisal Matrix for the Overall Enabling Environment

Incentive or parameter	Time Impact of Parameter	Provided by			
		Central Gov.	State Gov.	NCRPB	NHAI
APPROVAL PROCEDURE*)					
1.) 100 % FDI	Short-term	yes			
GENERAL INCENTIVES					
2.) Profit repatriation	Short-term	yes			
3.) Capital repatriation	Long-term	yes			
4.) Import of bitumen under OGL	Short-term	yes			
5.) Land ownership rights	[Long-term]	[yes]	[yes]		
6.) Off-shore borrowing (FCBs)	Short-Long term	[yes]			
7.) Sub-ordinated loans	Short-Long term	yes			
8.) Capital grants (up to 40%)	Short-term	yes			yes
9.) Equity participation (up to 30%)	Long-term				yes
10.) Bridging loans	Short-term				yes
INCENTIVES/EXEMPTIONS					
11.) Corporate tax holiday (5years)	Medium-term	yes			
12.) Corporate tax reductions	Medium term	yes			
13.) Exemption from import duty	Short-Long term	yes			
14.) Capital gains tax	Short-Long term	yes			
15.) Property tax	Short-term				
PROJECT LOCATION SPECIFIC					
16.) Real estate development rights	Short-Long term	[yes]	[yes]		[yes]

Source: Compiled by JICA Study Team.

Notes: A [...] indicates that there is some level of uncertainty.

Figure 12.5.2 Incentive System For Private Sector Participation In National Highway/Expressway Development

This routine applies to a company involved in expressway/National Highway development, provided that the investment does not exceed Rs. 1,500 crore (roughly equivalent to US \$ 349 million at Rs. 43 to one US dollar). There have been, furthermore, measures to adjust foreign exchange control regulations as they refer to profit and dividend repatriation, and to the "Road Development Fund - RDF", the receipts of which are employed to fund the operations and capital investments of the NHAI.

The overall regulatory framework needs considerable adjustments and fine-tuning in

the areas of standards, norms and definitions; proper statutory mandates and functions for the most important administrative entities; the process of obtaining government clearances; land-ownership rights for foreign entities; a proper supervisory author and toll rate determination; and some fine-tuning in the incentive system. The major issues, which need to be addressed by the authorities concerned are summarized in Figure 12.5.3.

12.7 Summary Conclusions On And Recommendations For The Concession Agreement

The concession agreement in its current form, a summary overview is provided for in Figure 12.5.4, is a “take it, or leave it” deal, which delegates all the risks to the private investor/concessionaire, with very little responsibility and or risk at the public sectors side. There is no reasonable risk sharing among the public and private sector, because:

- **Political risk:** is to be fully covered by the investor
- **Construction completion risk:** is to be fully covered by the investor
- **Market and revenue risk:** is to be fully covered by the investor
- **Operations risk:** is to be fully covered by the investor
- **Finance risk:** is to be fully covered by the investor. There are, for example, no inherent guarantees, no subsidy/grant elements covering revenue shortfall, and no foreign exchange assistance in whatever form. If the investors uses offshore money, he will have to carry for the loan period the full exchange rate risk.
- **Legal risk:** is to be fully covered by the investor. There are quite a number of clauses in the concession agreement, which protect the employer from legal liability by shifting such liability to the private investor/concessionaire.

Agenda Item	Conclusions & Comments	Policy Action Required	Target Of Policy Action	Time Frame
Standards & Norms, and Definitions	There is no official definition for expressways and/or super National Highways	Yes By Central Government	Establish a viable binding technical standard	ASAP. Over the short-term
	There is a need to establish clear non-political criteria for when state highways should form part of the national grid	Yes By Central and State Governments	Establish clear technical criteria for jurisdiction and responsibilities	ASAP. Over the short-term
Institutional Framework	The transport/road sector planning process needs streamlining	Yes By Central and State Governments	Establish a more coherent and systematic process, which ensures system integrity	Over the short- to medium-term
	The NCRPB's mandate & powers need to be strengthened. Its relations to other relevant planning bodies, such as the DDA, need to be clarified	Yes By Central and State Governments	Change, adjust or fine-tune the existing mandates, functions and responsibilities	ASAP. Over the short-term
	The NCRPB and NHAI need institutional strengthening	Yes By Central and State Governments	Enable both institutions to execute their mandate efficiently	ASAP. Over the short-term
Government Clearances	There are many clearances and also much "red-tape"	Yes By Central and State Governments	Establish a 'one stop' window at the appropriate entity	ASAP. Over the short-term
Land-ownership rights	Is presently somewhat not possible for foreign entities	Yes By Central and State Governments	Clarify and adjust the legal situation	Over the short- to medium-term
Toll rate policy & formulation	Toll rate levels are presently decided at the PMO level. However, there should be an independent regulatory authority ensuring across country fair rates	Yes By Central and State Governments	Consider positively the establishment of a regulatory & supervisory authority	Over the short- to medium-term
Incentive system	There may be a need to further clarify & streamline regulations regarding FDI and ECB	Yes By Central and State Governments	Adjust the rules in those areas, which need further clarification	Over the short- to medium-term
Concession agreement	[Is addressed separately]	[Is addressed separately]	[Is addressed separately]	[Is addressed separately]

Source: JICA Study Team.

Notes: 1.) FDI = foreign direct investment. 2.) ECB = External commercial borrowing.

Figure 12.5.3 Recommended Policy Actions for Overall Regulatory Frameworks

RIGHT OF WAY (ROW)	1.) Acquiring entity: State & Delhi Governments 2.) Acquisition cost: Pre-financing by State & Delhi Governments 3.) Investment: To be recovered from BOOT operator 4.) Conditionalities for investment recovery: <div data-bbox="531 521 1254 680" style="border: 1px dashed black; padding: 5px;"> 4.a) Interest rate: 13 % per annum; reducing balance method 4.b) Principal: Moratorium of up to 3 years possible 4.c) Repayment : Over ten years from the zero date 4.d) Beneficiary: State & Delhi Governments </div>
	5.) Other ROW related conditionalities: <div data-bbox="531 757 1254 1104" style="border: 1px dashed black; padding: 5px;"> 5.a) Enhancements: The BOOT operator is liable to pay for the enhancements in land acquisition of the ROW land occurring on account of an court at any time during the Concession Period as demanded by the respective State Governments 5.b) Transfer: The ROW land is to be transferred back to the respective State Governments at the end of the Concession Period free of cost </div>
REAL ESTATE DEVELOPMENT OUTSIDE THE ROW	
1.) General objective:	To improve financial viability of the project
2.) General conditions:	The BOOT operator can be, in addition and outside to the ROW land, be allotted up to a maximum of 80 ha. at designated locations in the jurisdiction of the State & Delhi Governments. The general land use has to conform with the one reflected in the NCRPB development Plan. Proposed land use is 40% commercial and 60% residential.
3.) Land acquisition cost:	The BOOT operator has to pay for the land cost, consisting of land acquisition cost and enhance compensation (for enhancement, the same conditions as outlined in 5.a) above apply. Payment is proportionate to 4.) below.
4.) Land allotment schedule:	a.) Commencement of project: 20% (= 16 ha) b.) An additional 20% (=16ha) at the completion of 20%, 40% 60% and 80% of the Expressway.
OTHER LAND & REAL ESTATE DEVELOPMENT RIGHTS	
1.) General conditionalities:	The BOOT operator can, after he has acquired the total 80 ha within the designated area, acquire other land directly from land owners within the urbanisable and/or permissible zones of the NCRPB.

Source: JICA Study Team compilation from the FNG Expressway Concession Agreement.

Figure 12.5.4 Key Features of NCRPB's Model Concession Agreement

The project sponsor/employer, i.e. the NCRPB, does not intend to provide any binding assistance for obtaining any clearances, any consent, approval, permit, no objection certificate or any other authorization whatsoever needed for the purpose of the project. Schedule I to clause 7.1.1 of Section two of the concession agreement, which lists the pre zero date clearances required, involves alone seven government or other entities and some twelve clearances, approvals, and so on.

It is understood that all features of the model concession agreement are subject to the agreement reached in an actual negotiation process. Figure 12.5.5 summarizes observations, comments and/or recommendations on all those central issues, which do either not adhere to international practice standards, and/or which are likely to be objected to by a private sector participant/investor.

12.8 Summary Conclusions On And Recommendations For The Institutional Framework

India has a heavy multi-layered administrative structure¹⁴. The institution of direct concern here is "The National Capital Region Planning Board" (NCRPB), which is one of India's few below national level cross-sectoral planning entities at the inter-state level. It falls under the control of the "Ministry of Urban Development". The second institution of interest is the "National Highway Authority of India" (NHAI), which falls under the control of the "Ministry of Surface Transport"¹⁵. Both institutions are involved in planning, sponsoring and executing expressway development projects.

How the GK-GM Expressway and other planned expressways in the NCR will be classified, i.e. as parts of the National Highway grid or strictly NCR specific regional purpose roads, is important for the issues of institutional jurisdiction.

¹⁴) India's government and government institutional structure is presented in the Appendix.

¹⁵) Both institutions have been discussed in detail in Chapter 10 of the Interim Report.

Model Agreement Item	Observations & Comments	Required Action, if any
Traffic demand forecast	It is common that project sponsors don't "guarantee" the accuracy of traffic demand forecasts. However, NCRPB should support its own projects by making available all historical and related traffic modeling data.	Yes BY NCRPB
Bid-security & forfeiture of bid-security.	The bid-security of about US \$ 2.1 million is significant. The period for returning the bid-security is excessively long and needs to be shortened. The question of accrued interest needs to be clarified in favor of the bid-security provider, as is international praxis. The reasons of forfeiture of bid-security need to be clarified.	Yes BY NCRPB
Time schedule, financial closure & "zero point" definition *]	The time schedule seems to be unrealistic as experience gained so far suggests. Financial closure occurs after signing of the concession agreement making the point "zero" definition meaningless. This should be reviewed to introduce more flexibility.	Yes BY NCRPB
Performance security	The Performance security is with US \$ 6.3 million considerable. Keeping the performance security over the concession period of 30 years is unrealistic. The question of accrued interest needs to be clarified.	Should be negotiated between sponsors & investors
ROW land acquisition	This issue needs complete review. It is suggested that ROW land is purchased by the State Governments and leased to the concessionaire at a marginal rate. The loan issues is to be scrapped.	Yes By State Governments & the NCRPB
Real estate development rights	It is recommended to grant them automatically, if really needed to improve financial viability of the project. The issues should be negotiated on a case-by-case basis.	Yes By State Governments & the NCRPB
Bid evaluation criteria	They should be made public, be clear and transparent from the beginning. They should not be limited to how much additional land over ROW is requested.	Yes, by State Governments & the NCRPB
Risk assessment & risk distribution **]	The distribution if the various risk is completely inadequate in the model concession agreement. It needs comprehensive and in-depth review paragraph by paragraph. A fair risk distribution is one of the keys to successful private sector participation.	Yes, by State Governments & the NCRPB To be negotiated, item by item.

Source: JICA Study Team.

Notes: *] The time schedule is attached in the Appendix.

**] The individual issues are too numerous to be repeated here. Please consult with the model concession agreement.

Figure 12.5.5 Comments On And Recommendations For The Concession Agreement

A brief comparative self-explanatory summary on both institutions is, therefore, provided for in Figure 12.5.6.

The NCRPB has important planning, supervisory, coordination and approval functions. However, the NCRPB faces some difficulties in the efficient execution of its general mandate and some institutional strengthening may be called for, in order for the NCRPB to play a stronger role as a credible promoter of expressway development projects in the NCR. Figure 12.5.7 provides the recommendations on all those issues, which should be addressed by the authorities over the short to medium-term.

12.9 Summary Observations On “Best International Practice”

Countries pursue, in principle, four different approaches or forms for a toll road operating entity, namely a (i) government agency; (ii) a public corporation; (iii) private concessions; and private-public partnership (PPP), all of which have their advantages and disadvantages (Figure 12.5.8 refers). In case of a government agency as entity, which is the case in Indonesia, Malaysia, the Philippines, Thailand and the United States, the overwhelming advantage is the potential for comprehensive, systematic and uncontradictory network planning and extension. The well known disadvantages, on the other hand, are the need for prioritization of competing fund usage (because public funds are often not enough to meet network development needs timely) and the difficulties often faced to improve cost effectiveness and operational efficiency.

The advantages in the case of public corporations, which are employed in Japan, Indonesia, Malaysia, Thailand, France and the Philippines, are not only their stronger impact in pursuing in a coherent manner government road and expressway network development goals, but the potential for cross subsidizing among routes in a network.

NATIONAL CAPITAL REGION PLANNING BOARD (NCRPB)	NATIONAL HIGHWAY AUTHORITY OF INDIA (NHAI)
Statutory Functions: Planning (land-use control, infrastructure) Appraising Monitoring Coordinating Financing (at a limited scale)	Statutory Functions: Planning Appraising Monitoring Coordinating Financing (loans & grants)
Implementation Function: Rests with the States	Implementation Function: Rests with NHAI
Area of Mandate: National Capital Region	Area of Mandate: Nation-wide
Accumulated Institutional Knowledge: 15 years.	Accumulated Institutional Knowledge: 2 years (12 years *)
Asset holder: No	Asset holder: Yes
Main sources of funds: Central Government (loans & grants) Other sources.	Main sources of funds: Capital by the Central Government Central Government loans & grants Bonds, debentures and other instruments
Land acquisition rights: No	Land acquisition rights: Yes

Source: JICA Study Team compilation.

Ne *) The important function of promoting involvement of the private sector was added only by an 1997 amendment to the act.
The NHAI was actually established in 1988.

Figure 12.5.6 Comparative Summary Overview on NCRPB And NHAI

Disadvantages of public corporations are normally that they lack incentives to respond timely and efficiently to changing market conditions, that they lack incentives for cost reductions, and that they are generally less efficient than private entities.

NCRPB Agenda Item	Observations, Comments & Recommendations
General Statutory Mandate	The general mandate of the NCRPB calls for the preparation, enforcement and implementation of the functional and sub-regional plans within the NCR. However, roads are explicitly excluded from the mandate, which creates a somewhat ambiguous situation. The NCRPB is also charged with the selection and approval of comprehensive priority projects. It is recommended to include roads/expressways into NCRPB's mandate.
Plan Implementation	Plan implementation rests with the participating States. However, the Government may wish to review this situation. It is difficult to see, how the NCRPB can be "responsible" for proper plan execution when the power to control such execution is completely beyond the institution's reach.
Land Acquisition	Land acquisition and title rights in any other property rests with the participating States. This situation should be reviewed, if the NCRPB is to be the signatory for expressway development, which involves ROW and real estate use rights to be transferred to a private concessionaire.
Financing & Funding Activities	The NCRPB is to provide financial assistance for the implementation of priority projects in the NCR. The Government should consider positively to strengthen that function in one way or another. It may be desirable, in particular for expressway development, which involves substantial investment, to review as to whether the NCRPB should not also be enabled to be an asset holder. Strengthening the financial assistance function may also enable the NCRPB to act as guarantor.
Institutional Capabilities & Capacity	There is a need to review the institutions capacities & capabilities in light of the above proposals. Control over NCRPB's planning cells now physically located with the State Governments should be reestablished. Proper consideration should be given to the institutional implications, if the NCRPB is to play a stronger role in expressway or project implementation.
Inter-agency Coordination	This aspects needs to be reviewed with a view to strengthen it. Particular attention should be paid to the relations with other planning entities, such as the DDA, and MOST and the NHAI. Twinning arrangements may be considered in particular for toll expressway development in the NCR.

