Nepal Fast Track Road: Contracting Strategy Review

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Contents

ACRONYMS

AASHTO	American Association of State Highway &Transportation Officials
ADB	Asian Development Bank
BOOT	Build Own Operate Transfer
BOT	Build Operate Transfer
CIAA	Commission for the Investigation of Abuse of Authority
DoR	Department of Roads
EOI	Expression of Interest
EWH	East-West Highway
GoN	Government of Nepal
IBN	Investment Board of Nepal
IL&FS	Infrastructure Leasing & Financial Services Limited
MOF	Ministry of Finance
MoPIT	Ministry of Physical Infrastructure and Transport
MoPPW	Ministry of Physical Planning and Works
OMT	Operate Maintain Transfer
NEPCA	Nepal Council of Arbitration
NPC	National Planning Commission
NRB	Nepal Roads Board
PBMC	Performance Based Maintenance Contract
PCU	Passenger Car Unit
PPMO	Public Procurement Monitoring Office
PPP	Public Private Partnership
PS	Private Sector
RfP	Request for Proposal
RoW	Right of Way
SNR	Strategic Road Network
WB	World Bank

EXECUTIVE SUMMARY

The Fast Track road project is a proposed 100km Nepali toll road linking Kathmandu to Pathlaiya in the Terai. The road would significantly reduce the time and cost of transport between the capital and the border, and, as a result, the road has clear economic benefits. The Government of Nepal has made repeated attempts to develop the project over the last 40 years, including through PPP procurement attempts in 2008, 2010 and 2012. However, each of these attempts has failed.

ICF International has been engaged by PPIAF to undertake a rapid assessment of potential contracting strategies suitable to take the Fast Track road forward. This has been done as a very high level assessment based on the following:

- As series of stakeholder consultations and site visits in Kathmandu and the surrounding area, organised by PPIAF at the start of the engagement. Subsequent follow up engagements were not feasible during the time period of the study.
- Desk-based review of publicly available information and Project related documents as supplied by PPIAF.
- Stakeholder consultations with previous private sector bidders for the Fast Track Project, organised through our own network.

As a result, this review provides a high level analysis of contracting, design and traffic specific issues that have been experienced with regards to the Project to date, and provides next steps for how progress could be made with the Project in the future. However, we must caveat that there are potentially limitations with our review based on the restricted scope of work for the engagement and the lack of control over stakeholder consultations in Nepal. It might be that we would have received different viewpoints had alternative stakeholders been consulted during the engagement, or alternative documents been available.

Nevertheless, over the course of this engagement we have considered 3 main questions;

- To what extent are the previous feasibility study and traffic/revenue forecasts from 2008 still relevant and usable for the Project today?
- What is the current state of the enabling environment for PPP in Nepal; and to what extent has this been a factor in the failure of recent procurement attempts for the Fast Track Project.
- What are the most suitable options and next steps for taking the Project forward with involvement from the private sector?

We outline below our findings with regards to these questions, and across our review more broadly.

Project Design and Prior Feasibility Study

The 2008 Feasibility Study analysed 5 potential route corridors for the Project, eventually recommending Alternative 3A. This comprises a greenfield road, from Kathmandu via Budune to Nijgadh, with an upgrade of the existing Nijgadh-Pathlaiya road from 2-lanes to 4-lanes. The route also includes the Hetauda Connector, a new 2-lane link from Budune to Hetauda incorporating in parts, stretches of existing local roads.

This alignment was carried through to the preliminary design in the 2008 Study, but our analyses have found a number of broad issues. These include high costs associated with tall bridges on the alignment (resulting from valleys being deeper and wider than originally thought), limited consideration of short tunnels as an option to reduce tall bridges (and associated costs), and inappropriately deep cuts which would are not feasible in such unstable natural ground. Overall, we feel that insufficient time or consideration was made to alternative alignment options which may have been more cost and technically favourable.

Further design issues include connectivity issues of the road at the Kathmandu end (due to reliance on construction of the Outer Ring Road), lack of consideration of inner safety strips, and insufficient geotechnical investigations during the feasibility study.

With regards to costings within the 2008 Feasibility Study, we have not been able to carry out a cost update given the scope of the study. Regardless, our review has found various inconsistencies and inaccuracies within the 2008 report, in addition to some methodological weaknesses. We have also analysed key technical challenges and risks associated with the project, and found these to be material owing to the high capital cost and complex technical design given the difficult terrain.

Overall, due to the time that has elapsed since the 2008 Feasibility Study was completed, together with the alignment, technical and calculation issues that we have noted in our review, we would recommend that a supplementary feasibility study and preliminary design is now required.

Traffic Studies and Revenue Forecasts

The key underlying traffic and revenue basis for each of the recent PPP procurement attempts for the Fast Track Project has been the relevant sections of the 2008 Feasibility Study. Our analysis of this has exposed severe weaknesses; in terms of report write-up, methodology and assumptions. Technical and calculation errors have also been identified.

In addition, in reviewing and comparing forecasted traffic growth for the period since 2008 to actual growth, our analysis suggest that the 2008 Study has materially overestimated non-Project related traffic growth. This, combined with the concerns identified above and with the basic fact that 6 years have elapsed since the Study was completed, lead us to recommend that a new assessment of traffic studies, and of traffic and revenue modelling should be undertaken.

Assessment of Institutional Capabilities

We have reviewed the capabilities of the Nepalese institutions involved in PPPs in the transport sector from the perspective of three key functions - policy development and enforcement, financial management and project development support. This review has identified a number of material weaknesses in Nepal's institutional capabilities to identify, develop and manage PPP projects including:

- Lack of clear delineation between institutions with regards to responsibilities and process for PPP;
- Limited enforcement of PPP policies, resulting in institutions choosing not to use these procurement options due to perceived complexity and difficulty;
- Limited PPP policy dissemination and understanding between line ministries;
- Limited PPP capabilities, particularly within MoPIT; the contracting authority for the previous PPP procurement attempts for the Fast Track project.
- Limited track record of key PPP institutions including the Investment Board of Nepal;
- Unclear management of contingent liabilities associated with PPP projects by the Ministry of Finance.

In addition, while there have numerous opportunities for Nepal's relevant institutions to advance and develop their capabilities over the last 6 years, limited improvements appear to have taken place. This has led us to question whether there is political high level support for the PPP approach. This, we believe, could be a major impediment to the successful development of the Fast Track Project as a PPP.

Previous PPP Procurement Attempts

At least 3 PPP procurement attempts have been made for the Fast Track Project in recent years. These have invariably preferred the Build Operate Transfer concession model:

- 2008 Procurement Attempt - In 2008 the Government of Nepal initiated a 2 stage procurement process for a Full Toll BOT concession for the project. The procurement attempt was poorly prepared and the BOT model proposed was fairly basic. It included no specific offers of government support via subsidies, risk sharing or traffic guarantees. The procurement attempt failed to progress beyond request for proposal stage. Project specific (excessive market risks) and procurement specific (lack of financial support from Government and unclear risk allocation) causes were largely responsible for this failure.
- 2010 Procurement Attempt - A second brief attempt to procure the project under a Full Toll Bot was attempted in 2010. This failed after several local firms lodged complaints with the Commission for Investigation of Abuse of Authority (CIAA) arguing that tender eligibility requirements were adverse to local firms.
- 2012 Procurement Attempt - In July 2012 the GoN issued a third invitation for expressions of interest in developing the Project under a Full Toll BOT model with up to 15% of the capital costs in subsidies from the GoN. While this included some improvements over prior attempts, including a longer procurement process and offer of 15% capital grant from the Government of Nepal, the proposal failed to adequately manage risks between the public and private sectors, and failed to attract any qualified proposals from the private sector.
- 2014 Unsolicited Annuity BOT Offer - In the period since the 2012 procurement attempt failed, IL&FS have approached GoN expressing interest in developing the Project via an Annuity BOT concession. According to media coverage, this offer has been rejected by the GoN

During the review we have held consultations with one of the shortlisted private sector bidders who chose not to submit during the 2012 procurement attempt, and who subsequently made the unsolicited annuity BOT offer in 2014. This stakeholder suggested that excessive traffic risks were the key issue with the structure of the 2012 concession offered to them; together with unwillingness on the part of the Government of Nepal to explore alternative, risk-sharing concession options.

It is our view that as well as project specific issues, a severe lack of PPP capabilities and expertise within Nepal significantly constrains the ability of the GoN to develop workable PPP solutions to this Project. This is further magnified by an apparent unwillingness on the part of the Government to take the steps required to improve their PPP capabilities, and thus insufficient willingness to make PPP happen within Nepal and even less to implement the Fast Track project in PPP.

Review of Previous Contract Management Approaches

Our review of Nepal's limited but poor prior experience with performance based maintenance contracts within the roads sector serves to caution us further. While many of the issues with the PBMCs may have been due to specific factors; inexperience amongst road contractors in particular, the review also suggests that the procurement process might not be designed in the most effective way and capacity building in relation to executing bids under the Public Procurement Act is required to ensure that bids can be selected according to both quality and price without fear of recrimination by the CIAA. Changes to either the Procurement Act or the Rules and Regulations might be required to improve the effectiveness of the procurement process.

Review of Viable PPP Procurement Options

Having considered both project-specific, and broader environmental considerations with regards to the implementation of the Fast Track Project under PPP, we are doubtful that a successful PPP implementation with substantial risks allocated to the private sector is likely to be feasible in the short term. Nevertheless, we believe that there should be scope to engage the private sector over the lifetime of the Project, and in doing so access private sector capital within the Project's construction and/or operations and access private sector efficiencies in relation to construction, operation or maintenance of the road.

We therefore recommend that the contracting modalities that are most suitable for application to the Project are those which delay the involvement of the private sector in the project until some point in the future when:

- Significant improvements have been made to Nepal's enabling environment for PPP; and
- The Project has been sufficiently de-risked to attract private sector interest.

Such procurement options include:

  - Performance Based Maintenance Contracts;
  - Operations and Maintenance Contracts; either with or without transfer of market risks from the public sector to the private sector, and with or without public sector capital investment for a second phase of development of the Project; and
  - Privatisation options, where a public toll road company is spun off into private ownership once the project has achieved a stable operating level.

Next Steps

In order to practically move forward with the development of the Project, we suggest the following next steps are critical:

1. Commission of a supplementary feasibility study and preliminary design, which will facilitate evaluation of realignment options, whilst also producing updated geotechnical investigations and cost analyses.
2. Commissioning of a new traffic and revenue study incorporating international best practice for traffic and revenue forecasting.
3. Performing a detailed analysis of the PPP environment within Nepal, to appraise, in detail, the posited conclusions made in this review regarding Nepal's institutional capabilities, and to evaluate whether material improvements are currently in progress.
4. Once the above three analyses (which could be done simultaneously) have been completed, and using updated cost and revenue assumptions to build a useful and relevant financial model, to perform an in-depth assessment of PPP procurement option suitability.

1 Introduction

1.1 Introduction

The Fast Track road project (the "Project") is a proposed 100km toll road linking Kathmandu to Pathlaiya in the Terai. The road would form part of Asian Highway 42, running from Kodari on the China border, via Kathmandu, to Birgunj on the Indian border. The Project would significantly reduce the time and cost of transport between the capital and the border; time savings are expected to be up to 4 hours and freight vehicle fuel cost savings of US$20-30 per trip over current routes. The road has clear economic benefits, and the Government of Nepal has made repeated attempts to develop the project over the last 40 years, including through PPP procurement attempts in 2008, 2010 and 2012. However, these attempts have failed, and the Government of Nepal has now requested support from the World Bank in developing the project.

1.2 Scope of work

ICF has been contracted by PPIAF (the "Client") to be a Contracting Strategy Advisor for the Fast Track road project, analysing previous development efforts for the road and providing advice and insights into potential contracting modalities that could be used to develop and operate the Project in the future. The engagement was a Rapid Needs Assessment, carried out in a short space of time, and is necessarily high level as a result.

Specific tasks include:

- Reviewing and analysing prior Fast Track road documentation and studies in order to comment on proposed technical specifications of the Project, key technical challenges and risks for its construction, and its likely capital, operation and maintenance costs.
- To review and comment on previous traffic and revenue forecasts for the Fast Track road.
- To review and comment on Nepal's enabling environment for PPP and on previous PPP procurement attempts for the Project in order to:
  - Identify any ongoing contractual liabilities the Government of Nepal may have as a result of the previous procurement attempts
  - Identify reasons for failure of prior procurement initiatives
- Review Nepal's legal and regulatory framework and prior contracting experience for other road projects.
- Assess potential contractual options for developing the Project going forward, including consideration of options with greater or less private sector involvement and including the option for asset divestiture.

1.3 Delivering the assignment

This assignment has been completed through a combination of site visits, desk reviews, consultation meetings and stakeholder engagement:

- The ICF Consultant, together with a road engineer from sub-consultant MVA Systra undertook a site visit to Kathmandu over the period 7-13 June 2014 to meet with the WB resident mission and a number of government and other

stakeholders. A field visit to the Project site was also made on 10 June 2014. Time constraints limited the visit to the initial stretch of the proposed route corridor along the Bagmati River valley down to the Kulekhani River confluence. The itinerary and meeting participants of this visit are detailed in Annex 1 and selected photographs from the field visit are given in Annex 2.

- Desk reviews and analysis of previous documents relating to the Project and provided by the World Bank were carried out with consideration of contracting strategies, technical specifications and costs, and traffic analysis. The key documents reviewed are listed in Table 1.1 below.

Table 1.1 Schedule of Documents reviewed

Title	Author	Year
Assistance for Reviewing and Facilitating a Public Private Partnership in the Transport Sector in Nepal	Castalia Strategic Advisors	2008
North South Fast Track Project: Final Project Report – Feasibility Studies and Preliminary Design. Volume 1 Study, Volumes 2 and 3 Supplementary Appendices, Volumes 4A and 4B Preliminary Design Drawings	Oriental Consultants Co. Ltd	2008
ADB Mission Engineering Review	Martin J Fox	20110
ADB Mission Traffic Review	Cameron Harvey	2010
Birgunj-Narayanghat Feasibility Study	MMM Group Ltd in JV with SAI Consulting Engineers	2011
Project Pipeline Screening & Initial Feasibility Assessment of Potential Infrastructure PPPs in Nepal	Dachs, Gorkhali & Pande	2012
DoR Traffic Data	Department of Roads	2012
2012 Procurement Documents (EOI and RfP)	MoPPW	2012
Nepal: Fast Track – Stakeholder Workshop Presentation	PPIAF	2014

- Stakeholder consultations were undertaken with a representative from IL&FS Transportation Networks Ltd, one of the companies previously shortlisted during the 2012 PPP procurement attempt, in order to gain an understanding of their experience of the procurement processes.

1.4 Structure of the Report

This report is structured into the following Chapters:

- Chapter 2 presents a technical review of the Project, including analysis of the previous design specifications, and key challenges and risks presented by this design. Chapter 2 also includes a review and discussion of capital, operation and maintenance cost estimates for the Project from previous studies.
- Chapter 3 reviews previous traffic and revenue data relevant to the Project. This includes consideration of the approach and methodology of prior forecasts, and analysis of supporting and subsequent traffic flow data.
- Chapter 4 provides an assessment of Nepal's institutional capabilities, and enabling environment for PPP. This seeks to identify and analyse any

weaknesses which may limit the potential procurement of the Fast Track road via a PPP contracting approach.

- The Government of Nepal have attempted to initiate the development of the Fast Track road under PPP contracts 3 times; in 2008, 2010 and 2012. Chapter 5 reviews these procurement attempts in order to inform and design future procurement options.
- Chapter 6 reviews current and previous contracting approaches used within Nepal's road sector.
- Chapter 7 identifies and discusses the broad range of possible PPP contracting approaches that could theoretically be applied to the Project.
- Chapter 8 provides an analysis of the possible contracting options for the Project, identifying a shortlist of those most likely to be suitable for the Project based on prior local and international experience.
- Chapter 9 summarises the findings and conclusions of our Study and recommends next steps for the development of the Project.