Source: JICA Study Team.

Figure 12.5.7 Issues Pertaining to NCRPB Needing Review And Adjustments

There is ample experience with private concessions, which are widely pursued now, in Argentina, Brazil, Chile, Colombia, France, Hungary, Mexico, Spain, Hong Kong SAR (China), and the United States seems to illustrate that they are, in general, more efficient and that they show a stronger tendency to respond quickly to changing market conditions. However, having private concessions in a network can lead to

difficulties in overall network planning and extension realization. Furthermore, such an approach, in particular, if it involves different private entities for different segments in a network, does not allow for cross subsidizing, leaving the highest traffic corridors to the private investor, while the less attractive segments have to be operated by the public sector.

Lessons to be learned for the realization of the KG-GM Expressways and other planned expressways in the NCR are summarized in Figure 12.5.9 regarding the advantages and disadvantages of common government support measures for toll road development. Figure 12.5.10 provides an overview on the advantages and disadvantages of toll adjustment procedures, and Figure 12.5.11 provides conclusions on the essential elements in toll road concession contracts.

Form of Entity (Country where Practiced)	Advantages	Disadvantages
Government Agency Indonesia; Malaysia; Philippines; Thailand; and United States	Facilitation of planning for network expansion.	Competing demands for government funds and difficulty in providing incentives to improve cost effectiveness and operational efficiency.
Public Corporations Japan; Indonesia; Malaysia; Thailand; France; and the Philippines *)	Greater effectiveness relative to private companies in pursuing goals set by the government, and their ease of accepting cross subsidies among routes in a network.	Lack of incentives for cost reduction, and tendency to be less efficient than their private counterparts. Due to tight government control, less effective in responding to market conditions, which change over time and differ across regions due to tight control by the government.
Private Concessions Argentina; Brazil; Chile; Colombia; France; Hungary; Mexico; Spain; Hong Kong SAR (China), and the United States, among others.	Often favored over government agencies because of their efficiency and market responsiveness.	Network development can be more difficult compared with public agencies. Private firms may not be able to assume all the risks associated with toll road development, which entails a long-term and large-scale investment.
Private-Public Partnership (PPP) Approach Hungary; Colombia; China; Indonesia; and Philippines	Brings additional resources to the project and complete it in a shorter time. Increases the efficiency in construction and project operation, through market discipline, assuring the project is completed on schedule and within the budget.	Requires clear and justifiable definition of responsibilities between the public and private sectors.

Source: Compiled by JICA Study Team.

Notes: Both SEMCAs in France and PNCC in the Philippines are strictly speaking "semi-public" bodies, but with a majority of shares held by the public sector.

Figure 12.5.8 Advantages and Disadvantages of Alternative Toll Road Opening Facilities

Support Measures	Contents	Advantages	Disadvantages
Comfort Letter China	A legally non-binding letter issued by government to give support to certain actions not clearly stated in contractual agreement, such as performance of a public corporations as a grantor of concession.	Can provide financiers and sponsors a minimum level of assurance when no implicit government support is attainable.	Not legally binding.
Land Acquisition China, Thailand, and United States, and others.	Expropriation of ROW for toll road construction. Cost of land acquired may be borne either by the government or the concessionaire.	Helpful for the concessionaire because the right of expropriation usually resides with the government. This support usually improves "project economics" to a great extent when implemented at no cost to the sponsors.	Delays.
Extension of Concession Period Indonesia and others.	Measure to provide compensation for the loss of profit due to circumstances caused by the government.	Improves project economics.	Effect on current cash flow is small.
Construction of Related Facilities United Kingdom, Thailand and others.	Construction of connecting roads, access ramp, and so on.	Contributes significantly to the project, since connecting roads and other facilities are critical elements for commencement of operation.	Construction delays may critically impair the commencement of operation.
Revenue Support Malaysia and China (including Hong Kong SAR)	Revenue support is usually done with a minimum threshold for compensation paid by the government.	Facilitation of the finance closing and the project.	Weak design may impose a large contingent liability on the government
Revenue Sharing with Existing Facilities Malaysia, Thailand, United Kingdom, and others.	Deriving revenue from an existing toll road facility; can take the form of taking over the complete facility including employees and assets as well as debts.	Possible mitigation of revenue shortfall risk in the startup years.	Revenue sharing formula requires careful design. Possible burden when all assets, debts, and employees are to be transferred.

Figure 12.5.9 Advantages and Disadvantages of Common Government Support Measures for Toll Road Development (Part 1)

Support Measures	Contents	Advantages	Disadvantages
Shadow Toll United Kingdom and Argentina	Toll is paid by government according to the vehicle-km of the traffic counted automatically.	Facilitation of private financing without stimulating resistance to tolling.	Possible financial burden/fiscal inflexibility in the later years; may hinder transition to real tolling.
Provision of Development Rights and Third-Party Revenue Malaysia and China (including Hong Kong SAR)	Right of commercial development along the toll road to supplement project economics.	Enhancement of project economics.	Excessive dependence on this measure may impair project economics.
Subsidies/Grants Chile, Colombia and Spain.	Government support both in cash and kind, such as land and facility.	Enhancement of project economics.	Arrangement may be time consuming and implementation may be delayed; possible risk of undue governmental intervention, "moral hazard", and so on.
Subordinated Loan Malaysia and others.	A type of loan for which repayment is subordinated to the senior loan (ordinary loan). Government, parent company and, in some cases, institutional investors are providers of the loan. The interest rate is higher than for a senior debt.	Facilitation of finance closing because it is treated as equity; could be used as stand-by facility to mitigate risks, such as cost overrun and revenue shortfall.	Possible deterioration of project economics due to higher interest cost.
Foreign Exchange Guarantees Indonesia, Philippines, and Spain	Compensation for impact caused by devaluation of local currency. It could be built into the tariff formula.	Facilitation of finance closing in foreign currency when country risk in this respect is high.	Possible large contingent liability for the government in the event of large currency devaluation.
Loan (Bond) Guarantees China and others.	Guarantee on repayment of loan and on redemption of bond.	Facilitation of finance closing.	Possible large contingent liability for the government; moral hazard for concessionaire and lenders.
Equity Guarantees	Guarantee of equity investment.	Facilitation of project proposals and implementation.	Possible large contingent liability for the government; moral hazard for concessionaire and other investors.

Source: Compiled by JICA Study Team.

Figure 12.5.9 Advantages and Disadvantages of Common Government Support Measures for Toll Road Development (Part 2)

Country	Example	Description of Approach
France	Governmental discretion.	Toll rate adjustments are at the discretion of the Ministry of Finance, which tends to approve larger increases for less profitable companies. The French approach avoids unnecessarily high return to investors, but at the risk a sacrificing efficiency by undermining incentives to make exceptional efforts to control costs or improve productivity.
Japan	Use of an advisory committee to the Prime Minister	The Japanese toll revenue pooling system requires a reexamination of total cost redemption every time there is an expansion of the expressway network (i.e. when the Minister of construction issues a construction order for a network addition). When the cost of constructing a network expansion or other significant improvement requires a toll rate adjustment and/or an extension of the toll collecting period, the proposal goes through official government procedures involving a review and examination by a "Toll Committee," and approval by MOC and MOTC reflecting public hearings.
Spain	Use of a formula linked to inflation.	Spain's approach to regulating the toll rates of concessionaires is based on a formula linked to price inflation. The Spanish approach has the merit of promoting new investment and efficiency, and it has only limited risks of unnecessarily high returns to investors, since "excess" profits are moved to a Special Reserve.
Hong Kong SAR	A sophisticated yet straight-forward toll adjustment formula (TAM) - "best practice".	If traffic and therefore revenue falls below a forecast volume, the TAM will allow the operator to advance the prespecified date of a toll increase. Conversely, if the amount of revenue received by the operator is above the forecast, resulting in a rate of return that exceeds a specific range, a toll increase will be deferred.
Philippines	An advanced toll adjustment formula - "best practice" for investors.	Mandated by Presidential Decree No. 1894, it is based upon a parametric formula that takes into account prevailing local and foreign interest rates, the consumer price index, currency values, and a construction materials price index. However, if toll road investors happen to receive a windfall, there is no profit-sharing clause - the investors keep all the reward.
Indonesia	Uncertainty in adjustment procedures.	Under Law 13/1980, the designation of a road section as a toll road and the determination of initial toll tariffs require Presidential approval of proposals made by the Minister of Public Works. The concession company proposes tariff adjustments every two or three years based on a formula incorporating the consumer price index, but approval cannot be guaranteed by the Government. Uncertainty over the toll adjustment procedure may discourage private investors.
Mexico	Uncertainty in adjustment procedures.	Both toll increases and decreases typically require approval of the Secretariat of Communications and Transport, which restricts most concessionaires' abilities to responsively adjust pricing to optimize revenues once the roads were open to traffic.
Malaysia	An approach for addressing uncertainty - similar to that of Hong Kong SAR	The proposed new method is to annex the forecast traffic volume to the concession agreement. If the actual traffic level is more than the forecast level at a specified time, the government could request either the deferral of a toll rate increase or lowering of the level of toll rate increase; but if the actual traffic is less than forecast, the concessionaire could request to bring forward the timing of toll rate increases.

Source : Compiled by JICA Study Team.

Figure 12.5.10 Selected Examples of Toll Adjustment Procedures

Concession Contract Element	Description
Grant of Concession	The concessionaire should be granted exclusive rights to the use of the toll road ROW.
Credit enhancement of concession grantor	When financial support measures (for example, revenue shortfall compensation, payment of shadow tolls) are involved in a concession contract, the credibility and capability of the concession grantor to make such payments on a timely basis is important.
Toll rate setting and adjustment	The concession contract must provide a clear framework for toll setting and adjustment covering topics such as operating cost fluctuations, currency devaluation, and minimum debt service ratios. Such matters are particularly important when revenue guarantees are not in place and the concessionaire bears construction, traffic, and toll collection risks.
Conditions to terminate contract	In the event that concession is terminated, whether as a consequence of a default by the concessionaire or the grantor, or as a result of the occurrence of a force majeure event, then the grantor or a new entity appointed by the grantor would take over all ownership rights to the toll road, including the right to collect tolls.
Step-in right of lenders/ concession grantor	Project lenders will invariably seek to take an assignment from the concessionaire of its rights and interests under the concession contract, including its right to the revenues from the tolls or fares. In addition, when the concessionaire is in breach of its obligations under the concession contract or there has occurred a default event under the financing documents, the project lenders will wish the right to "step-in" to cure the breach and, in some cases, transfer the shares in the concessionaire to a new sponsor, or transfer the concession to a new concessionaire.
Changes in law	One of the most difficult concession contract negotiation issues relates to changes in law, the occurrence of acts of government interference, force majeure, and other events or circumstances outside the control of the concessionaire that reduce returns for the sponsors or results in the concessionaire's inability to pay the project lenders. In most concession contracts, unless a deficiency guarantee or subsidy is provided, such events or circumstances will expressly exclude insufficient traffic or downturn in usage.
Exclusivity	The concession contract should ideally provide that no other concession that would compete with the project has been or would be granted, at least for an acceptable period. Unless such an assurance is provided, a competing concession may be granted and reduce traffic flow.
Dispute resolution	The approach may be to require dispute resolution under local law, with proceedings in the local language and/or English, or to provide for offshore arbitration under internationally tested rules.
Mitigation of risks	Various risks associated with the projects are assumed among the participants who are best able to manage such particular risks. Major risks for a private financed toll road project include: (i) political risks; (ii) construction completion risks; (iii) market and revenue risks; (iv) operation risks; (v) finance risks; and (vi) legal risks.
Post concession issues	There has not yet been a toll road concession project in which the concession has expired and the facility transferred. These post concession issues must be discussed and determined as a part of the integrated policy of each country before the granting of concessions.

Source: WB, Ministry of Construction, Japan: "Seminar on Asian Toll Road Development in an Era of Financial Crisis", page II-1

Figure 12.5.11 Essential Elements of Toll Road Concession Contracts

12.10 Financial Analysis

12.10.1 Basic Assumptions And Methodology

The financial analysis and implementation planning study is based on the following fundamental assumptions, namely that:

- The KG-GM expressways are, in combination with the FNG and other expressways under consideration in the NCR, needed (regardless of their financial feasibility), in order to (a) relieve traffic congestion to the north-east and east of Delhi; and (b) reduce traffic inflow, which is now forced to go through Central Delhi
- The Central Government together with other relevant authorities adopts a comprehensive and consistent expressway development policy, which is fully conducive to such expressway development
- There is a suitable toll-rate policy, which is acceptable (“willingness-to-pay” principle) to the Indian general public, and in particular expressway users, and
- India will have full and continued access to official development assistance (ODA) concessional financing arrangements.

In addition, the following assumption were used in the calculations made to establish the basic feasibility of the project as indicated by its simple pre-tax IRR :

- A distance-based toll rate system will be adopted for the KG-GK Expressway
- Revenue streams reflect only income from tolls, in order to adopt a conservative approach in revenue estimations. Revenues generated by real estate development or any other not toll road related business activities have not been allowed
- No direct incentive elements to be provided by the GOI, such as for example grants and/or interest rate subsidies, have been allowed for simple IRR and case study calculations, and
- Return on Equity (ROE) for basic feasibility calculation has been assumed at zero value over the project’s life cycle of 33 years.

The fundamental approach and procedure for “base case” selection is divided into two essential steps as illustrated in Figure 12.10.1.

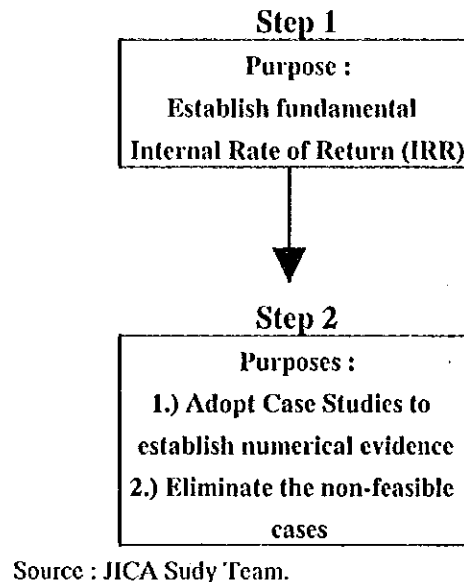


Figure 12.10.1 Methodological Steps Used In The Fundamental Approach

Step 1 serves the purpose of establishing for the identified cost and revenues streams the KG-GM Expressway’s fundamental financial merit. Step 2 added project structure alternatives in form of four case studies to the equation. Differences in the project structure were assumed in the essential equity to debt ratios and the equity and debt structures. These differences are summarized in Table 12.10.1. The purpose of step 2 was to establish empirical results for the four case studies with a view to eliminate the non-feasible cases. The steps of this iterative process are illustrated in Figure 12.10.2. The whole process aims at the identification of the “base case”, which is to be recommended for potential realization. The general difference between the four case studies is :

- **CASE STUDY 1:** Assumes a 100 percent private sector concessionaire. The conditionalities are tailored around the existing model concession agreement.
- **CASE STUDY 2 :** Assumes a 100 percent private sector concessionaire. The conditionalities are tailored around the existing model concession agreement. However, the project structure has been adjusted eliminating the long-term domestic loan.

- **CASE STUDY 3** : Assumes a private sector dominated Private Public Partnerships (PPP) undertaking, and
- **CASE STUDY 4** : Assumes a public sector dominated PPP.

Table 12.10.1 Underlying Project Structures Of Case Study 1 To Case Study 4

Parameter	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Equity to Debt Structure	30% to 70%	30% to 70%	40% to 60%	30% to 70%
Equity Structure	1.) Private concessionaire: 19.51% 2.) Other private domestic: 10.49%	1.) Private concessionaire: 19.51% 2.) Other private domestic: 10.49%	1.) Private concessionaire: 20.53% 2.) NCRPB* 14.73% 3.) Other private domestic companies : 4.74%	1.) Government entities: 22.50% 2.) Priv. domestic financing company : 7.50%
Debt Structure	1.) Land acquisition & compensation: LT domestic loan at i=13% n=10 years	1.) Land acquisition & compensation: LT domestic loan at i=13% n=10 years	1.) Land acquisition & compensation has been eliminated as a loan. It is treated as NCRPB equity	1.) Land acquisition & compensation has been eliminated as a loan. It is treated as NCRPB equity
	2.) 50% of remaining debts: LT domestic loan at i=16% n=10 years	Eliminated	Eliminated	Eliminated
	3.) 50% (the balance) LT foreign US \$ dominated loan at i=8.75% and n=30 years	2.) All other debts to be financed from LT foreign US \$ dominated loan at i=8.75% and n=30 years	2.) All other debts to be financed from LT foreign US \$ dominated loan at i=8.75% and n=30 years	2.) All other debts to be financed from LT foreign US \$ dominated loan at i=3.4% and n=30 years

Source: JICA Study Team.

Furthermore, the following financial rationale is employed in pre-determining in which principal category the GK-GM Expressways will fall:

Fully commercially viable. Is defined as resulting in an FIRR of at least 20 percent, preferably in the range of plus/minus 25 percent, without any FIRR increases having been generated by real estate development assumptions. Twenty percent seem to be a reasonable threshold, because this rate is also used by the "Infrastructure Leasing & Financial Services" (IL&FS) company as the minimum

rate for project consideration, and because a rate of say 23 percent would allow for a minimum of 10 percent return above domestic prime lending rate (PI.R)

The implications of such a case would typically be:

- That it is unlikely that a sovereign guarantee, a grant and/or implicit interest rate subsidy would be needed and/or granted
- That most likely no sub-ordinated loan and/or bridging financing will be needed or granted, and
- That the investor/concessionaire arranges under its own creditworthiness all domestic and/or foreign borrowing.

It has to be noted, however, that financial assistance under any ODA scheme is unlikely in such a case, since the relevant ODA institutions require sovereign guarantees for their ODA loan facilities.

percent, but above 13 percent. A spread of some seven percent (maximum) between the project's FIRR and the domestic prime lending rate (PLR) generates a financial return, but is in itself not attractive enough for a private investor to consider allocating investment resources for a time frame of up to 30 years, as is illustrated by the capital gains achievable at relatively low or zero risk through bank deposit and bond rates.

Such relatively unattractive financial return would most likely have to be sweetened either by some form of guarantee, implicit subsidy, or any other government support measure, which ensures long-term stability of the project and which averts risk for the private investor. Hence, such case is difficult to realize without some form of public sector support and/or participation.

The implications in this case would typically be:

- That there is a need for some form of a sovereign guarantee, a grant and/or implicit interest rate subsidy, and
- That there is also most likely need for a sub-ordinated loan and/or bridging financing and or any other support measure.

It should be highlighted that in such a case involvement of concessional borrowing from ODA financing institutions, which is passed on through a government entity to the private investor, may be easier to realize.

Commercially not viable. Is defined as a case in which the project's FIRR is around or below the prevailing PLR of around 13 percent.

The implications of such a case would be that the project may have to be a pure public sector undertaking.

12.10.2 Basic Financial Performance Results

The basic pre-tax IRR was calculated for three different toll rate levels, in order to allow from the beginning for sensitivity testing, namely 1.0 Rs./km; 1.5 Rs./km; and

2.0 Rs./km. The simple pre-tax IRR for the recommended optimal distance-based toll rate of 1.5 Rs./km is as indicated in Table 12.10.2 :

Internal Rate of Return (IRR) = 10.4 percent.

The minor difference in the IRR between Case Study 1 to 3 and Case Study 4 is due to minor differences in the cost streams caused by treating “land acquisition and compensation cost” slightly differently. The calculation underlying the above result assumed for all case studies that (a) road rehabilitation will be financed from operational revenues, while (b) the capital cost for road widening in 2022 will be financed from a domestic loan taken by the implementing entity.

The cashflow and debt-service analyses calculated for the four case studies with their underlying project structures (as summarized in the previous Table 12.10.1) reveals that Case Study 1 and 2 have fundamental problems in meeting long-term debt service during their crucial first five years of operations as in summarized in Table 12.10.3.

Case Study 3 shows minor amounts of negative cashflow during the first two operational years. It is reasonable to assume that the two negative cashflows can be balanced out by slight adjustments in the project’s structure. Case Study 4 shows positive cashflows during all first five operational years.

It must be concluded, therefore, that :

- Case Study 1 and 2, which represent the 100 percent private sector/concessionaire approach have to be rejected as being not feasible under given assumptions, and that
- Case Study 3 and 4, which represent the private and public sector dominated PPP approach, can be accepted as being feasible, in principle. The underlying features of Case Study 3 and 4 qualify, therefore, for “base case” considerations.

Table 12.10.2 Simple Pre-tax IRR And Basic Appraisal Results
(based on constant 1999 prices)

Case under Consideration	Main Features	INTERNAL RATE OF RETURN			APPRAISAL	COMMENTS
		1.0 Rs. per km	1.5 Rs. per km	2.0 Rs. per km		
CASE STUDY NO.1	100 % PRIVATE SECTOR	8.1 %	10.4 %	11.1 %	NOT FEASIBLE	Project cannot meet long-term debt service in first 5 operational years.
CASE STUDY NO.2	100 % PRIVATE SECTOR [different project structure]	8.1 %	10.4 %	11.1 %	NOT FEASIBLE	Project cannot meet long-term debt service in first 5 operational years.
CASE STUDY NO.3	PPP/ PRIVATE SECTOR DOMINATED	8.1 %	10.4 %	11.1 %	FEASIBLE [in principle]	Basic feasibility can be established by minor adjustments in the project structure.
CASE STUDY No. 4	PPP/ PUBLIC SECTOR DOMINATED	7.9 %	10.3 %	10.9 %	FEASIBLE [in principle]	Role of private sector is rather limited.

Source: JICA Study Team.

Notes: 1.) All calculations are in "constant 1999" prices, i.e. no real price increase in output and input streams have been taken so far into account.

2.) All calculations have so far assumed "zero" return on equity.

3.) If land acquisition cost in Case study 4 is treated as sunk cost, the IRR would be 9.7% (1 Rs./km); 12.2% (1.5 Rs./km); and 12.8% (2.0 Rs./km)

4.) The calculation for all cases assume that (a) road rehabilitation will be financed from operational income, and (b) road widening capital cost in 2022 will be financed by a domestic loan taken by the implementing entity.

5.) A "project structure" is defined as the combination of the equity to debt ratio, and the equity and debts structures.

Table 12.10.3 Net Cashflow After Long-term Debt Service During The First 5 Operational Years(in constant 1999 prices)

(Unit: million Rs.)

First 5 operational years	Case Study 1	Case Study 2	Case Study 3	Case Study 4
Toll Rate at 1.0 Rs./km				
2006	-1829.4	-1110.8	-187.9	138.7
2007	-1663.6	-1029.4	-183.3	194.3
2008	-1427.7	-877.9	-108.6	252.5
2009	-1,189.2	-723.8	-31.4	313.1
2010	-948.1	-567.1	48.5	376.5
Accum. Value	-7,058.0	-4,309.0	-462.7	1,275.1
Toll Rate at 1.5 Rs./km				
2006	-1731.7	-1013.1	-90.2	236.4
2007	-1544.9	-910.7	-62.6	315.0
2008	-1285.9	-736.1	37.5	398.6
2009	-1,021.6	-556.2	143.1	487.6
2010	-751.9	-370.9	254.5	582.5
Accum. Value	-6,336.0	-3,587.0	282.3	2020.1
Toll Rate at 2.0 Rs./km				
2006	-1899.9	-1181.3	-258.4	68.2
2007	-1696.6	-1062.4	-216.3	161.3
2008	-1416.5	-866.7	-97.4	263.7
2009	-1,125.9	-660.5	31.9	376.4
2010	-823.6	-442.6	173	501.0
Accum. Value	-6,962.5	-4,213.5	-367.2	1,370.6

Source: JICA Study Team.

The proposed 1.5 Rs./km distance-based toll rate has been determined to be the rate resulting in the highest possible or optimal revenue stream. In addition, it can be concluded from the above considerations that even a only theoretically possible higher toll rate of 2.0 Rs./km would not improve fundamentally in the 1999 constant price calculations the above drawn conclusions of the four case studies' capacity to service long-term debts during the crucial first five operational years.

12.10.3 IRR and Basic Options for Sequencing Expressway Construction

The above Internal Rate of Return and case study appraisal results assumed simultaneous construction of the KG-GM Expressways. There is a need in this context to investigate two questions. First, which sections of the KG-GM Expressway should be built first, should capital availability constrain simultaneous construction ? Secondly, can any higher Internal Rate of Return be achieved by "unbundling" the KG-GM Expressway construction phasing schedule ?

The results of this analysis are that :

- If the KG Expressway (sections 1, 2 and 3) would be built first, the resulting IRR will be 9.6 percent, and in the case of the GM (sections 3, 4 and 5) it will be 8.9%.
- If the KG Expressway were built first and sections 4 and 5 of the GM Expressway in five or say ten years later, the resulting IRR will be 10.1 % and 10.0 %, respectively.

In other words building the combined KG-GM Expressway under one project umbrella is likely to constitute the highest achievable simple pre-tax IRR of 10.4 % as illustrated in Figure 12.10.3.

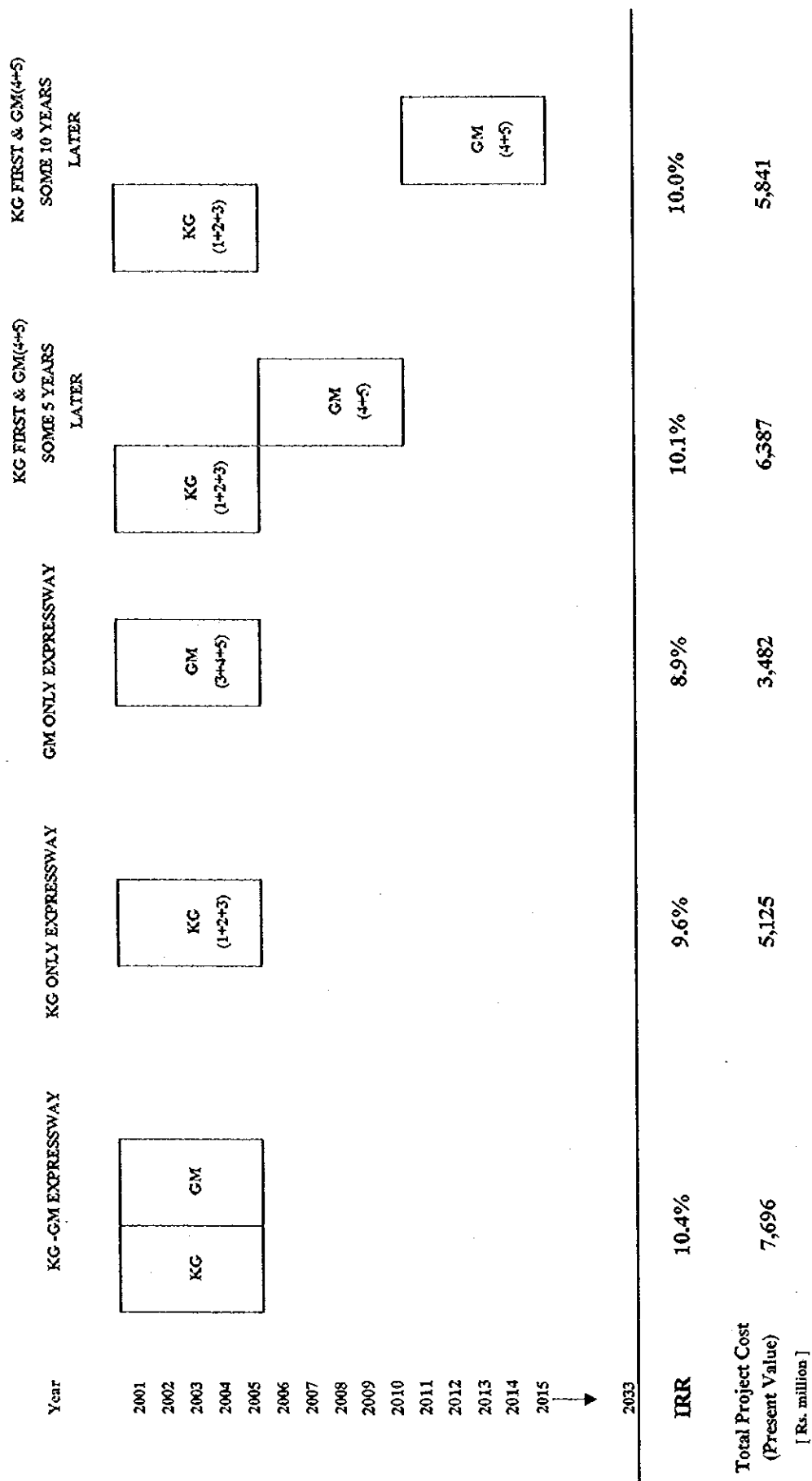


Figure 12.10.3 IRR And Alternative Phasing In Construction Implementation

12.10.4 Summary Conclusions On The Case Study Results And Base Case Selection

The general appraisal shows that fundamental reasons¹⁶ for Case Study 1 and 2, and therefore the 100% private sector concessionaire approach failing to meet the basic feasibility test measured by long-term debt service coverage capability in the first 5 crucial years of operations, are :

- Though projected traffic volume measured in PCU's is comparatively (to other locations in the NCR and India) high in absolute terms, it is not high enough to support an Expressway project with a 33-years project and 28-years economic life cycle, in particular during the crucial first ten years of operations
- The absence of a real long-term domestic capital market conducive to the financing of such long-term gestation period infrastructure projects. Long-term life cycle assets must be funded by long-term borrowing with the repayment period matching more or less the life cycle of the assets. However, long-term lending by the domestic Indian capital market is presently between ten to maximum twelve years. The cashflow and debt service analysis shows clearly the project cannot shoulder such only ten to twelve years long-term debts at prevailing lending rates, even if lending terms & conditions grant a five years grace period on principal repayment
- The high real Indian market interest rates (about 8% at a Prime Lending Rate (PLR) of around 13%) leading in the case of both case studies' having after start-up in 2006 immediate need to additional funds and/or raise short-term funds at an annual interest rate of 9.33%, in order to try to cover for shortfall in long-term debt service¹⁷
- The realization of obtaining long-term funding depends according to the model concession agreement, that is in the absence of any GOI support and/or guarantees, to 100% on the creditworthiness of the private sector/concessionaire. Given the financing needs involved, this restricts the number of potential concessionaires to a very small number of domestic and/or foreign corporations, which have a large enough asset base and, therefore, a high enough level of creditworthiness, to consider investing in

¹⁶) There are, of course, other serious reasons, such as a weak overall "enabling environment" (discussed in detail in the Interim Report), unsuitable terms & conditions in the model concession agreement (addressed later in Progress Report (2), collateral problems, and so on. The assumed terms & conditions of the project structure/financing plan are attached in the Appendix to this Chapter.