2 Technical review

The proposed Fast Track road is a high quality expressway, running north-south from Kathmandu to Pathlaiya in the Terai. When constructed, the road would form part of AH42 of the Asian Highway network. A map of the Project area is given in Annex 3.

This chapter presents a technical review of the Fast Track Feasibility Study and Preliminary Design of May 2008 prepared under Asian Development Bank (ADB) TA 4842-NEP (the "2008 Study"). This review is intended to identify potential challenges, issues or weaknesses with the previous design, with the aim of ascertaining next steps towards taking the Fast Track project (the "Project") forward.

This chapter begins by analysing aspects associated with the planning, engineering and cost of the Project. For each of these we review both the methodology and output of the 2008 Study. Thereafter we review technical challenges and risks associated with the project. Finally, we suggest our recommendations and timelines for next steps, including an option to develop the Project in two stages.

2.1 Planning Aspects

2.1.1 Route Alignment

2.1.1.1 Overview of Route Alignment

The 2008 Study analysed 5 potential route corridors for the Project, eventually recommending Alternative 3A. This comprises a greenfield road from Kathmandu via Budune to Nijgadh, with an upgrade of the existing Nijgadh-Pathlaiya road from 2-lanes to 4-lanes. The route also includes the Hetauda Connector, a new 2-lane link from Budune to Hetauda incorporating in parts, stretches of existing local roads. The route map of the recommended alignment is given in Annex 4.

Alternative 3A is attractive as it serves the proposed new Southern International Airport (SIA) at Nijgadh in addition to the traffic from Birgunj (Nepal/India border). Alternative 3A was carried through to the preliminary design in the 2008 Study.

The Project starts on the future Kathmandu Outer Ring Road where an interchange is proposed. The route follows the Bagmati valley corridor for the initial part, passes through a proposed 1.35km long tunnel at Km 29.9 to enter the Simat/Bakaiya valley corridor. This stretch has two proposed future interchanges, at Kulekhani valley (Km 16) and Kitni/Malta (Km 22), although no location/layout drawings of these were seen in the 2008 preliminary design documents received. It continues south after the tunnel, to Budune where an interchange is provided at Km 47.7 for the link to Hetauda. After the Budune interchange, the route continues south to Shripur where an interchange is proposed at Km 55.5, and then further south to Nijgadh, Km 75.9, where an interchange is proposed with the East West Highway (EWH).

2.1.1.2 Comments on Alignment Methodology

There are a number of broad issues with the 2008 preliminary design alignment that now warrant further study. Although some of these were highlighted in the 2008 Study (as noted below), we have identified additional areas for improvement. It is essential for the alignment to be fixed at the preliminary design stage. This is particularly the case in mountainous terrain where minor shifts in the alignment would have technical and cost implications.

- Time constraints impacted the preliminary design alignment resulting in the alignment design process starting before the topo survey was complete. The

topo survey band, which was based on feasibility study stage work and limited in width, allowed only minor improvements to the horizontal alignment in the preliminary design stage (refer 2008 Study Volume 2, Supplementary Appendix 2, paras 322, 323).

- There are high costs associated with the tall bridges which resulted from the valleys being deeper and wider than originally thought (refer 2008 Study Volume 2, Supplementary Appendix 2, para 323). There are 7 tall bridges between Km 29 and Km 45, along which stretch there is also the 1.35km long tunnel. The limited width of the topo survey would not have permitted the investigation of alignment changes to minimize bridge heights.
- There may be potential to eliminate some of the tall bridges by the use of a deeper and longer tunnel. This could also reduce the overall length of the road (refer 2008 Study Volume 2, Supplementary Appendix 2, paras 324, 325, 326).
- Realignment may be required at Km 65 in view of a hydro scheme that had been approved for construction on the Bakaiya River (refer 2008 Study Volume 2, Supplementary Appendix 2, para 327).
- The alignment requires deep cuts, some up to 50-60m at the road centreline. Such deep cuts would lead to slopes greater than 100m in depth where the road traverses sloping valley sides (side-long ground). These are generally not feasible in such unstable natural ground prone to landslides. Even with costly slope protection measures, there would be a risk of injury to road users and lane closure due to debris from slope failures, particularly in heavy rains. The proposed route alignment should therefore be reconsidered to avoid such deep cuts.
- The direct distance from the start point of the road on the Outer Ring Road in Kathmandu to the end point on EWH at Nijgadh is approximately 54km as the crow flies. The total road length of the preliminary design is 75.6km, adjusted for 0.3km chainage equalities used in the drawings. The preliminary design plans show a number of kinks and semi-loops, dictated by the terrain, in some stretches of the alignment. It would be useful to investigate the adoption of further tunnels to achieve a more direct route in such stretches. The increased tunnelling costs would be partly offset by the reduced length of road. Further, this has the benefit of eliminating altogether some of the cut slopes.

2.1.1.3 *Options for Alignment Improvement*

Our review suggests that route realignments should be investigated in order to eliminate/minimize deep cuts and tall bridges along the route. Realignments may incorporate, but would not be limited to, the following options:

- More tunnels, especially short ones that do not require mechanical ventilation.
- Deeper and longer tunnels to minimize/eliminate tall bridges.
- Viaducts along the river bed where the valley is not tortuous and of adequate width.
- Where the road traverses side-long ground, minimizing cut construction by more use of retained fill construction.

Realignments would have a significant impact on the overall cost of the Project; the length of the road could be reduced with an alignment incorporating more tunnels, increased length of tunnelling would significantly increase the cost, and reduced bridge heights would also significantly reduce the overall costs. Realignments could also reduce the total number of bridges and drainage structures. Viaducts along the valley bottom are technically attractive, but will have a significant cost premium,

although this would be partly offset by the elimination of retained fill and cut construction. Where the road traverses side-long ground, larger retaining structures would be required to reduce cut construction.

Good topographical information is necessary to study realignments. An Aerial LiDAR survey with ground controls would provide topographic information over a broad width for the study of major realignments of selected stretches. Aerial LiDAR technology is versatile in terms of survey band width and meeting the required accuracies. Outputs are orthophotos and a digital terrain model (DTM) for realignment study and preliminary design purposes.

2.1.1.4 *Alignment Geometry*

There are also aspects of the alignment geometry that require review and improvement for a high class road.

- The preliminary design horizontal alignment has a number of small directional changes with short curve lengths. There is no apparent reason to do so for a greenfield road. Horizontal curve lengths should be long to allow phasing of horizontal/vertical alignments to provide a safer driving environment. Transition spirals should have been used with the horizontal curves.
- The preliminary design vertical alignment has some safety concerns such as the use of crest curves leading to horizontal bends. There is no apparent reason to do so for a greenfield road.

The maximum grade used in the preliminary design is 4%, which possibly takes into consideration the high proportion of truck traffic on the Fast Track. This is appropriate as long up-grades greater than 4% would cause excessive speed reduction in loaded standard powered trucks.

2.1.2 Design Standards

The Intergovernmental Agreement on the Asian Highway Network, adopted in November 2003, gives the design standards for the Asian Highway (AH) network in Annex II of the Agreement. A summary table of the AH design standards, abstracted from the above document, is given in Annex 5 herein.

The standards adopted in the 2008 preliminary design are AH Class I with design speeds of 50 kph for mountainous/steep terrain and 80kph for rolling terrain. This is lower than the Nepal Road Standard Class 1 road requirements of 80/100kph for mountainous/rolling terrain. However, the Nepal Road Standard permits a reduction to 75% of these values (i.e. to 60/75kph) in very difficult terrain. The 2008 preliminary design alignment complies with the foregoing and other criteria stipulated in the AH design standards. In line with good design practice, the preliminary design alignment has avoided using the absolute minimum criteria. Thus, the alignment also meets the Nepal Road Standard Class I requirements, albeit with permitted reduction in some stretches.

As the Fast Track will be an access-controlled highway, consideration could be given to adopting the AH Primary classification where the design speeds are 80/100 for mountainous/rolling terrain.

2.1.3 Lane Configuration

The 2008 Study and preliminary design looked at two scenarios, 2-lane with future upgrading to 4-lane and 4-lane at the outset. Given the considerable delay to the year of opening of 2014 assumed in the feasibility study, it is considered that a 4-

lane road would be required at the outset. This will need to be substantiated by a new traffic study, as discussed in Chapter 3.