¹⁷) Not to mention the fact that covering intentionally long-term investments with short-term funds would violate in the real management world classic financing rules and standards of prudence with potential legal repercussions for management in some countries.

- and shouldering the risk associated with the proposed expressway
- A crucial consideration in the context of the above issue is the question of **collateral and/or securitization**. The model concession allows only projected revenues to be used as security for bank borrowing. It is not unreasonable to assume that this may be considered insufficient by domestic and/or off-shore banks.

The fundamental reasons for Case Study 3 and 4, the either private or public sector dominated Private Public Partnership (PPP) approach meeting the basic requirement of long-term debt service coverage capability are :

- A redefined project structure, which decreases the overall debt burden to a 40% to 60% equity to debt ratio and which substitutes costly domestic borrowing by less costly off-shore financing (in the case of the private sector dominated PPP)
- By doing so, the overall financing cashflow burden to the project is decreased, but the exchange rate risk increases and the overall business risk is reflected in the potential Return on Equity (ROE) the private concessionaire may be able to realize on his share of the equity investment
- A more favorable basic long-term debt structure of the project, which matches funding terms with the project's life cycle by placing the burden of debt-servicing more evenly over the life cycle of the project (in principle, this is so for both, the private and public sector dominated Case Studies 3 and 4)
- A most favorable and suitable basic long-term debt structure of the project, if financing cost are further reduced by obtaining a concessional ODA loan, as is the underlying assumption for the public sector dominated Case Study 4.

Case studies 3 and 4 qualify, therefore, for further base case considerations.

12.10.5 General Features Of The Private Or Public Sector Dominated PPP

Pursuing an implementing entity created under a private sector dominated PPP approach, either in the form of a Joint Venture (JV) and/or in the form of an Special Project Vehicle (SPV) has the following strong arguments "in favor" of it from a strategic perspective :

- It serves the overriding policy objective of privatization of infrastructure projects in general, and expressway projects in particular, thus guaranteeing eventually efficient operations at reasonable market prices
- It would by definition realize the crucial “expressway management, operations & maintenance” function, for the realization of which there is presently no suitable organization in the NCR covering institutional set-up, and
- The strategy would, in the long run, compliment and even substitute for public budget expressway development and maintenance funds, which would otherwise have to be raised through limited budgetary resources.

Potential arguments “against” such a strategy could typically concentrate on :

- Given the investment cost involved, there are only few domestic or internationally operating and experienced companies, which have the capital base and experience to only consider bidding for the project. Finding the “right” strategic private sector partner with long-term commitment to NCR (and/or India wide) expressway development may prove difficult, thus leading to delays in project realization and the associated project cost increases and traffic problems
- The still prevailing high risks involved for the private sector, which cannot be compensated for easily by higher than average returns (even if they can be guaranteed on paper)
- This approach would require a very strong government function for system harmonization and integration (given the proposed concession period of over 30 years, for which there is no adequate institutional entity as yet in the NCR).

The strategy to pursue an implementing entity created under a public sector dominated PPP approach, either in the form of a Joint Venture (JV), a Public Service Undertaking (PSU) and/or in the form of an Special Project Vehicle (SPV) has the following strong arguments “in favor” of it:

- It could potentially strengthen and support overall inter-modal transport system integration, if given the proper mandate and resources
- It would allow for “cross-subsidizing” among the various expressway

sections, and

- It would open the window for concessional funding from international official development assistance (ODA) agencies.

Potential arguments “against” such a strategy could typically concentrate on :

- It would be somewhat detrimental to the achievement of the overall privatization policy objective
- It would not realize the crucial “expressway management, operations & maintenance” function, for the realization of which there is presently no suitable organization in the NCR covering institutional set-up. The NCRPB and other NCR relevant agencies would still be faced with the fundamental question of who would realize that essential function, and
- It would not safeguard overall efficiency and create a significant burden to the budget over the coming thirty years or so.

Which of the two potentials will eventually be realized will depend on the overriding strategy finally selected by the relevant authorities, their level of political will to pursue such strategy, and the flexibility of the partners negotiating this concrete case eventually.

12.10.6 Numerical Characteristics Of The Potential “Base Case”

It suffices in the context of this feasibility report to highlight the following major project features and operational characteristics of the potential base case : (a) total projects cost; (b) proposed implementation schedule; (c) total estimated investment cost; (d) implied project/financing structure; and (e) cash flow and debt-service analysis.

Total project cost are estimated at :

Rs. 11,367 million (constant 1999 prices) for the public sector dominated PPP,
and

Rs. 11,201 million (constant 1999 prices) for the private sector dominated PPP

for a given implementation cycle of five years (2001 to 2006, with January 1st, 2006 being the opening day of expressway operations). Table 12.10.4 indicates that total project cost are slightly higher for the public sector dominated PPP and the already

**TABLE 12.10.4 COMPARISON OF TOTAL PROJECT COST,
TOTAL INVESTMENT COST & IMPLIED IDC COST(in constant 1999 prices; million Rs.)**

Parameter	Case Study 1	Case Study 2	Case Study 3 (POTENTIAL CASES)	Case Study 4
Total Project Cost	11,201	11,201	11,201	11,367
Total Investment Cost	14,107	13,803	12,511	11,922
Implied IDC Cost	2,906	2,602	1,310	555

Source: JICA Study Team.

Notes: 1.) Total investment cost include Rs. 9.9 million working capital financing for 2006.
2.) Implied financing cost includes IDC only, not total financing cost.
3.) The results for Case Study 4, if land acquisition is treated as sunk cost, are: total project cost = Rs. 9,551 million, total investment cost Rs. 10,108 million, and implied IDC Rs. 557 million.

eliminated cases. This is only due to the fact that “land acquisition and compensation” does not have to be completed at the zero date for legal PPP establishment. Therefore, a 10% physical contingency allowance has been made. Interest During Construction (IDC) cost, and therefore total investment cost, are with Rs. 555 million (constant 1999 prices) the lowest for the public sector PPP scenario.

Total investment cost (Tables 12.10.5 and 12.10.6 refer) are estimated at :

**Rs. 11,922 million (in constant 1999 prices) for the public sector dominated PPP,
and**

Rs. 12,511 (in constant 1999 prices) for the private sector dominated PPP

if the PPP/Public implementation entity can realize the implementation schedule as indicated in Figure 12.10.4 and the PPP/Private can realize the implementation schedule as indicated in Figure 12.10.5.

Based on revenues generated by a distance based toll rate of 1.5 Rs./km (Table 12.10.7 refers), the projected cashflow and the related debt-service analysis after long-term financing, taxes, rehabilitation and widening cost is summarized as presented in Table 12.10.8 for the PPP/Public and Table 12.10.9 for the PPP/Private. Revenue streams reflect pure toll-rate revenues, as highlighted already before.

**TABLE 12.10.5: THE KG-GM EXPRESSWAY IN THE NCR
TOTAL PROJECT COST BY LOCAL & FOREIGN COST COMPONENTS
"SPV" IMPLEMENTATION SCHEME: CASE STUDY 4**
[in 1999 constant prices; million Rs.]

CAPITAL BASE COST ITEM	2001			2002			2003			2004			2005			TOTAL			% of Total Project Cost
	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	
1.) Land Acquisition Cost	711.5	0.0	711.5	355.8	0.0	355.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,067.3	0.0	1,067.3	9.39
2.) Compensation Cost	388.3	0.0	388.3	194.1	0.0	194.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	582.4	0.0	582.4	5.12
SUB-TOTAL	1,099.8	0.0	1,099.8	549.9	0.0	549.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,649.7	0.0	1,649.7	14.51
3.) Detailed Engineering Design & Supervision	358.9	35.9	394.8	287.1	35.9	323.0	71.8	35.9	107.7	0.0	35.9	35.9	0.0	35.9	35.9	717.8	179.5	897.2	7.89
SUB-TOTAL	358.9	35.9	394.8	287.1	35.9	323.0	71.8	35.9	107.7	0.0	35.9	35.9	0.0	35.9	35.9	717.8	179.5	897.2	7.89
4.) Administration Cost Implementation	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	448.6	0.0	448.6	3.95
SUB-TOTAL	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	448.6	0.0	448.6	3.95
5.) Initial Construction Cost	0.0	0.0	0.0	254.1	119.2	373.2	985.4	119.2	1,104.6	2,758.5	119.2	2,877.7	2,847.9	119.2	2,967.1	6,845.9	476.7	7,322.5	64.43
SUB-TOTAL	0.0	0.0	0.0	254.1	119.2	373.2	985.4	119.2	1,104.6	2,758.5	119.2	2,877.7	2,847.9	119.2	2,967.1	6,845.9	476.7	7,322.5	64.43
6.) Capital Cost Maintenance Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	14.4	14.4	0.0	14.4	0.13
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	14.4	14.4	0.0	14.4	0.13
7.) TOTAL BASE COST ESTIMATION	1,548.4	35.9	1,584.3	1,180.8	155.1	1,335.9	1,146.9	155.1	1,302.0	2,848.2	155.1	3,003.3	2,952.0	155.1	3,107.1	9,676.3	656.1	10,332.5	90.91
8.) 10% for Physical Contingencies	154.8	3.6	158.4	118.1	15.5	133.6	114.7	15.5	130.2	284.8	15.5	300.3	295.2	15.5	310.7	967.6	65.6	1,033.2	9.09
9.) TOTAL PROJECT COST ESTIMATION	1,703.3	39.5	1,742.7	1,298.9	170.6	1,469.4	1,261.6	170.6	1,432.2	3,133.0	170.6	3,303.6	3,247.2	170.6	3,417.8	10,644.0	721.7	11,365.7	100.00
10.) Working Capital Requirements	0.0	n.a.	0.0	0.0	n.a.	0.0	0.0	n.a.	0.0	0.0	n.a.	0.0	9.9	n.a.	9.9	9.9	n.a.	9.9	
11.) Interest during con- struction (IDC)	0.0	7.3	7.3	0.0	26.1	26.1	0.0	64.8	64.8	0.0	168.5	168.5	0.0	279.9	279.9	0.0	546.6	546.6	
12.) TOTAL CAPITAL COST ESTIMATION	1,703.3	46.8	1,750.0	1,298.9	196.7	1,495.5	1,261.6	235.4	1,497.0	3,133.0	359.1	3,472.1	3,257.1	450.5	3,707.6	10,653.9	1,268.3	11,922.2	

Source: JICA Study Team.

Notes: n.a. = not applicable.

1.) Working capital requirements are estimated at 30% of annual O&M requirements.

**TABLE 12.10.6: THE KG-GM EXPRESSWAY IN THE NCR
CAPITAL COST ESTIMATION BY LOCAL & FOREIGN COST COMPONENTS
"CONCESSIONAIRE" IMPLEMENTATION SCHEME: CASE STUDY 3**
[in 1999 constant prices; million Rs.]

CAPITAL BASE COST ITEM	2001			2002			2003			2004			2005			TOTAL			% of Total Project Cost
	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	
1.) Land Acquisition Cost	1,067.3	0.0	1,067.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,067.3	0.0	1,067.3	9.53
2.) Compensation Cost	582.4	0.0	582.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	582.4	0.0	582.4	5.20
SUB-TOTAL	1,649.7	0.0	1,649.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,649.7	0.0	1,649.7	14.73
3.) Detailed Engineering Design & Supervision	358.9	35.9	394.8	287.1	35.9	323.0	71.8	35.9	107.7	0.0	35.9	35.9	0.0	35.9	35.9	717.8	179.5	897.2	8.01
SUB-TOTAL	358.9	35.9	394.8	287.1	35.9	323.0	71.8	35.9	107.7	0.0	35.9	35.9	0.0	35.9	35.9	717.8	179.5	897.2	8.01
4.) Administration Cost Implementation	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	448.6	0.0	448.6	4.01
SUB-TOTAL	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	89.7	0.0	89.7	448.6	0.0	448.6	4.01
5.) Initial Construction Cost	0.0	0.0	0.0	254.1	119.2	373.2	985.4	119.2	1,104.6	2,758.5	119.2	2,877.7	2,847.9	119.2	2,967.1	6,845.9	476.7	7,322.5	65.38
SUB-TOTAL	0.0	0.0	0.0	254.1	119.2	373.2	985.4	119.2	1,104.6	2,758.5	119.2	2,877.7	2,847.9	119.2	2,967.1	6,845.9	476.7	7,322.5	65.38
6.) Capital Cost Maintenance Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	14.4	14.4	0.0	14.4	0.13
SUB-TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0	14.4	14.4	0.0	14.4	0.13
7.) TOTAL BASE COST ESTIMATION	2,098.3	35.9	2,134.2	630.9	155.1	786.0	1,146.9	155.1	1,302.0	2,848.2	155.1	3,003.3	2,952.0	155.1	3,107.1	9,676.4	656.1	10,332.5	92.25
8.) 10% for Physical Contingencies	44.9	3.6	48.5	63.1	15.5	78.6	114.7	15.5	130.2	284.8	15.5	300.3	295.2	15.5	310.7	802.7	65.6	868.3	7.75
9.) TOTAL PROJECT COST ESTIMATION	2,143.2	39.5	2,182.7	694.0	170.6	864.5	1,261.6	170.6	1,432.2	3,133.0	170.6	3,303.6	3,247.2	170.6	3,417.8	10,479.0	721.7	11,200.8	100.00
10. Working capital re- quirements *]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9	0.0	9.9	9.9	0.0	9.9	
11.) Interest during con- struction (IDC)	0.0	29.1	29.1	0.0	89.7	89.7	0.0	152.1	152.1	0.0	383.6	383.6	0.0	646.2	646.2	0.0	1,300.7	1,300.7	
12.) TOTAL CAPITAL COST ESTIMATION	2,143.2	68.6	2,211.8	694.0	260.3	954.2	1,261.6	322.7	1,584.3	3,133.0	554.2	3,687.2	3,257.1	816.8	4,073.9	10,488.9	2,022.4	12,511.4	

Source: JICA Study Team.