2.1.4 Typical Road Cross-section

The typical road cross-section proposed in the 2008 Study does not incorporate inner safety strips with the median separated 4-lane roadway, presumably because this aspect is not covered in the AH design standards or the Nepal Road Standard.

We consider the inner safety strips are necessary. These may be provided with reference to an appropriate international standard (E.g.: AASHTO recommends paved inner safety strips of 1.2m width). Inner safety strips will add to the cost of the Project due to the increased road formation and paved width.

2.1.5 Connectivity at the Kathmandu End

As the Kathmandu Outer Ring Road may not be implemented in the short/medium term, it will be necessary to provide a connection to the Kathmandu Inner Ring Road – at least for an interim period. Provision needs to be made as this aspect was not addressed in the 2008 preliminary design.

The length of road required to connect to the Kathmandu Inner Ring Road is approximately 3.5km. We believe that at least a dual 3-lane road with 2 service lanes will be required. The lane configuration will have to be confirmed by a new traffic study.

2.1.6 Interchanges

Interchanges are proposed at (a) Km 0, on the proposed Kathmandu Outer Ring Road, (b) at Budune, Km 47.7 for the Hetauda Connector, (c) at Shripur, Km 55.5 and (d) at Km 75.9, on the EWH at Nijgadh. Layout plans of these have been included in the preliminary design drawings. These are standard “Trumpet” and “Diamond” type interchanges widely used on expressway projects. However, the following issues need to be addressed:

- Neither the AH Standard nor the Nepal Road Standard cover interchanges. The 2008 preliminary design report does not state the reference standard adopted for the proposed interchanges. Aspects such as acceleration/deceleration lengths and weaving lengths have not been properly addressed. An internationally accepted standard such as those set by the American Association of State Highway Transportation Officials (AASHTO) should be considered for planning and designing the interchanges.
- The interchange at Km 0 should be modified to accommodate the through-road from the Fast Track to the Kathmandu Inner Ring Road, which link will be in place before the Outer Ring Road is likely to be implemented.
- The lane configuration of the interchange at Budune will need to be reviewed if the Hetauda Connector were to be 4-lane subject to a new traffic study, or if a staged construction approach is adopted where Stage 1 will require a 4-lane Hetauda Connector (see below under Staged Construction).
- The lane configuration of both the Shripur Interchange and the Nijgadh Interchange should be reviewed based on a new traffic study.

Future interchanges were also proposed at Kulekhani valley (Km 16) and Kitni/Malta (Km 22), although no layouts or concept plans were included in the preliminary design drawings. It is necessary to plan these interchanges and produce layouts to establish the preliminary concepts with due consideration to the projected traffic and mainline geometry, and confirm suitability to the terrain and available space. The

necessary extent of land should be defined and acquired, along with the rest of the land acquisition for the road.

2.1.7 Right-of-Way

The proposed right-of-way (RoW) in the 2008 Study (4-lane road) is generally 50m which includes the allowance for boundary fencing. In cut areas, RoW is increased to accommodate the slopes. The 50m RoW is adequate for fill construction with retaining structures in side-long ground. It is also consistent with the Nepal Road Standard of July 2013.

From discussions with the DoR, it is understood that between Kathmandu and Nijgadh the RoW of the 2008 preliminary design alignment is mainly on GoN land – totalling some 60km of the 75.6km overall length. The balance length would be on privately owned land where formal acquisition of the RoW will be required.

2.1.8 Access

The Nepal Army has opened up an access track to the Project site. This will facilitate access to the construction contract packages and reduce mobilization and site establishment times. However, the access track is blocked in places due to landslides which would need to be cleared and cut slopes stabilized.

2.1.9 Contract Packages

The 2008 Study and preliminary design report proposed 10 civil works contract packages for the implementation of the mainline under engineering, procurement and construction contracts (EPC), procured through International Competitive Bidding (ICB). In this review report, the term EPC is used for conventional project implementation with detailed design and documentation by a consultant and construction by contractors.

The number of ICB contract packages for the 75.6km main line is excessive, and the small size of packages is likely to deter large international contractors from bidding. We suggest that the number of contract packages for the main line civil works should be reduced to 3 or 4 depending on the type/complexity and quantum of work, and access issues.

2.2 Engineering Aspects

2.2.1 Pavement

The 2010 ADB engineering review report noted inconsistencies in the 2008 Study's pavement design and that the design may be inadequate depending on the passenger car unit (PCU) factors adopted. We also note that the design reference used, TRL Road Note 31, is applicable for design of pavements less than 30 million cumulative Equivalent Standard Axle Load (ESAL) during the design life, which potentially raises the question of suitability of the design method for this road.

As there is a major delay to the Project, it is necessary to review and update the pavement design for a design period commencing from the revised year of opening. In addition, we recommend that it would be good practice to perform alternative pavement designs based on other design standards for cross-check purposes. AASHTO is another widely used standard for pavement design. In the supplementary study/design recommended further on in this Chapter, pavement design to AASHTO could also be considered.

2.2.2 Bridges

The total number and length of bridges on the 75.6km long mainline (are summarized in Table 2.1.

Table 2.1 Summary of Mainline Bridges

Mainline Bridges	No. of Bridges	Total Length (m)
Tall/Long bridges	7	1,837
Major bridges (>50m)	44	5,335
Minor bridges	17	447
Total	68	7,619

The total bridge length of 7.6km is 10% of the road length. There could be possibilities of overall reduction in bridge length through realignments. This would contribute to cost reductions for the Project.

2.2.3 Geotechnical Investigations

The geotechnical investigation for the 2008 preliminary design comprised boreholes and electric resistivity covering only eleven bridge sites, and limited investigation of the tunnel site (one borehole at the eastern portal, electric resistivity, and geo-radar). The 2010 ADB engineering review report noted that altogether only 3 boreholes were done for the bridges covering 3 of the 7 tall bridges.

Considerably more investigation is required, especially for the tunnel as well as for bridges, for a preliminary design. Although there are very deep cuts, there is no mention of any geotechnical investigation of these locations. The stability the ground slopes were hazard-rated based on available maps and field inspections.

2.3 Cost Aspects

2.3.1 Discussion of Costing Methodology in 2008 Study

The 2008 cost estimate for the Project has four main civil works components; structures, earthworks, pavement, and tunnel. Variations in the quantities of these components and weaknesses in the rates will have major impacts on overall cost of the Project, and we found significant weaknesses in the 2008 Study's cost calculations. These weaknesses, together with their impacts on the overall 2008 cost estimate are summarized in Table 2.2. The potential cost impacts of realignments are also noted.

Table 2.2 Discussion of Key Project Cost Components

Component and % share of base cost	Remarks	Potential Impact on 2008 Cost
Structures (55%)	• Insufficient geotechnical information to determine foundation types for tall/long bridges. • Realignments to reduce/eliminate tall/long bridges.	• Not predictable • Decrease
Earthworks (19%)	• Insufficient geotechnical information at deep cuts, may lead to more use of expensive slope protection measures. • Realignments to reduce/eliminate deep cuts. • Increase in retained fill construction associated with reduction in cut.	• Increase • Decrease • Increase
Pavement	• Possibly under-designed, may require more layer	• Increase

(7%)	thickness. • Insufficient levelling layer thickness in rock cut. • Pavement for inner safety strips	• Increase • Increase
Tunnel (6%)	• Insufficient geotechnical information for preliminary design. • Realignments may have more tunnelling. • Reduction in road length for realignments with more tunnelling.	• Not predictable • Increase • Decrease

The scale of such cost impacts cannot be assessed with the present level of information available. As such, a construction cost update is not possible under the present review.

Below, we also comment on several other components of methodology and calculation within the 2008 Study:

- **Overall Approach to Capital Costs**

Cost estimates in the 2008 Study were based on rates from several methods:

- Derived unit rates based on MoPIT Norms for Rate Analysis and District rates for labour and materials.
- Costs from similar works in Nepal.
- Costs in other countries for those items that are new to Nepal, notably from India, People's Republic of China and Japan.
- Consultant's cost database and experience.

This appears to be a reasonable approach for establishing rates towards estimating costs based on preliminary design. However, the specific unit rates adopted are not supported, making it difficult to understand how they were derived or chosen.