**FIGURE 12.10.4 : THE KG-MG EXPRESSWAY IN THE NCR
TOTAL PROJECT COST & IMPLEMENTATION SCHEDULE
"SPV" IMPLEMENTATION SCHEME : PPP/PUBLIC**

[In 1999 constant prices]

MAJOR PROJECT COST ITEMS (Year in implementation cycle)	Responsible Entity	2000	2001	2002	2003	2004	2005	2006	TOTAL
		1	2	3	4	5			
1.) Land Acquisition & Compensation *)	SPV	549.9	549.9	549.9					1,649.7
2.) Detailed Engineering Design & Construction Supervision	SPV								
3.) Initial Construction Cost	SPV	394.8	323.0	107.7	35.9	35.9			897.3
4.) Administration Cost Implementation	SPV		373.2	1,104.6	2,877.7	2,967.0			7,322.5
5.) Maintenance Equipment Capital Cost	SPV	89.7	89.7	89.7	89.7	89.7	89.7		448.5
6.) BASE COST AS OF 1999	SPV	549.9	1,034.4	1,335.8	1,302.0	3,003.3	3,107.0		10,332.4
7.) 10% Allocation for Physical Contingencies	SPV	55.0	103.4	133.6	130.2	300.3	310.7		1,033.2
8.) "TOTAL PROJECT COST"	SPV	604.9	1,137.8	1,469.4	1,432.2	3,303.6	3,417.8		11,365.7

Source: JICA Study Team.

"SPV LEGAL ESTABLISHMENT" 1.) Start System Revenue Inflows

Notes:

1.) Figures for items 1.) ; 2.) 3.) and 4.) are based on 1999 engineering base cost estimation.

*) Allocation for physical contingency for "Land acquisition and compensation" had to be added, since the acquisition process has not yet been finalized at the point of legal establishment of the SPV.

2.) Ref. item 4.) These are pure administration costs associated with the implementation cycle. The project management component is included under the "Detailed Engineering Design" component.

3.) The total 1999 base cost estimation differs slightly from the 1999 engineering base cost estimation for the inclusion of maintenance equipment capital cost and the reason indicated under note *) above.

FIGURE 12.10.5 : THE KG-MG EXPRESSWAY IN THE NCR
TOTAL PROJECT COST ESTIMATION & BASIC IMPLEMENTATION SCHEDULE
A "BOOT" IMPLEMENTATION SCHEME - PPP/PRIVATE

[In 1999 constant prices; Rs. million]

MAJOR PROJECT COST ITEMS (Year in implementation cycle)	Responsible Entity	2000	2001	2002	2003	2004	2005	2006	TOTAL
1.) Land Acquisition & Compensation	CONCESSIONAIRE		1,649.7						1,649.7
2.) Detailed Engineering Design & Construction Supervision	CONCESSIONAIRE		394.8	323.0	107.7	35.9	35.9		897.2
3.) Initial Construction Cost	CONCESSIONAIRE								
4.) Administration Cost Implementation	CONCESSIONAIRE			373.2	1,104.6	2,877.7	2,967.0		7,322.5
5.) Maintenance Equipment Capital Cost *]	CONCESSIONAIRE		89.7	89.7	89.7	89.7	89.7		448.6
6.) BASE COST AS OF 1999	CONCESSIONAIRE		2,134.2	785.9	1,302.0	3,003.3	3,107.1		10,332.5
7.) 10% Allocation for Physical Contingencies *]	CONCESSIONAIRE		48.5	78.6	130.2	300.3	310.7		868.3
8.) "TOTAL PROJECT COST"	CONCESSIONAIRE		2,182.7	864.5	1,432.2	3,303.6	3,417.8		11,200.7

Source: JICA Study Team.

"ZERO POINT"

1.) Start System Revenue Inflows

Notes:

Figures for items 1.) ; 2.) 3.) and 4.) are based on engineering base cost estimation.

*]) There is no allocation for physical contingency for "Land acquisition and compensation", since all ROW land title will be handed over to the concessionaire at "Zero Point", that is January 1, 2001.

Ref. item 4.)

These are pure administration costs associated with the implementation cycle. The project management component is included under the "Detailed Engineering Design" component.

1.) The total 1999 base cost estimation differs slightly from the engineering base cost estimation for the inclusion of maintenance equipment capital cost and the reason indicated under note *) above.

**TABLE 12.10.7 : THE KG & GM EXPRESSWAYS IN THE NCR
SYSTEM's ANNUAL TOLL REVENUE ESTIMATIONS 2006 T 2033**
(Unit : 1999 constant prices; million Rs.)

YEAR	Toll : 1 Rs./km		Toll : 1.5 Rs./km		Toll : 2.0 Rs./km		Additinal Revenue Generated		
	Traffic Demand PCUs	Annual Revenues Rs.	Traffic Demand PCUs	Annual Revenues Rs.	Traffic Demand PCUs	Annual Revenues Rs.	1.5 to 1.0 Rs./km Rs.	2.0 to 1.0 Rs./km Rs.	1.5 to 2.0 Rs./km Rs.
2001		0.0		0.0		0.0	0.0	0.0	0.0
2002		0.0		0.0		0.0	0.0	0.0	0.0
2003		0.0		0.0		0.0	0.0	0.0	0.0
2004		0.0		0.0		0.0	0.0	0.0	0.0
2005		0.0		0.0		0.0	0.0	0.0	0.0
2006	66,800	801.6	51,400	899.3	34,500	731.1	97.70	-70.50	-168.20
2007	70,529	845.6	55,289	966.3	38,137	812.6	120.70	-33.00	-153.70
2008	74,466	892.2	59,473	1,038.3	42,158	903.4	146.10	11.20	-134.90
2009	78,623	941.3	63,974	1,115.8	46,603	1,004.6	174.50	63.30	-111.20
2010	83,013	993.1	68,815	1,199.1	51,516	1,117.6	206.00	124.50	-81.50
2011	87,647	1,047.8	74,022	1,288.7	56,947	1,243.5	240.90	195.70	-45.20
2012	92,540	1,105.6	79,623	1,385.0	62,951	1,384.1	279.40	278.50	-0.90
2013	97,706	1,166.6	85,648	1,488.7	69,588	1,540.9	322.10	374.30	52.20
2014	103,160	1,231.0	92,130	1,600.2	76,925	1,716.0	369.20	485.00	115.80
2015	108,919	1,299.0	99,101	1,720.1	85,035	1,911.5	421.10	612.50	191.40
2016	115,000	1,370.9	106,600	1,813.3	94,000	2,129.9	442.40	759.00	316.60
2017	120,006	1,433.4	111,238	1,902.8	98,647	2,243.7	469.40	810.30	340.90
2018	125,231	1,499.0	116,078	1,997.1	103,524	2,364.0	498.10	865.00	366.90
2019	130,682	1,567.8	121,128	2,096.4	108,642	2,491.2	528.60	923.40	394.80
2020	136,371	1,639.9	126,399	2,201.1	114,014	2,625.7	561.20	985.80	424.60
2021	142,308	1,715.6	131,898	2,311.6	119,650	2,767.9	596.00	1,052.30	456.30
2022	148,503	1,794.9	137,637	2,428.0	125,566	2,918.2	633.10	1,123.30	490.20
2023	154,968	1,878.1	143,625	2,550.7	131,774	3,077.3	672.60	1,199.20	526.60
2024	161,714	1,965.4	149,874	2,680.2	138,288	3,245.5	714.80	1,280.10	565.30
2025	168,754	2,056.9	156,395	2,816.8	145,125	3,423.6	759.90	1,366.70	606.80
2026	176,100	2,153.0	163,200	2,961.0	152,300	3,611.9	808.00	1,458.90	650.90
2027	183,766	2,253.8	170,301	3,113.1	159,830	3,811.3	859.30	1,557.50	698.20
2028	191,766	2,359.6	177,710	3,273.7	167,731	4,022.4	914.10	1,662.80	748.70
2029	200,114	2,470.6	185,442	3,443.2	176,024	4,245.9	972.60	1,775.30	802.70
2030	208,826	2,587.1	193,511	3,622.2	184,726	4,482.5	1,035.10	1,895.40	860.30
2031	217,917	2,709.4	201,930	3,811.2	193,859	4,733.1	1,101.80	2,023.70	921.90
2032	227,403	2,837.8	210,716	4,010.9	203,443	4,998.6	1,173.10	2,160.80	987.70
2033	237,303	2,972.6	219,884	4,221.8	213,501	5,279.0	1,249.20	2,306.40	1,057.20

Source: JICA Study Team.

- Notes:
- 1.) Traffic demand is based on demand projections in PCUs entering the project expressway for the years 2006, 2016 and 2026.
 - 2.) Calculation is based on 300 days per year.
 - 3.) Revenue calculation is not based on "on ramp traffic", but demand in PCU-km by Sections.

**TABLE 12.10.3: THE KG-GM EXPRESSWAY IN THE NCR
TOTAL CASHFLOW & DEBT SERVICE ANALYSIS
"SPV" IMPLEMENTATION SCHEME: PPP/PUBLIC**
[in 1999 constant prices; million Rs.]

YEAR	NET CASH FLOW BEFORE FINANCING										FINANCING CASH FLOW										NET CASH FLOW		NET CASH FLOW AFTER		BALANCE AFTER SHORT-T. FINANC.
	INFLOW					OUTFLOW					COMPOSITE FLOW	INFLOW					OUTFLOW					NET FINANCING STREAM	CORPORATE TAX PAYMENTS	LI-FINANCING & TAX	
	SYSTEM REVENUES	INVESTMENT COST	O & M COST	PARTNER SHARE	TOTAL	EQUITY	DOM. LT. LOAN	FOR. LT. LOAN	TOT. FIN. INFLOW	CUMULATIVE INFLOW		REPAYMENT	FOR. LT. REPAYMENT	DM. LT. REPAYMENT	TOTAL DEBT SERVICE										
2001	0.0	1,750.0	0.0	0.0	1,750.0	-1,750.0	1,528.8		221.2	1,750.0	1,750.0			0.0	0.0	1,750.0	0.0	0.0	0.0	0.0	0.0				
2002	0.0	1,495.5	0.0	0.0	1,495.5	-1,495.5	924.0		571.6	1,495.6	3,245.6			0.0	0.0	1,495.6	0.0	0.0	0.0	0.0	0.0				
2003	0.0	1,497.0	0.0	0.0	1,497.0	-1,497.0	319.1		1,177.9	1,497.0	4,742.6			0.0	0.0	1,497.0	0.0	0.0	0.0	0.0	0.0				
2004	0.0	3,472.1	0.0	0.0	3,472.1	-3,472.1	319.1		3,153.0	3,472.1	8,214.7			0.0	0.0	3,472.1	0.0	0.0	0.0	0.0	0.0				
2005	0.0	3,707.6	0.0	0.0	3,707.6	-3,707.6	319.1		3,388.5	3,707.6	11,922.3			0.0	0.0	3,707.6	0.0	0.0	0.0	0.0	0.0				
2006	899.3	0.0	33.0	0.0	33.0	866.3			629.9		629.9	629.9		0.0	629.9	-629.9	236.4	0.0	236.4	236.4	0.0				
2007	966.3	0.0	33.0	0.0	33.0	933.3			618.3		618.3	618.3		0.0	618.3	-618.3	315.0	0.0	315.0	315.0	0.0				
2008	1,038.3	0.0	33.0	0.0	33.0	1,005.3			606.8		606.8	606.8		0.0	606.8	-606.8	398.6	0.0	398.6	398.6	0.0				
2009	1,115.8	0.0	33.0	0.0	33.0	1,082.8			595.2		595.2	595.2		0.0	595.2	-595.2	487.6	0.0	487.6	487.6	0.0				
2010	1,199.1	0.0	33.0	0.0	33.0	1,166.1			583.6		583.6	583.6		0.0	583.6	-583.6	582.5	0.0	582.5	582.5	0.0				
2011	1,288.7	0.0	33.0	0.0	33.0	1,255.7			572.0		572.0	572.0		0.0	572.0	-572.0	683.7	0.0	683.7	683.7	0.0				
2012	1,385.0	0.0	33.0	0.0	33.0	1,352.0			560.4		560.4	560.4		0.0	560.4	-560.4	791.6	0.0	791.6	791.6	0.0				
2013	1,488.7	0.0	33.0	0.0	33.0	1,455.7			548.9		548.9	548.9		0.0	548.9	-548.9	906.8	0.0	906.8	906.8	0.0				
2014	1,600.2	0.0	33.0	0.0	33.0	1,567.2			537.3		537.3	537.3		0.0	537.3	-537.3	1,029.9	0.0	1,029.9	1,029.9	0.0				
2015	1,720.1	0.0	33.0	0.0	33.0	1,687.1			525.7		525.7	525.7		0.0	525.7	-525.7	1,161.4	0.0	1,161.4	1,161.4	0.0				
2016	1,813.3	792.0	33.0	0.0	825.0	988.3			514.1		514.1	514.1		0.0	514.1	-514.1	474.2	0.0	474.2	474.2	0.0				
2017	1,902.8	0.0	33.0	0.0	33.0	1,869.8			502.6		502.6	502.6		0.0	502.6	-502.6	1,367.3	175.4	1,191.9	1,191.9	0.0				
2018	1,997.1	0.0	33.0	0.0	33.0	1,964.1			491.0		491.0	491.0		0.0	491.0	-491.0	1,473.1	205.1	1,268.0	1,268.0	0.0				
2019	2,096.4	0.0	33.0	0.0	33.0	2,063.4			479.4		479.4	479.4		0.0	479.4	-479.4	1,584.0	236.0	1,348.0	1,348.0	0.0				
2020	2,201.1	0.0	33.0	0.0	33.0	2,168.1			467.8		467.8	467.8		0.0	467.8	-467.8	1,700.3	268.3	1,432.0	1,432.0	0.0				
2021	2,311.6	0.0	33.0	0.0	33.0	2,278.6			456.3		456.3	456.3		0.0	456.3	-456.3	1,822.4	301.9	1,520.5	1,520.5	0.0				
2022	2,428.0	3,589.9	33.0	0.0	3,622.9	-1,194.9	2,797.9	2,797.9	444.7	2,797.9	2,797.9			385.9	830.6	1,967.3	772.4	0.0	772.4	772.4	0.0				
2023	2,550.7	0.0	33.0	0.0	33.0	2,517.7			433.1		433.1	433.1		758.6	1,191.7	-1,191.7	1,326.1	19.6	1,306.5	1,306.5	0.0				
2024	2,680.2	0.0	33.0	0.0	33.0	2,647.2			421.5		421.5	421.5		708.8	1,130.3	-1,130.3	1,516.9	76.8	1,440.1	1,440.1	0.0				
2025	2,816.8	0.0	33.0	0.0	33.0	2,783.8			410.0		410.0	410.0		659.1	1,069.0	-1,069.0	1,714.8	135.7	1,579.1	1,579.1	0.0				
2026	2,961.0	1,078.0	33.0	0.0	1,111.0	1,850.0			398.4		398.4	398.4		609.3	1,007.7	-1,007.7	842.3	0.0	842.3	842.3	0.0				
2027	3,113.1	0.0	33.0	0.0	33.0	3,080.1			386.8		386.8	386.8		559.6	946.4	-946.4	2,133.7	393.0	1,740.7	1,740.7	0.0				
2028	3,273.7	0.0	33.0	0.0	33.0	3,240.7			375.2		375.2	375.2		509.8	885.1	-885.1	2,355.7	457.3	1,898.4	1,898.4	0.0				
2029	3,443.2	0.0	33.0	0.0	33.0	3,410.2			363.6		363.6	363.6		460.1	823.7	-823.7	2,586.5	523.7	2,062.8	2,062.8	0.0				
2030	3,622.2	1,078.0	33.0	0.0	1,111.0	2,511.2	0.0	0.0	0.0	0.0	0.0	0.0	410.4	762.4	-762.4	1,748.8	177.1	1,571.7	1,571.7	0.0					
2031	3,811.2	0.0	33.0	0.0	33.0	3,778.2	0.0	0.0	0.0	0.0	0.0	0.0	360.6	360.6	-360.6	3,417.6	773.2	2,644.4	2,644.4	0.0					
2032	4,010.9	0.0	33.0	0.0	33.0	3,977.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,977.9	961.4	3,016.5	3,016.5	0.0				
2033	4,221.8	1,078.0	33.0	0.0	1,111.0	3,110.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,110.8	577.5	2,533.3	2,533.3	0.0				
TOTAL	63,956.6	19,538.1	923.7	0.0	20,461.8	43,494.8	3,410.1	2,797.9	8,512.2	14,720.2	n.a.	12,274.6	5,422.2	17,696.8	-2,976.51	40,518.2	5,282.0	35,236.2	35,236.2	35,236.2	0.0				

Sources: JICA Study Team.

Notes: 1.) The O&M cost reflect resurfacing expenditures of million 792.00 Rs. in 2016 and 2022, as well as widening expenditures in 2022 of million Rs. 2412.00 (constant 1999 price base).

2.) It is assumed that the widening cost are a net-investment that they are financed from a long-term domestic loan.

3.) The O&M expenditures in 2030 and 2033 reflect resurfacing expenditures of million 1,078.00 Rs. for the widened road.

4.) The "Partner share" or ROE is set to zero here.

5.) Based on revenues generated by a 1.5 Rs./km distance-based toll rate system.

TABLE 12.10.9: THE KG-GM EXPRESSWAY IN THE NCR
TOTAL CASHFLOW & DEBT SERVICE ANALYSIS
"CONCESSIONAIRE" "BOOT" IMPLEMENTATION SCHEME (Case Study 3)

[in 1999 constant prices; million Rs.]

YEAR	NET CASH FLOW BEFORE FINANCING					FINANCING CASH FLOW										NET CASH FLOW AFTER		CORPORATE TAX PAYMENTS		NET CASH FLOW AFTER LT-FINAN- CING & TAX		BALANCE AFTER SHORT-T. FINANC.
	INFLW SYSTEM REVENUES	OUTFLOW			TOTAL	COMPOSITE FLOW	INFLW				OUTFLOW				NET FINANCING STREAM	LT. FINA.	PAYMENTS	LT-FINAN- CING & TAX				
		INVESTMENT	O & M	PARTNER SHARE			EQUITY	DOM. LT. LOAN	FOR. LT. LOAN	TOT. INFLW	CUMULATV INFLW	FOR. LT. REPAYMENT	DM. LT. REPAYMENT	TOTAL DEBT SERVICE								
																			CONT.	CONT.	CONT.	
2000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
2001	0.0	2,211.8	0.0	0.0	2,211.8	-2,211.8	1,849.7	0.0	0.0	362.1	2,211.8	2,211.8	0.0	0.0	0.0	2,211.8	0.0	0.0	0.0			
2002	0.0	954.2	0.0	0.0	954.2	-954.2	200.0	0.0	0.0	754.3	954.3	3,166.1	0.0	0.0	0.0	954.3	0.0	0.0	0.0			
2003	0.0	1,584.3	0.0	0.0	1,584.3	-1,584.3	810.1	0.0	0.0	774.2	1,584.3	4,750.4	0.0	0.0	0.0	1,584.3	0.0	0.0	0.0			
2004	0.0	3,687.2	0.0	0.0	3,687.2	-3,687.2	810.1	0.0	0.0	2,877.1	3,687.2	8,437.6	0.0	0.0	0.0	3,687.2	0.0	0.0	0.0			
2005	0.0	4,073.9	0.0	0.0	4,073.9	-4,073.9	810.1	0.0	0.0	3,263.8	4,073.9	12,511.5	0.0	0.0	0.0	4,073.9	0.0	0.0	0.0			
2006	966.8	0.0	33.0	0.0	33.0	933.8	0.0	0.0	0.0	0.0	0.0	1,024.0	0.0	0.0	1,024.0	-1,024.0	-90.2	0.0	0.0			
2007	966.3	0.0	33.0	0.0	33.0	933.3	0.0	0.0	0.0	0.0	0.0	995.9	0.0	0.0	995.9	-995.9	-62.6	0.0	0.0			
2008	1,038.3	0.0	33.0	0.0	33.0	1,005.3	0.0	0.0	0.0	0.0	0.0	967.8	0.0	0.0	967.8	-967.8	37.5	0.0	0.0			
2009	1,115.8	0.0	33.0	0.0	33.0	1,082.8	0.0	0.0	0.0	0.0	0.0	939.7	0.0	0.0	939.7	-939.7	143.1	0.0	0.0			
2010	1,199.1	0.0	33.0	0.0	33.0	1,166.1	0.0	0.0	0.0	0.0	0.0	911.6	0.0	0.0	911.6	-911.6	254.5	0.0	0.0			
2011	1,356.2	0.0	33.0	0.0	33.0	1,323.2	0.0	0.0	0.0	0.0	0.0	883.5	0.0	0.0	883.5	-883.5	439.7	0.0	0.0			
2012	1,385.0	0.0	33.0	0.0	33.0	1,352.0	0.0	0.0	0.0	0.0	0.0	855.4	0.0	0.0	855.4	-855.4	496.7	0.0	0.0			
2013	1,488.7	0.0	33.0	0.0	33.0	1,455.7	0.0	0.0	0.0	0.0	0.0	827.2	0.0	0.0	827.2	-827.2	628.5	0.0	0.0			
2014	1,600.2	0.0	33.0	0.0	33.0	1,567.2	0.0	0.0	0.0	0.0	0.0	799.1	0.0	0.0	799.1	-799.1	768.1	0.0	0.0			
2015	1,720.1	0.0	33.0	0.0	33.0	1,687.1	0.0	0.0	0.0	0.0	0.0	771.0	0.0	0.0	771.0	-771.0	916.1	0.0	0.0			
2016	1,815.3	792.0	33.0	0.0	825.0	988.3	0.0	0.0	0.0	0.0	0.0	742.9	0.0	0.0	742.9	-742.9	245.4	0.0	0.0			
2017	1,902.8	0.0	33.0	0.0	33.0	1,869.8	0.0	0.0	0.0	0.0	0.0	714.8	0.0	0.0	714.8	-714.8	1,155.0	0.0	0.0			
2018	1,997.1	0.0	33.0	0.0	33.0	1,964.1	0.0	0.0	0.0	0.0	0.0	686.7	0.0	0.0	686.7	-686.7	1,277.4	0.0	0.0			
2019	2,096.4	0.0	33.0	0.0	33.0	2,063.4	0.0	0.0	0.0	0.0	0.0	658.6	0.0	0.0	658.6	-658.6	1,404.8	0.0	0.0			
2020	2,201.1	0.0	33.0	0.0	33.0	2,168.1	0.0	0.0	0.0	0.0	0.0	630.5	0.0	0.0	630.5	-630.5	1,537.6	0.0	0.0			
2021	2,311.6	0.0	33.0	0.0	33.0	2,278.6	0.0	0.0	0.0	0.0	0.0	602.4	0.0	0.0	602.4	-602.4	1,676.3	0.0	0.0			
2022	2,428.0	3,589.9	33.0	0.0	3,622.9	-1,194.9	0.0	2,797.9	0.0	0.0	2,797.9	0.0	0.0	385.9	960.2	1,837.8	642.9	0.0	1,676.3			
2023	2,550.7	0.0	33.0	0.0	33.0	2,517.7	0.0	0.0	0.0	0.0	0.0	546.1	0.0	0.0	546.1	-546.1	1,213.0	3.2	1,209.8			
2024	2,680.2	0.0	33.0	0.0	33.0	2,647.2	0.0	0.0	0.0	0.0	0.0	518.0	0.0	0.0	518.0	-518.0	1,420.4	66.8	1,353.6			
2025	2,816.8	0.0	33.0	0.0	33.0	2,783.8	0.0	0.0	0.0	0.0	0.0	489.9	0.0	0.0	489.9	-489.9	1,634.8	131.9	1,502.9			
2026	2,961.0	1,078.0	33.0	0.0	1,111.0	1,850.0	0.0	0.0	0.0	0.0	0.0	461.8	0.0	0.0	461.8	-461.8	1,778.9	0.0	778.9			
2027	3,113.1	0.0	33.0	0.0	33.0	3,080.1	0.0	0.0	0.0	0.0	0.0	433.7	0.0	0.0	433.7	-433.7	2,046.8	267.7	1,819.1			
2028	3,273.7	0.0	33.0	0.0	33.0	3,240.7	0.0	0.0	0.0	0.0	0.0	405.6	0.0	0.0	405.6	-405.6	2,325.3	399.4	1,925.9			
2029	3,443.2	0.0	33.0	0.0	33.0	3,410.2	0.0	0.0	0.0	0.0	0.0	377.5	0.0	0.0	377.5	-377.5	2,572.6	470.2	2,102.4			
2030	3,622.2	1,078.0	33.0	0.0	1,111.0	2,511.2	0.0	0.0	0.0	0.0	0.0	349.4	0.0	0.0	349.4	-349.4	1,751.5	130.0	1,621.5			
2031	3,811.2	0.0	33.0	0.0	33.0	3,778.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,417.6	664.7	2,752.9			
2032	4,010.9	0.0	33.0	0.0	33.0	3,977.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,977.9	852.9	3,125.0			
2033	4,221.8	1,078.0	33.0	0.0	1,111.0	3,110.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,110.8	406.8	2,704.0			
TOTAL	64,091.6	20,127.3	923.7	0.0	21,051.0	43,040.6	4,480.0	2,797.9	8,031.5	15,309.4	n.a.	17,167.3	5,422.2	22,589.5	-7,280.1	35,760.5	3,393.6	32,366.9	14,695.7			

Source: JICA Study Team.

Notes: 1.) The "Partner share" or ROE is set to zero here.

2.) The revenue stream reflects in the years 2006 and 2011 Rs. 67.50 million 25% repayment to the concessionaire of the performance bond.

12.11 Improving the FIRR

A FIRR of 10.4 %, which is below the prevailing Indian lending rate of around 13 %, is not yet attractive enough to harvest ample private sector capital. Apart from other measures outlined below (such as toll rate increase) geared at increasing the FIRR, a sensitivity test has been undertaken to measure the impact on the project's FIRR, if land acquisition and compensation cost are treated as "sunk cost" in the cash flow analysis. The test result shows that in such a case the project's FIRR would increase to about 12 %.

Alterations in the concession period, however, are no suitable measure to improve the FIRR. This is due to the fact that the higher growth in traffic demand and therefore revenues takes place in the later years of the project's life cycle. In fact, the pre-tax FIRR goes down considerably, if the concession period is shortened. The results of the computation are FIRR of 8.5 % for a 25 years concession period, 6.6 % for a 20 years and 1.3 % for a 15 years concession period.

12.12 The Equity Holder's Point-of-View

The potential Return-on-Equity (ROE) has been investigated for the first ten crucial years of operations. The results of this test revealed that the accumulated net cash flows during the first ten years after taxes are Rs. 3,402.6 million and Rs. 6,504.7 million for the Case Studies 3 and 4 respectively.

Average annual ROE for all equity holders would be 7.6 % and 19.1 % for Case Study 3 and Case Study 4, respectively. The much higher ROE for Case Study 4 is possible, because of the much more favorable long-term concessional financing conditions than in Case Study 3, the long-term financing for which is at market rates. Potential ROE for private equity shareholders only (that is assuming zero ROE for other equity shareholders) during the first ten years would be 14.8 % and 76.3 % for Case Study 3 and Case Study 4, respectively.

12.13 Conclusions, Recommendations & Guidelines For Government Position In Project Negotiations

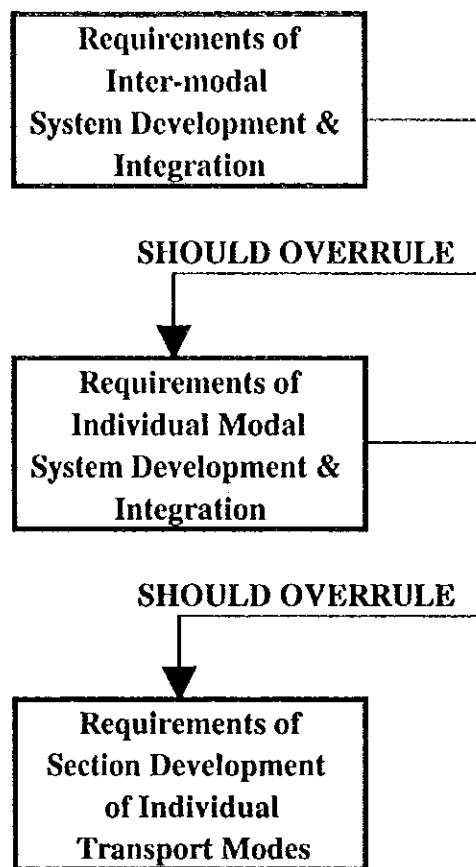
12.13.1 Conclusions & Basic Recommendations

The following principles to be observed in the realization of the KG-GM Expressway project may be stated in conclusion :

- The long-term debt structure in terms of borrowing terms (repayment periods) should match, at the lowest possible interest rate, the life cycle of the long-term assets, which it finances, and
- Adjustments in the project structure, that is equity to debt ratio, equity structure, and finally long-term debt structure, always lead only to a trade-off between these three project structure elements, and not to “the solution” for the given financing problem under consideration.

From the perspective of the government (that is the GOI and/or the NCRPB), looking at the feasibility of an individual project is a necessary, but not a sufficient condition, to decide among projects and/or in favor or against an individual project proposal. Therefore, the decision to pursue one or the other of the above two strategic PPP options must be screened and complimented by additional policy related and also functional criteria.

A policy-objective hierarchy is, therefore, suggested to that end as depicted in Figure 12.13.1.