The broad methodologies for estimating quantities pertaining to civil works are stated as being based on cross-sections and drawings. This is standard practice. However, there are weaknesses in some of the methodologies used for individual items. Earthwork estimates were based on manual techniques using plotted cross-sections at 50m intervals which may be too far apart for mountainous terrain. Although the road alignment drawings are computer drawn, no mention is made of the use of highway design software. Whilst manual methods are acceptable, computer-generated earthworks quantity estimates are more accurate and lend versatility to efficiently optimise the alignment design. The slope stabilization quantities were estimated from the drawings for typical road sections, but no mention is made of the methodology for slope surface area estimates which would typically be computer-generated.

In addition, while quantities for various items of civil works were given, these are not supported by calculations.

- **Approach for estimate of Foreign Capital Cost Components**

The 2008 Study estimates the foreign and local components of each of the cost items on the following basis:

- Imported manufactured items (e.g. cement, high tensile reinforcement steel and bitumen), imported construction machinery, and imported spare parts contribute towards the foreign component of construction costs.
- Local materials and local labour are used where possible.
- Diesel, petrol, oil etc. are included in the local component as they would be purchased locally.

The above is an acceptable approach to estimate the foreign and local cost components. As road construction is machine-intensive and the works include complex structures (tall bridges and tunnel), the quoted overall foreign component of 47% seems reasonable although no back-up calculations for this figure are presented.

- **Data and Calculation Inconsistencies**

In Appendix 10 (Volume 1 Main Report) two cost tables (for 2-lane and 4-lane road options) were presented giving the foreign and local cost components in both Nepali Rupee (NRS) and US Dollars (USD). However, the percentage foreign components for **two tables are inconsistent and do not reconcile**. There are additional inconsistencies and errors within the calculations; foreign and local component subtotals do not sum correctly and the percentage of foreign components do not match the amounts given.

The report includes further sources of confusion/error in relation to foreign exchange rates. For example, the total 4-lane Project cost of NRS 67,478 million is converted to a figure of USD 922 million (refer Table 2 in Volume 1 Main Report and the table in Appendix 10), but this conversion does not use the stated 2008 USD/NRS exchange rate of 63.25, and no explanation is given as to how this conversion to USD was made.

- **Projection to 2014 Costs**

It would appear that the cost estimate of NRS 67,478 million in 2008 prices has been projected to a 2014 year of opening cost of USD 922 million, possibly taking into consideration some or all of - (a) a projected disbursement pattern for the period 2008 to 2014 based on construction schedules, (b) a projected USD/NRS exchange rate variation from 2008 to 2014, (c) projected escalation figures for the years 2008 to 2014, and (c) the percentage foreign components for the civil works items. Thus the figure of USD 922 million for the 4-lane road would likely be the projected 2014 constructed cost

As we are now in 2014, it is possible to project the 2008 cost estimate of NRS 67,478 million to a 2014 USD figure based on the following parameters:

  - USD/NRS exchange rate of 63.25 in 2008 as noted in the 2008 preliminary design report.
  - USD/NRS exchange rate of 95.62 in mid-June 2014 as published by Nepal Rastra Bank (mid-rate).
  - Escalation of foreign portion of civil works at 0.8% per year based on the change in Manufactures Unit Value (MUV) Index for the period 2008 to 2014 (as published by the World Bank).
  - Escalation of local portion of civil works at 6.5% per year based on the Wholesale Price Index (WPI) for construction materials for the period 2008 to 2014 (as published by the Nepal Rastra Bank).
  - Escalation of foreign portion of services of 2.0% per year based on Euro area inflation for the period 2008 to 2014 (web source).
  - Escalation of local portion of services of 9.8% per year based on Consumer Price Index (CPI) for the period 2008 to 2014 (as published by the Nepal Rastra Bank)
  - The percentage foreign components for the items as given in the 2008 preliminary design cost estimate.

The above exercise gives a figure of USD 959 million for the 4-lane road. This is simply a conversion of the figure of NRS 67,478 million in 2008 prices to a 2014 figure of USD 959 million, and not an updated construction cost estimate.

The 2008 cost estimate in 2014 terms, as noted above, is an increase of just 3% over the original projected estimate. This minor change masks a 51% depreciation in the Nepali Rupee between 2008 and 2014, which almost entirely offsets the significant local cost inflation of 46% that has occurred during the period.

- **Operation and Maintenance Cost**

Operation and maintenance costs have been prepared for standard DoR categories adopted in Nepal (a) routine and recurrent maintenance, (b) periodic maintenance, and (c) emergency maintenance, and are discussed in the 2008 Study under both the cost estimates (Volume 2, Supplementary Appendix 3) and financial evaluation (Volume 3, Supplementary Appendix 8) sections.

We have identified several issues with these and other operation/maintenance cost estimates:

- There are discrepancies in the figures presented in the two documents, but no details or explanations are given.
- The 2010 ADB review report noted that no provision was made for high bridges which require special maintenance equipment to access the underside of the bridge from the bridge deck.
- Tunnel operation and maintenance costs take into account ventilation and lighting provisions, but, no provision was made for an emergency truck, maintenance vehicle with a platform for replacing lights, and a washer truck for cleaning walls etc.

As a result, we suggest that all of the operation and maintenance cost estimates require detailed review.

2.3.2 Discussion of Project Costs

The 2008 Study presents foreign and local cost components for the Project in both Nepali Rupee and US Dollars, with civil works costs additionally broken down into 8 areas; earthworks, pavement, structures, tunnels, slope stabilization, roadside facilities, miscellaneous and overheads (Volume 1 Main Report, Appendix 10). The 2008 Study also outlines the basis for the cost estimate and also gives a breakdown of the civil works into items with quantities and rates (Volume 2, Supplementary Appendix 3). Both give the base cost, (i.e. excluding contingencies) of the 4-lane road as NRS 57,091 million in 2008 prices. Including physical and price contingencies, the amount is NRS 67,478 as given in the Volume 1 Main Report, Appendix 10.

While an updated estimation of project costs is not possible under the scope of this study, we have analysed the components of the Project's costs through comparison with international examples:

- **Tunnel Costs**

The 2008 cost estimate for the proposed 1.35km twin-bore 4-lane tunnel equates to USD 42 million per km when escalated to 2014 prices (as per method described above). In Table 2.3 below, we compare this cost estimate to those of recent tunnel projects in the region (although these are for much longer tunnels). As this shows, the 2008 cost estimates is low compared to the Indian tunnel costs, but high compared to Chinese costs. Differences in tunnelling material and the tunnel technical specification may have contributed to the very large cost difference between these Indian and Chinese tunnels. Overall, this comparison suggests that

while project specifics are extremely important, the Fast Track tunnel cost estimates appear to be of an appropriate order of magnitude, although the Chinese tunnel costs are possibly at 2012/2007 prices.

Table 2.3 Comparator Tunnel Costs

Tunnel Description	Completion	Total Cost	Comparable Cost per km[1]
Fast Track road, Nepal (2008 Study)			USD42m per km
Rohtang Tunnel, Himachal Pradesh, India. On Leh-Manali Highway. 8.8km. Single tube, 2 lanes. 80kph. 10m width. 2.25m high x 3.6m wide emergency tunnel beneath main carriageway. Under construction, blasting and digging.	Projected Completion 2016	USD 290m	USD 66m
Chenani-Nashri Road Tunnel. Jammu & Kashmir, India. 9.2km. Single tube, 2 lanes. Smaller parallel escape tunnel. Under construction, blasting and digging. Includes 2km of approach roads.	Projected Completion 2016	USD 466m including 2km approach roads.	USD 83m (including roads)
Shakhriston Tunnel, Tadjikistan. 3.3km. Twin-tubes, 4 lanes. (Chinese Contractor).	Opened 2012	USD 90m	USD 27m
Zhongnanshan Tunnel, China. 18.0km. Twin tubes. 4 lanes. 80kph. Blasting and digging.	Opened 2007	USD 410m	USD 23m

1. *Rohtang Tunnel and Chenani-Nashri Tunnel are single tube. Comparable costs per km viz the Fast Track, Shakriston and Zhongnanshan tunnels are therefore twice the single tube estimate.*

Source: 2008 Study, Internet

Bridge Costs

An overall review of the 2008 bridge costs escalated to 2014 prices is shown in Table 2.4. This shows that while the 2008 Study's estimates for RC and PC girder bridges are comparable to the Department of Roads (DoR) broad planning estimate of USD15,000 per metre for 2 lane bridges (or USD30,000 for 2 x 2 lane), the proposed costs for PC box girder bridges are significantly higher. This may possibly be due to high substructure costs.

Table 2.4 Summary of bridge costs per metre

Bridge Type	Estimate Source	Cost per metre
DoR 2x2-lane bridge	DoR	USD30,000
RC Bridge	2008 Study	USD 23,000
PC Girder Bridge	2008 Study	USD 35,000
PC Box Girder Bridge (tall bridges)	2008 Study	USD 79,000
PC Box Girder Bridge (regular bridges)	2008 Study	USD 54,000

Source: 2008 Study and Department of Roads

Contingency Costs

Physical contingency provision of 5% is inadequate for a cost estimate based on a preliminary design. It would be more common to adopt a figure in the range of 10-15%.

- **Operation and Maintenance Cost**

Table 2.5 presents a summary of the various Operations and Maintenance (O&M) cost estimates within the 2008 Study, together with our comments on their appropriateness. As this shows, while proposed costs are adequate in some areas (e.g. routine maintenance), there are areas of shortfall, where we believe additional cost provisions should be made.

Table 2.5 Summary & Discussion of Project O&M Costs

Operation/ Maintenance	2008 Study Proposal for 4-lane (2008 prices)	Remarks
Routine & Recurrent Maintenance of Road (ref Volume 2, Supplementary Appendix 3)	NRS 0.41 million/km/year in 2014 NRS 0.65 million/km/year in 2024	Comparable to Indian costs for high standard of maintenance.
Emergency Maintenance of Road (ref Volume 2, Supplementary Appendix 3)	NRS 0.20 million/km/year	Reasonable allowance (if no issues with cut slopes).
Periodic Maintenance of Road	NRS 8 million/km in 2024 and 15-year cycle (as per Supplementary Appendix 3)	NRS 8 million/km is reasonable, but the cycle would typically be 7-10 years.
	NRS 140 million in 2021 and NRS 201 million in 2028. (as per Volume 3, Appendix 8, Table 8.7)	If for the entire road, these are grossly inadequate for a typical overlay. The 7-year cycle is ok.
Toll Plazas O&M	Equipment replacement cost of NRS 480 million in 2024 (Discussed in Supplementary Appendix 8 but no details of O&M costs, given as NRS 68.3 million per year in Supplementary Appendix 3)	No details presented
Tunnel O&M	Costs NRS 107.7 million (2014), 184.3 million (2024), 261.1 million (2034)	The methodology takes into consideration electricity consumption of ventilation and lighting, and staffing costs. Does not include vehicle requirements.
Tall/Long Bridge Maintenance	Not specifically mentioned.	Requires special maintenance equipment to access underside of superstructure from the deck.

Source: 2008 Study and Consultant comments

2.4 Challenges and Risks

Major technical challenges from an overall Project perspective, technical/cost risks and suggested mitigation measures are presented in Table 2.6 below.

Table 2.6 Summary of Key Technical Challenges and Risks for the Project

Challenge	Risks	Mitigation
Connectivity at Kathmandu end	■ Lack of connectivity due to uncertainties with Kathmandu Outer Ring Road.	■ Provide connectivity to existing Inner Ring Road.
Fast Track traffic using Hetauda Connector to avoid Nijgadh toll.	■ Loss of revenue. ■ Reduced pavement life of Hetauda Connector.	■ Appropriate overall planning.
Planning and Design of Interchanges.	■ Land issues with future implementation if not properly planned. ■ Compromised road safety if poorly designed.	■ Planning/design of the interchanges in the preliminary design stage based on appropriate international standards (interchanges are not covered in Nepal Standards).
Deep Cuts	■ Cost over-runs and delays due to increased hard rock excavation quantity, ■ Costly slope stabilization measures. ■ Injury to road users and lane closures due to falling debris from cut slopes. ■ Excessive maintenance of cut slopes.	■ Investigation of realignments to minimize/eliminate deep cuts, including the use of short tunnels. ■ Provision of adequate cut slope protection measures based on geotechnical evaluations.
Tunnel	■ High cost over-runs and delays during the construction stage. ■ Safety during construction.	■ Preliminary and detailed design based on adequate geotechnical field investigations. ■ Good scheduling of tunnel construction in overall project planning. ■ Use of capable and experienced contractors for construction.
Tall/Long Bridges	■ High cost. ■ Safety during construction.	■ Investigation of realignments to minimize/eliminate tall/long bridges. ■ Use of capable and experienced contractors for construction.
Pavement	■ High cost. ■ Reduced service life due to overloaded trucks.	■ Pavement design with appropriate in-built safety, but without overly catering to current practice of excessive overloading. ■ Use of Weigh-in-Motion (WIM) equipment and weighbridges to monitor overloading. ■ Strengthening of legislation and regulatory provisions as necessary and education/empowerment/enforcement.
Timely acquisition of	■ Overall Project delay and cost over-run	■ GoN to acquire the RoW prior to award of civil works construction contracts. Can be

Challenge	Risks	Mitigation
RoW		scheduled to run parallel with procurement processes.

For a major project such as this, there could be challenges posed by construction management and supply chain requirements. These aspects were not covered in the 2008 Study although it contained a contract packaging proposal. It would be useful to make a brief assessment of the local construction sector covering areas such as contractor capacity, quarrying capacity etc. in the context of the Fast Track road, under the supplementary study/design recommended later in this review. That would enable better decision making with respect to appropriate contract packaging and international/local procurement.

2.5 Staged Construction

The capital cost of the Project is high. We therefore suggest that there could be significant advantages in undertaking a staged construction approach to the Project. A potential two-stage construction option is as follows:

- **Stage 1:** New 4-lane construction Kathmandu-Budune-Hetauda, and upgrading Hetauda-Pathlaiya to 4-lane from the present 2-lane.
- **Stage 2:** New 4-lane construction Budune-Nijgadh, and upgrading Nijgadh-Pathlaiya to 4-lane from the present 2-lane. This could be implemented in line with the opening of the Second International Airport (SIA) at Nijgadh.

Stage 1 is essentially Alternative 3B of the 2008 Study.

Staged construction would allow GoN with the opportunity to further review subsequent stages of construction taking into consideration the prevailing conditions experienced under the first stage, and may also be more suitable for the Project from a contracting standpoint.

In addition to the proposed SIA at Nijgadh, there are a further two proposed international airports at Lumbini and Pokhara. All three are classified as National Pride projects. Parallel implementation of all three airports is unlikely. Staged construction of Fast Track as above will be particularly attractive where the implementation of Nijgadh airport would be in the long-term.

A separate study in 2011 under the WB assisted Road Sector Development Project (RSDP) looked at the feasibility of upgrading the existing Birgunj-Narayanghat road which goes through Parwanipur, Pathlaiya and Hetauda. The study found that upgrading the entire stretch Parwanipur-Pathlaiya-Hetauda-Narayanghat to 4-lane was necessary and economically viable. The 4-laning of Hetauda-Pathlaiya section, which could be considered a stand-alone project, would complement the Stage 1 of Fast Track.

Finally, the May 2010 ADB engineering review report recommended that the 2008 feasibility alignments 2B, 3A, and 3B be re-examined. Alignment 2B is a route to Hetauda (and further to Pathlaiya) via the Kulekhani valley, and is not favourable for a future direct link between the Fast Track and the proposed SIA at Nijgadh. Alignment 3B is the Bagmati Valley route to Budune-Hetauda-Pathlaiya. The supplementary feasibility study and preliminary engineering recommended in this review and the staged construction approach discussed here effectively address “re-visiting” 3A and 3B.

2.6 Overall Project Timeline

An overall Project timeline based on conventional EPC approach is given in Annex 7. The timeline takes into consideration the expected durations for project preparation, procurement of services and works. A 5-year construction period is considered. Assuming that procurement of services for the supplementary feasibility study and preliminary design that is recommended further on in this review would commence in January 2015, a reasonable target for Project completion and opening to traffic would be the 4th quarter of 2023.