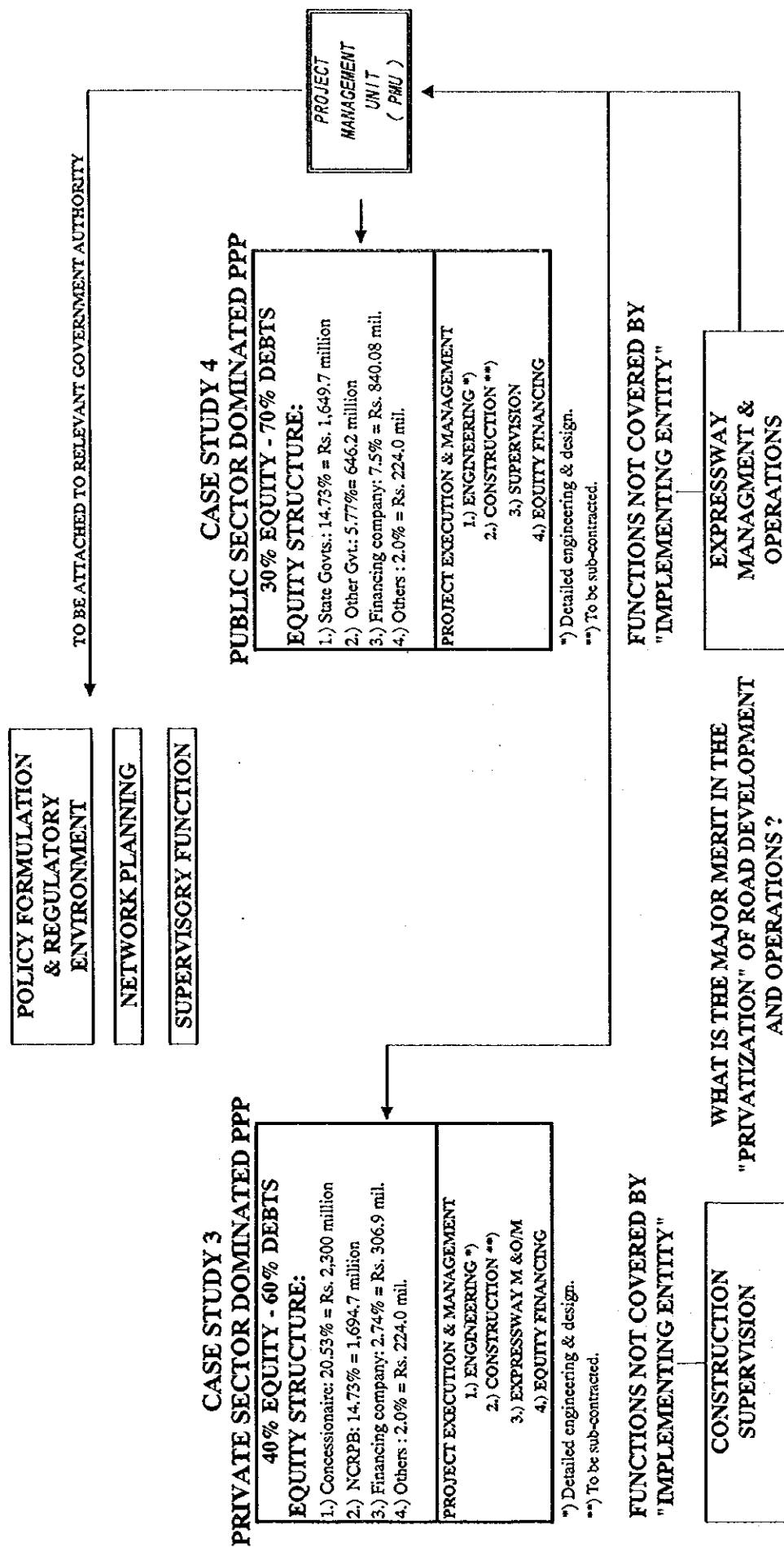
Source: JICA Study Team.

Figure 12.13.1 Policy-objective Hierarchy

In addition to the overall policy objective hierarchy, related functional criteria as depicted in Figure 12.13.2 are introduced into the appraisal of the two principal potentials.

A rationale and justifiable decision can thus be made based on an assessment of the combined results and conclusions of :

- The KG-GM Expressway's basic feasibility measured in terms of its simple pre-tax IRR and long-term debt service capability
- The level of realism of the pursued project structure (equity to debt ratio; equity structure, and long-term debt structure)



Source: JICA Study Team.

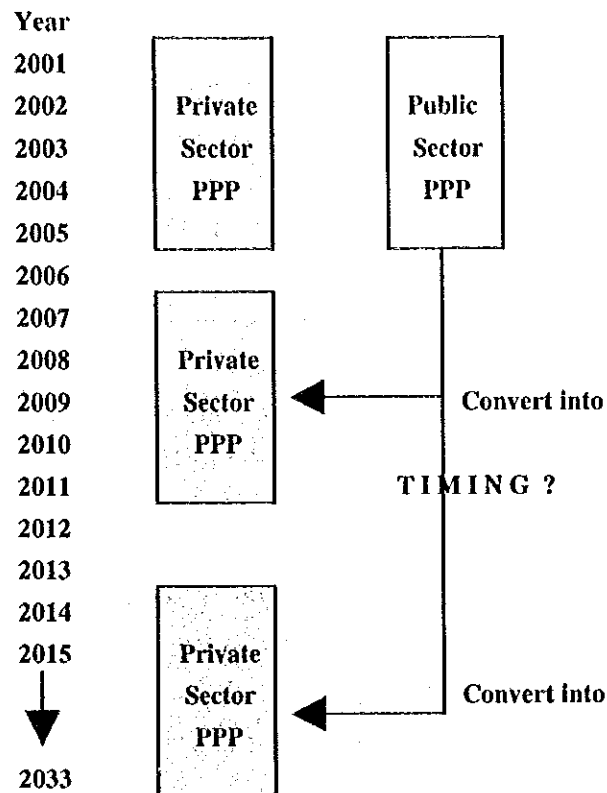
Figure 12.13.2 Policy Related Functional Criteria

- The extent to which the KG-GM Expressway project features fit into the overall highway/expressway development landscape and contribute thus to and/or strengthen achievement of overall, individual project overriding policy objectives.

The above deliberations should have made the key point that private sector versus public sector dominated PPP are not necessarily alternatives excluding each other and that they should not be regarded as such. As long as privatization of expressway development, management, operations & maintenance remains an overriding Indian policy objective, this issue is not an issue of principle, but of operational timing as depicted in the simplistic Figure 12.13.3.

It is clear from the basic assumption that the KG-GM Expressways are needed to be constructed regardless of their individual feasibility, that either way, public or private sector dominated PPP, the GOI and/or NCRPB will have to assume the basic risks associated with this endeavor. The only remaining issue is as to whether the GOI and/or NCRPB can find a strategic private partner in a timely fashion.

If this target cannot be realized, the GOI and/or NCRPB may wish, in order not to lose precious time, to proceed with a public sector dominated PPP, which is to be converted, as soon as possible, into a private sector dominated PPP.



Source: JICA Study Team.

Figure 12.13.3 Timing For Privatization

The overriding policy objective for the NCR should be a harmonized inter-modal system development, which corresponds to the needs of the NCR, and which is based on an integrated long-term transport sector master plan. In addition to this, the following principal roles/responsibilities should be considered :

- The Central & Delhi Governments. To review critically the partly overlapping and partly competing functions of the relevant entities involved in planning in general in the NCR, and in particular transport/ expressway development planning. Such a rationalization of the planning approach would not only strengthen the planning functions of each of the entities involved, but eventually the integrity of the NCR itself. The Central Government should assume the risks, which are beyond State Government or state institutional levels. The Central Government may wish to consider in this context to be a direct or indirect equity holder
- State Governments. The alignments of the KG-GM Expressway go through

the state territory of UP and Haryana. The State governments may wish to participate in the PPP's equity, or delegate their authority in this matter to the NCRPB

- MOST and NHAI should be invited to join the expressway development effort in the NCR. The argument that the envisaged expressways serve primarily regional purposes falls short of the appreciation that the NCR expressways should form an integral part of the envisaged larger national highway/expressway system, and that, therefore, system harmonization and integration should be the overriding policy objective. In any event, regardless of how the expressways are classified, MOST/NHAI would bring a significant accumulated institutional knowledge to road planning, engineering and construction supervision, and so on. MOST and NHAI could function as equity holders in the proposed PPP implementing entity
- NCRPB. NCRPB is one of the very few Indian inter-state planning bodies and its planning and implementation capacity is somewhat constrained by the very nature of the organization. Its functional responsibilities and relations with other relevant administrative entities should be reviewed, clarified and strengthened where necessary. NCRPB must be an equity holder in the proposed PPP implementing entity.

The proposed public or private sector dominated PPP implementing entity should have the following minimal functions:

- KG-GM Expressway project execution and management
- Expressway management, operations and maintenance.

The detailed engineering and design functions as well as the construction function itself can be sub-contracted.

The PPP implementing entity could be assisted by an externally supported project management unit (PMU), in order to strengthen in the initial years of operations institutional knowledge and skills at every level, and also in order to preserve the public sector's interest in infrastructure development.

12.13.2 Guidelines For Government Position In Project Negotiations

The basic strategy of the GOI and/or NCRPB in the actual negotiation process with potential private sector investors should be to:

- To function as a facilitator for the establishment of a private sector dominated PPP. If this is not possible in the short-term, a clear timetable should be established for converting the then necessary public sector dominated PPP into a private sector dominated one
- The use of public funds necessary in this context should be viewed as “seed money” for the above purpose and for an early achievement of the governments privatization goals
- Within this context, the GOI and/or NCRPB should aim at optimizing the simple pre-tax IRR of individual projects while trying to minimize, where and when possible, total project investment cost.

The GOI and/or NCRPB may wish to consider positively a negotiation attitude on individual items as summarized in Figure 12.13.4.

Reasonable risk distribution according to the principle of “risk adequacy” (the assumed risk must be fully compatible with the risk bearer’s capacity to assume such risk) becomes the overriding operational guidance, if such a strategy is to be pursued successfully.

12.14 Recommended Implementation Plan And Timetable

The recommended implementation plan and timetable is very tight, if the goal of opening the KG-GM Expressways in January 2006 is to be realized. The major milestones are summarized in Figure 12.14.1.

Subject Item	Observations, Comments & Recommended Negotiation Attitude
Recourse or non-recourse financing	A recourse financing approach, which would imply the provision of GOI guarantees, would reduce the risk for financing institutions and ease the pressure on private equity investors to obtain such financing. However, if recourse financing is not possible, the project sponsors may have to guarantee a certain level of returns for private sector equity investors and provide other assurances, such as sub-ordinated loans serving as debt service guarantee and/or revenue shortfall guarantees to financing institutions. The latter would have a strong and direct impact on the project's cashflow.
Equity/Debt Structure	A credible equity to debts structure is crucial. The GOI/NCRPB should aim for a 30:70, or even better 40:60 equity to debt ratio.
Equity Structure	It is essential in case a public sector dominated PPP is established first that all "stakeholders", that is the Central and State Governments, and the NCRPB take a stake in equity without expecting a high ROE. This may be needed to sort of guarantee the private equity holders a reasonable ROE. If a private sector dominated PPP is established, the GOI/NCRPB may need to assume measures to also safeguard the ROE for the private investor.
Debt Structure	India's financial market offers funds for up to 10 to 12 years at around 16% interest p.a. . This is expensive money at an implied 8% real interest rate. The GOI/NCRPB should consider positively to obtain concessional lending from an ODA entity. This would involve a sovereign guarantee and the assumption of exchange rate risk. However, it would have a positive impact on private sector confidence and ease the burden on the project's cashflow.

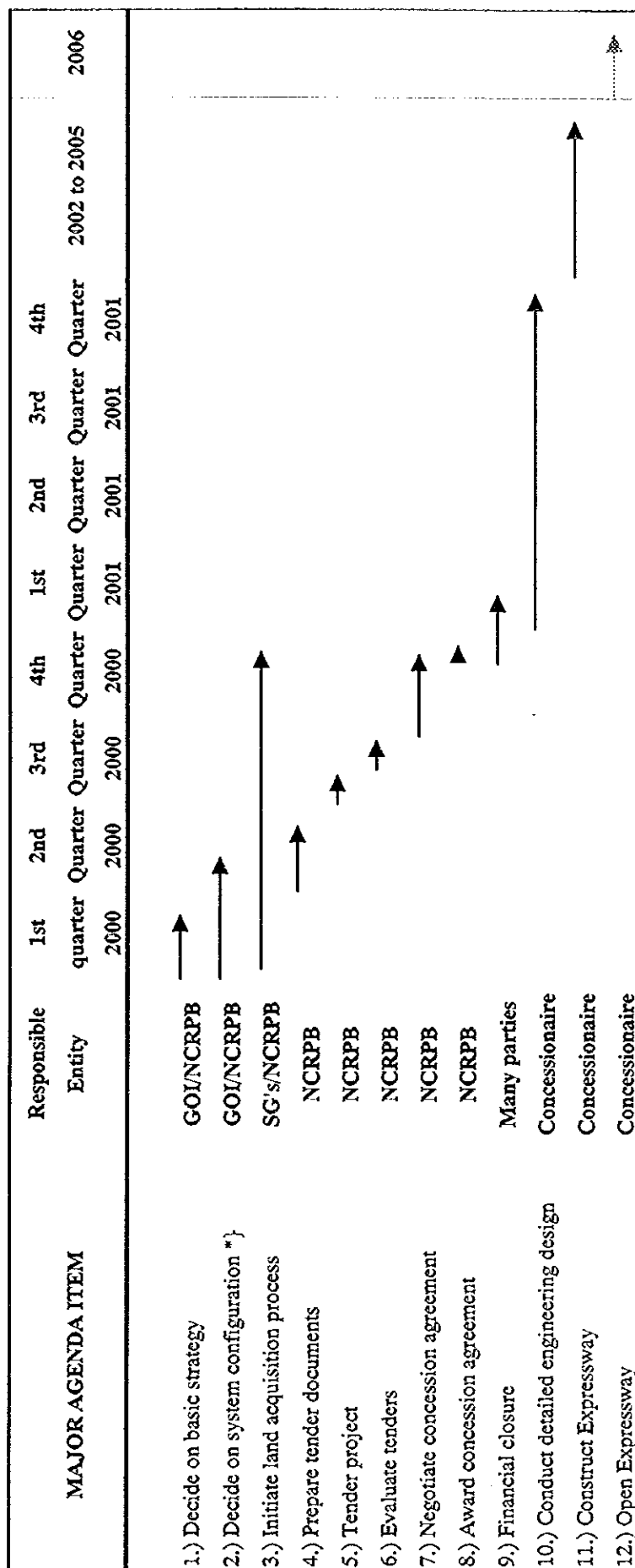
Figure 12.13.4 Recommended Negotiation Attitude For The GOI/NCRPB (Part 1)

Subject Item	Observations, Comments & Recommended Negotiation Attitude
FIRR Considerations	<p>The FIRR for the potential "base cases" is with 10.4% not high enough. The GOI/NCRPB may wish to consider positively in this context to enhance the FIRR through adoption of the following measures:</p> <p>Measure 1: Secure ROW and possibly other land use rights through budget resources, so that this cost title can be treated as "sunk cost".</p> <p>Measure 2: Grant real estate development rights automatically, if they are needed to bring the FIRR into the 20% to 25% range.</p> <p>Measure 3: Negotiate other critical items in the concession agreement in a flexible manner (as discussed already earlier).</p>
Toll Rate	<p>The toll rate, established at 1.5 Rs. per km, should not exceed consumer benefits. However, the GOI/NCRPB should consider positively:</p> <p>a.) to peg the toll rate not to the unprecise WPI, but the CPI, which is more accurate</p> <p>b.) allow for annual toll increases, since revenues have a strong and direct impact on cashflow, and</p> <p>c.) allow for real toll rate increases, perhaps in line with real per capita income increase. Such an approach would keep tolls at the same "real price" level in terms of "willingness-to-pay".</p>
Other vital items	<p>1.) Traffic data. The GOI/NCRPB must make all historical data available to the investor at an early stage.</p> <p>2.) System integration. The NCR needs badly an integrated transport sector master plan. Such plan should be realized ASAP.</p> <p>3.) Psychological factors. It is important at the early stage of private sector led development to create a "success story". Hence, the GOI/NCRPB must do everything necessary to realize a success.</p>

Source: JICA Study Team.