The timeline for Stage 1 of the staged construction approach discussed above will be similar to the above because the overall timeline will be driven by the most complex stretch of the road, Kathmandu-Budune, which is also part of Stage 1.

The overall timeline for Project implementation through PPP methods may differ, but not greatly, as preparation, procurement and construction are still integral activities of the process.

2.7 Recommendations

2.7.1 Supplementary Feasibility Study and Preliminary Design

To take forward the Fast Track project, we conclude that a supplementary feasibility study and preliminary design will be required.

The scope of such a study/design shall be drawn up to address the Project requirements, also covering the following:

- A supplementary topographical survey.
- A supplementary geotechnical investigation.
- Address the planning, engineering, cost and other issues highlighted herein.
- Traffic and revenue study as recommended in the traffic/revenue review.
- Consideration as appropriate of the findings of the May 2010 ADB review.
- Consideration as appropriate of the areas for further investigation as noted in the May 2008 Study and preliminary engineering report.

This supplementary study/design will effectively cover both Alignment 3A and Alignment 3B of the 2008 Study.

2.7.2 Timeline for the Supplementary Study/Design

An indicative timeline for the supplementary feasibility study and construction under EPC contract is given in Annex 7. We note that the fieldwork needs to have sufficient time allocated and be appropriately sequenced so that the supplementary study/design work is not compromised - as occurred in the 2008 Study.

3 Traffic and revenue forecast

3.1 Introduction

The Fast Track road was defined by the 2008 Feasibility Study; which, as described in Section 2, reviewed a series of possible route alignments before recommending Alternative 3A. The route comprises a new 4 lane road from Kathmandu via Budune to Nijgadh, together with a new 2 lane spur road from Budune to Hetauda and an upgrade of the existing Nijgadh-Pathlaiya road from 2 lanes to 4 lanes.

The 2008 Study included a traffic and revenue review and forecast for the proposed alignment. In the period since 2008, there have also been several other discussions and collections of traffic data, as reviewed in the following documents:

- Assistance for Reviewing and Facilitating a Public Private Partnership in the Transport Sector in Nepal by Castalia Strategic Advisors (2008)
- ADB Mission Traffic Review by Cameron Harvey (2010)
- Birgunj-Narayanghat Feasibility Study (2011)
- Department of Roads Traffic Data (2012)

We have analysed the traffic and revenue forecasts and analysis from these reports in the context of determining their relevance and import for future development of the Project. This chapter summarises our key findings, and is structured as follows:

- Section 3.2 provides a methodological review of the traffic and revenue forecasts from the 2008 Study, including a discussion on both the methodology and write-up of the data.
- Section 3.3 details our analyses of the full suite of traffic data relevant to the Project and as collected and forecast from the 2008 Study onwards.
- Section 3.4 includes our analyses of road revenue forecasts from the 2008 Study.
- Section 3.5 presents the conclusions of our study, including our recommendations for further work.

3.2 Methodological Review of 2008 Feasibility Study

The Fast Track road Project is extremely significant in terms of cost and complexity, on both an international scale, and even more so within the context of Nepal. This, in combination with its proposed structure as a PPP which ensures that financial viability is critical, mean that the traffic and revenue forecasts used to justify and plan the project are extremely important. In previous PPP attempts, the 2008 Study has been the key source of traffic and revenue forecasts. Our reviews have found significant weaknesses in terms of both the write-up of the review, and of the underlying methodologies of the review's forecasts.

3.2.1 Review of Write-Up of 2008 Traffic & Revenue Forecasts

The 2008 Study indicates that the traffic and revenue review and forecasts in the work broadly followed international practice. However, our review has found that there is an overall lack of clarity and lack of detail on basic methodology, findings, and implications within the 2008 Study. This has made it difficult to review the quality of the underlying findings and forecasts, and this leaves us in a position where we are not always able to determine whether it is the quality of the write-up, or the quality of the analysis itself that is lacking.

In particular, we have identified several key areas of concern within the write-up. These are outlined and discussed below.

- There is an overall **lack of explanation of basic underlying information**. Key diagrams including a simple block diagram illustrating the main steps in the analytic procedure would have significantly clarified the methodological approach, and a simple map illustrating the location of the Fast Track, its connection with any feeder links, and illustrating the main traffic flows forecasted to divert into or away from the Fast Track would have improved readers' understanding of assumptions and forecasts. In addition, the report notes that there are other toll roads in Nepal, but does not provide further details regarding these roads, even though discussion of user experiences for these roads would be useful context to inform stakeholders' understanding and confidence in revenue forecasts for the Fast Track.
- There is a **lack of explanation of key assumptions and model inputs**. This information could have been presented as a list to enable project stakeholders to perform subsequent sensitivity analyses. For example, the main driver of traffic growth is assumed to be growth in Nepal's the GDP. However, the model also clearly utilises assumptions regarding cross-border traffic with India, but the details of these assumptions are not given. Similarly any future changes in alternative roads that are in place, not in place, or will come in to being during the model period are not detailed.
- There are areas in the report where a **lack of detail regarding model processes** limit understanding of the quality of model outputs. For example, there is no discussion of assignment parameters for the road such as whether the different vehicle types had separate assignment values, or whether the same values and flows were used for all types.
- While the report notes that a GDP elasticity model was used to forecast traffic data, and that the model was calibrated for existing data, **how the model was calibrated is not explained**. While the write-up indicated some difficulties in developing the parameters for the calibration, this lack of explanation makes it difficult to assess risks and uncertainties associated with the model forecast.
- There is **limited explanation or detail of model outputs**. In particular:
  - There is **no summary description of the usage of the Fast Track** road in terms of "system entries" over the years, including how many vehicle trips categorised by the vehicle toll classes per day use the system, their trip length and "Origin-Destination" pattern, and how these change over time. There is **no description of the proportion of travel which uses the Fast Track** compared with parallel routes at a particular screen line under the model forecasts. For example, this could be traffic leaving Kathmandu, or alternatively a general east west screen-line catching north-south traffic flows across the central mountains. Such a description would also enable discussion of how these traffic flows might vary under different scenarios including policy decisions to alter toll levies, or the provision of other infrastructure.
  - There is **limited description of how the impact of tolls on traffic has been considered**. The report includes detail on the impact of "diversion" traffic, but it is unclear whether this refers to a) additional, un-surveyed traffic from outside the sample area which would divert into the Fast Track due to its superior quality, or b) a reduction in traffic on the Fast Track due to alternative transport routes. The difference between these two alternative readings of the text is significant, and illustrates the overall difficulty that the

report's poor write-up has played in assessing the quality of the underlying data and forecasts.

Across all of these points, **additional detail within the report write-up would have been useful** both for the purposes of this study to analyse the quality of the resulting data and forecasts, and to enable senior decision-makers and their advisors to make informed decisions regarding the financial performance of the project and any policies and associated infrastructure required to enhance the chances of its successful implementation. Given that uncertainties regarding traffic and revenue forecasts for the project have been cited by several stakeholders to the project in the period since 2008 (as discussed in more detail in Section5.3.3), improvements in the write-up of any future studies must be ensured.

3.2.2 Analysis of Underlying Methodology

The lack of clarity in the 2008 traffic and revenue study, as detailed above, make a fair and complete assessment of the underlying methodology difficult. In particular, there may be several areas where we have identified potential shortcomings in the original methodology, but where it is simply a case that the methodology has not been explained appropriately.

Nevertheless, there are a number of areas of concern in our understanding of the original methodology for the 2008 study. These are in relation to both traffic and revenue forecasts, and are explained for each category below.

3.2.2.1 Analysis of Methodology of Traffic Forecasts

The report discussed travel demand on the Project by 8 sources. Demand from four sources was forecast separately, while consideration of the remaining four was also given in the analysis. While this is an appropriate approach, there are **weaknesses in the consideration of several of the traffic segments**, as detailed in Table 3.1.