Figure 12.13.4 Recommended Negotiation Attitude For The GOI/NCRPB (Part 2)

FIGURE 12.14.1 : THE KG-MG EXPRESSWAY IN THE NCR
PROPOSED IMPLEMENTATION SCHEDULE & TIMETABLE



Source: JICA Study Team.

Notes: *] This refers to the question of the package to be tendered. KG-GM only or in combination with the FNG.

CHAPTER 13:

ENVIRONMENTAL IMPACT ASSESSMENT

13.1 Introduction

The Kundli-Ghaziabad-Meerut expressway is one of the most prestigious projects proposed by the National Capital Region Planning Board (NCRPB). This expressway is proposed from Ghaziabad on NH-58 (G.T. Road junction) to Kundli on NH-1 and to Meerut at Meerut Baghpat Road. (Figure-13.1.1)

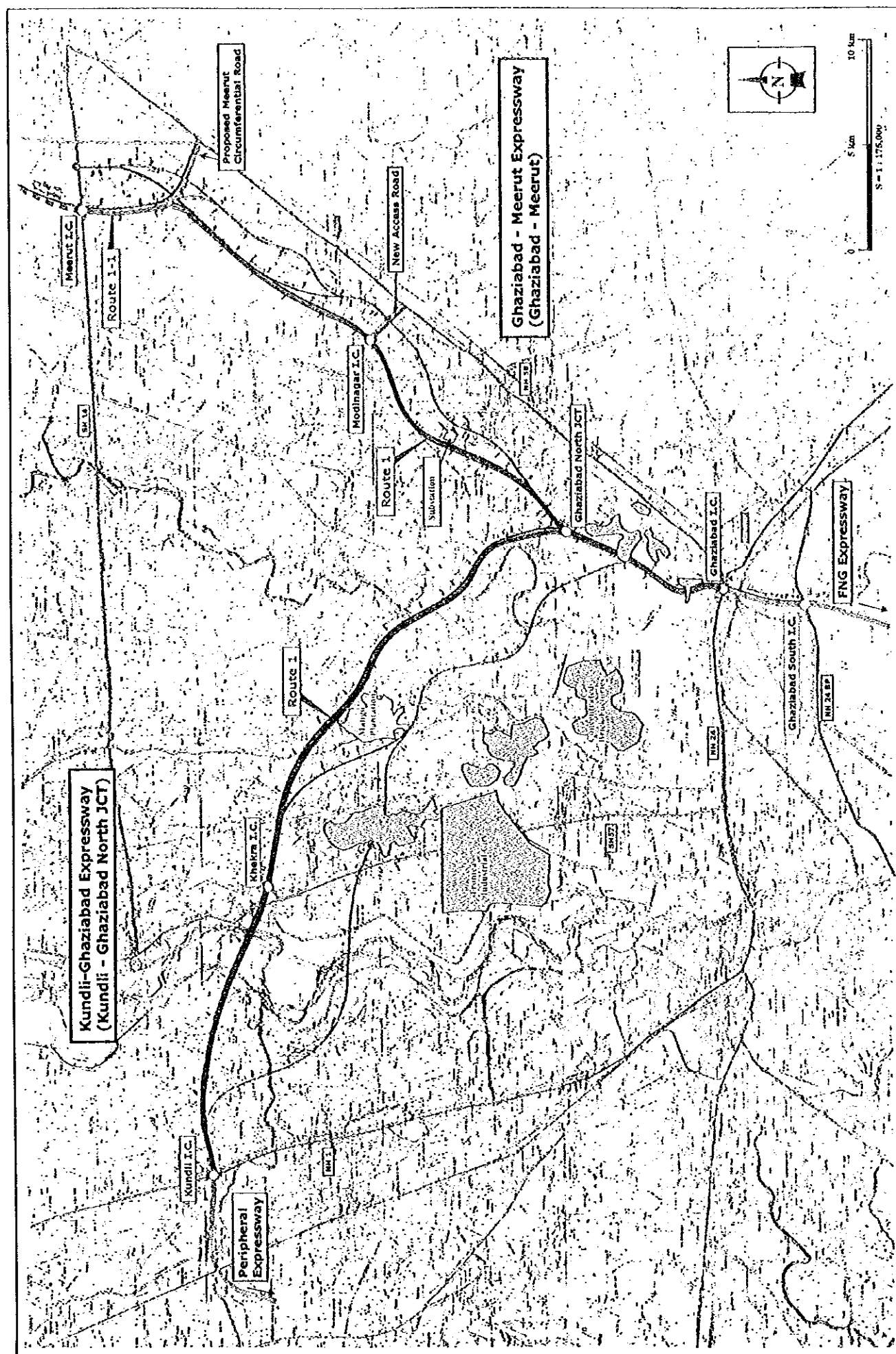
Population within NCR has increased from 19.0 million in 1981 to 26.4 million in 1991 with an annual growth rate of 3.3% which is higher than the national average of 2.1%. Delhi too has seen phenomenal growth with continuous influx of people from the other States. This may lead to high traffic density (3-8%) in the region. This project thus has been proposed to reduce vehicular traffic as well as effective travel distance on the existing roads. This is expected to have a number of positive environmental, social, and economic impacts due to equitable distribution of traffic, saving in fuel (less pollution) and travel time particularly for a typical passenger trip from NH-1 to Ghaziabad for onward journey to Moradabad, Lucknow, Varanasi, etc. as well as from Delhi to Meerut, Dehradun, Haridwar, and Rishikesh onward.

The Initial Environmental Examination (IEE) study was conducted separately in which screening and scoping checklists were prepared. The scoping checklist describing the impacts due to the implementation of the project is tabulated in Appendix 13.1.1. Based on the IEE study, a detailed environmental impact assessment was carried out for the project.

13.1.1 Scope of Environmental Study

An area within 1-km distance on the either side of the alignment is considered for the Environmental Study. The broad scope of the study was:

Fig 13.1.1-Setting up of project road



- To review the literature and collect additional data relevant to the study area;
- To undertake environmental monitoring so as to establish the baseline environmental status of the study area;
- To assess the impacts on environmental attributes due to the construction and operation of the proposed road project;
- To prepare an Environment Management Plan (EMP) outlining the measures for protecting the environment and cost estimation for implementation of the measures; and
- To identify critical environmental attributes required to be monitored subsequent to the implementation of the proposed project.

13.1.2 Study Approach

A reconnaissance survey was first conducted to identify the major environmental issues. Accordingly, field surveys were undertaken for a period starting from 7th May to 20th July to determine the ambient air quality, meteorological conditions (concurrent to the air quality studies), water quality, noise levels, soil characteristics, ecological status, and prevailing land use. Detailed studies for these parameters were conducted for the distance up to 1 km on the either side of alignment and up to 10 km for data collection from secondary sources. The field studies conducted to determine the existing conditions of various environmental attributes are outlined in Table-13.1.1. The methodology adopted for this study is depicted in a flowchart as Figure-13.1.2, which defines the input and output related to the evaluation of environmental impacts.

The field observations and secondary data were used for:

- Assessment of the existing baseline (existing) environmental status;
- Identification of the extent of incremental impacts on community and natural resources; and
- Identification of mitigation measures and monitoring requirements during construction and operational phases.

Figure-13.1.2: Basic Methodology Adopted for Environmental Assessment

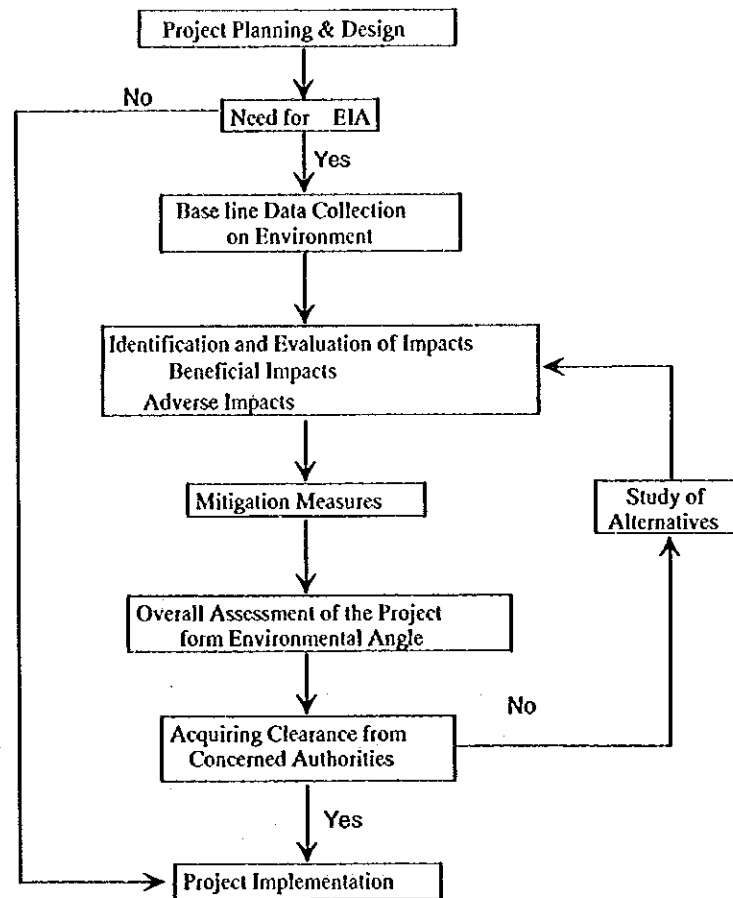


Table-13.1.1: Environmental Attributes Covered under Field Studies

Attribute	Frequency / Coverage
Meteorology	Wind speed and direction at one location continuously at an hourly interval during the study period
Ambient air quality	Twenty-four hours continuously for eight days including one weekend during study period at fifteen locations.
• SPM, SO ₂ , and NO _x	Hourly sample for eight days during study period at fifteen locations.
• CO and HC	
Water quality	Samples were collected at ten locations from rivers and canals across the alignment. These included six surface water locations and four ground water locations. These were analyzed for physical, chemical, and bacteriological parameters.
Noise levels	Continuous noise level monitoring was done at ten locations for a period of twenty four hours for three day including one day in weekend to determine L _{eq} values during day and night time.
Soil characteristics	Six samples were collected and parameters related to agricultural and planting potential were analyzed.
Ecology	Six aquatic and eight terrestrial locations were selected for the field study.

In addition, secondary data were also collected to supplement the field data, as mentioned in Table-13.1.2.

Table-13.1.2: Environmental Attributes Covered with Secondary Data

Attribute	Coverage
Meteorology	Published meteorological data for a period of 12 years for IMD (Safdarjung Airport) was collected from India Meteorological Department at Pune.
Air Quality	Data Not Available
Water quality	Secondary data on ground water quality was collected from office of State Ground Water Authority and Central Pollution Control Board.
Noise Quality	Data Not Available
Ecology	List of species for flora and fauna in the general study area were collected from the published secondary data from forest and wild life department.
Geology	General geological history of the area has been collected from published literature for National Capital Region.
Hydrology	General groundwater hydrology in the area has been collected from published literature for National Capital Region and field study done by Consultants.
Land use	Changes on land use for different categories were compiled by primary survey and from published literature.

13.1.3 Environmental Legislations

The principal Environmental Regulatory Agency in India is the Ministry of Environment and Forests (MoEF). MoEF formulates environmental policies and accords environmental clearance for the projects as per notification dated 27 January 1994 (amended on 4th May 1994).

The status of key environmental legislation in India is given in Table-13.1.3. As per the notification from the MoEF, a new project, expansion or modernisation of any activity shall not be undertaken in any part of India unless it has been accorded environmental clearance by the central government in accordance with the procedures specified in the notification. As per the procedure, anybody who desires to undertake a project needs to submit a detailed project report including *inter alia* an Environmental Impact Assessment (EIA) report.

Table-13.1.3: Key Environment Legislation

Name	Scope and Objective	Key Areas	Operational Agencies / Key Players
Environment (Protection) Act, 1986	To provide protection and improvement of Environment	An umbrella legislation ; supplements pollution laws	Central government nodal agency MoEF; can delegate powers to state department of Environment
Forest Act, 1927	To consolidate acquisition of common property such as forests	Regulates access to natural resources; state has monopoly right over land; categories forests	State and Central government
Forest Conservation Act, 1980	To halt India's rapid deforestation and resulting Environmental degradation	Restriction on dereservation and using forest for non-forest purpose	Central government
Wildlife Protection Act, 1972	To protect wildlife	Creates protected areas (national parks/sanctuaries) categories of wildlife which are protected	Wildlife Advisory Boards; Central Zoo Authorities
Air (Prevention and Control of Pollution Act, 1981)	To provide for the prevention and control of air pollution	Controls emissions of air pollutants	Central and State Pollution Control Boards
Water (Prevention and Control of Pollution Act, 1974)	To provide for the prevention and control of water pollution and enhancing the quality of water	Controls sewage and industrial effluent discharges	Central and State Pollution Control Boards

(Source: Government of India Publications)

The MoEF has the overall responsibility to set policies, laws, and standards for the protection of environment along with Central Pollution control Board (CPCB). This includes air, noise, and water quality standards, and the requirement for the preparation of Environmental Impact Assessment (EIA) statements for development projects. These standards are of significance for the proposed project. This expressway project is categorized under "Item 21: Highway Projects" under Schedule 1 of the notification dated 27th January 1994 (amended on 4th May 1994). This project will require Environmental Clearance from the MoEF, New Delhi. The block diagram depicting the procedures for getting environmental clearance and forest clearance are shown in Appendix 13.1.2 and Appendix-13.1.3, respectively. Appendix 13.1.4 to 13.1.6 gives the air, noise and water quality standards respectively.