In addition, we would **recommend additional categories of travel are also considered**. In particular, we believe that forecasts of cross-border traffic should be split into 'normal' cross-border traffic, which can then be forecasted as a function of international trade forecasts, and 'generated' cross-border traffic which is likely to arise due to the new accessibility of Kathmandu from India.

Table 3.1 Summary of Traffic Sources and Forecasting Approaches

Traffic Source	Source/Explanation	Model Approach in 2008 Study	Discussion of Approach
Existing Corridor Traffic ("Normal Traffic")	As estimated from traffic surveys and assumed to grow naturally for development and economic reasons	Elasticity model based on Nepal GDP and calibrated	Appropriate approach given data paucity but model requires additional complexity including more refined travel classes (e.g. major types of freight and passenger transport), appropriate ramp-up of traffic and, potentially, a revisited model structure. Model calibration not explained.
Local Traffic	Non-mechanised transport, farm equipment and other users unlikely to use Fast Track road	General growth factor was applied. The presence on existing roads of this class of vehicles will encourage other vehicles to divert	Appropriate approach.

Traffic Source	Source/Explanation	Model Approach in 2008 Study	Discussion of Approach
		to Fast Track road	
Generated Traffic	New traffic due to existence of road as access is improved and travel costs decrease	Assumed to be based on elasticity model.	Relative importance of this element is unclear. Representation of tolls should be clarified, and additional ramp-up period included
Diverted Traffic	Unclear whether this refers to additional traffic from outside the survey area using the road, or traffic choosing alternative routes.	Unclear	Far more detail required. Relative importance of this element is unclear. Representation of tolls should be clarified, and additional ramp-up period included. Impact of additional construction plans should also be considered.
Induced Traffic	Similar to Generated Traffic, but occurs when the project has caused new activities or new land use development.	Assumes interchanges at Shripur and Malta would encourage light industry and residential development 5 years after road opens.	Assumptions here are unclear; Shripur would be an interchange from the start of the project, but an interchange at Malta was only proposed for future development. The Study may have meant Kulekhani & Malta. Regardless, a more comprehensive assessment of the potential should be included as this could be much more significant in the medium to long term.
Railway	Impact of changes to railway infrastructure during model period. This is included as it could attract traffic away from the road.	Trans Himalayan line assumed to be delayed until after end of model period	There is no traffic from this source, but if Rail is constructed it should reduce the forecast for the Project. The assumptions for rail-associated traffic impacts are therefore important.
Air Traffic	Impact of changes to air traffic during model period.	New International airport at Nijgadh, assumed in place for 2015 causing 850 PCUs/day of 2 way traffic from 2015 onwards	Impact should be estimated on a vehicle basis instead of PCUs due to relevance for tolls and road revenues.
International trade	Impact of changes in international trade on road traffic during model period	Additional 4% per annum growth in cross border traffic in excess of normal growth is forecast for 2008-2014	It would be better to separate cross-border traffic into 'normal growth' and generated traffic and to forecast each separately.

3.2.2.2 *Analysis of Methodology of Revenue Forecast*

Toll road revenues are a function of road traffic (and traffic growth), toll levels, and users' willingness to pay the tolls to use the new asset. While these 3 parameters are certainly interconnected, revenue forecasts for a road must consider all 3 aspects. The 2008 Study's approach to road traffic and traffic forecasts has been

considered above, and below we discuss below considerations with respect to toll levels and users' willingness to pay.

- **Toll Levels**

The setting of toll levels is generally a compromise between optimising revenues for the road operators, and optimising economic benefit for the road users. Focusing on the revenue approach often leads to a high toll scenario, whilst optimising economic benefits often requires maximising usage which is typically a low toll scenario. The 2008 Study suggested that tolls should be set at a level related to users' savings in operating costs. According to the Study, these savings would result primarily from shorter driving distances and therefore lower fuel costs. However, **user saving calculations should also include reduced vehicle operating costs** as a result of the improved driving conditions of less stops and starts, higher speeds, and less rutted and smoother surfaces.

In addition, economic benefit of toll road usage by commercial road users should also consider that the better road conditions would lead to a reduction in accidents and break-downs which, when combined with the reduced travel times, would result in more efficient vehicle scheduling and thus higher asset productivity. Furthermore, commercial road users (such as bus operators or freight companies) may also be able to introduce new, premium service lines to account for the higher speed of travel on the Fast Track road. We therefore suggest that **toll level setting should consider additional economic parameters**, beyond simply fuel savings, especially for commercial users of the road.

- **Willingness to Pay**

Users' willingness to pay tolls is important in determining both the level that tolls should be set at, and in forecasting the extent of generated travel, induced travel and diverted travel for the road. Willingness to Pay is related to both how toll levels compare to direct cost savings for road users, but also to a road user's consideration of the value of their time in relation to the time savings achieved by using the road. **It is unclear whether the value of time was considered** during the 2008 Study as there are no values presented or discussed. If it was not, this is a weakness which should be addressed in any future study.

The 2008 Study includes a discussion of a small survey of car drivers, bus and truck managers about their willingness to pay the proposed tolls. In the case of bus and truck managers, proposed toll levels were seen as acceptable and are arguably low, while car drivers found the tolls too high. However, we would argue that **it would be more appropriate for car passengers to have been surveyed instead of car drivers** for vehicles with professional drivers, as passengers may frequently be the toll payer and main beneficiary of reduced travel times.

- **Trade-off Between Factors**

In forecasting toll revenue, the trade-off between toll levels and user's willingness to pay must be considered. The mechanism for how this trade-off is assumed to occur is also important. Unfortunately, this mechanism is not explicitly stated in the 2008 report. It is our interpretation that this trade-off was managed as the function of calibrated "diversion curves", but **neither the curves nor the calibration method are documented**. Overall, our review suggests that the elasticity of the tolls appears to be in line with other studies. However it may be argued that the unusual length of project and size of tolls begs the question of whether the toll sensitivity should be similar to other projects.

3.3 Review of Traffic Data

As detailed in Section 3.2, the 2008 Study analysed and forecasted 4 separate streams of traffic for the Fast Track road; Normal traffic, Generated traffic, Induced Traffic and Diverted Traffic. Construction of the road was forecast to complete in 2013, and therefore 2014 was expected to be the opening year for the road.

In order to assess the quality of the 2008 traffic forecast, we have completed a number of analyses.

Firstly, as Nepal's GDP forecast was used as the main driver of 'Normal traffic' growth in the study, we have compared the forecasts used with Nepal's actual performance since 2008. This comparison is shown in Table 3.2. As this shows, the forecast and actual GDP close are relatively consistent.

Table 3.2 Comparison of Forecast and Actual GDP Growth

	Average for 2008-2014	2014 onwards
Annual Real GDP Growth Forecast in 2008 Study	4.0%	5.0%
Actual GDP Growth	4.4%	4.7%

Source: 2008 Study and www.indexmundi.com (sourced to IMF 2011 World Economic Review and CIA World Factbook)

Secondly, it is possible to compare forecast traffic growth under the scenario of "no Fast Track road" for the period 2008-2014, with observed data. The most comparable observed data that we have for this period has been taken from the 2012 Department of Roads Traffic Counts Report, from which we have grouped traffic counts at a number of stations in order to compare to traffic station points in the 2008 report. This comparison is shown in Table 3.3.

Table 3.3 Comparison of Observed and Forecast Traffic Growth

Area	Annual Traffic Growth		Comments
	Observed 2008-2012	Model 2008-2014	
Pathlaiya	-0.7%	+11%	Average of Stations 40-42 in 2012 DoR Traffic Study
Hetauda	+4%	+13%	Average of Stations 44-45
Narayanghat-Mugling	+8%	+9%	Average of Stations 48-52
Average	4%	11%	

Source: DoR Traffic Forecast (2010), 2008 Study,

This comparison shows that **predicted annual traffic growth by the model was significantly higher than actual annual traffic growth during a similar period for selected stations**. Our calculations suggest that this increased growth rate may lead to **estimates that are as much as 30% higher as actual by 2015**. In addition, we note that growth in the model is very uniform, as few local factors have been applied and there is little growth variation between locations.

In 2010, a review of the 2008 traffic and revenue data was completed by Cameron Harvey for the ADB. This review found **significant technical errors** within the computer files of the 2008 study. In correcting these errors, the 2010 review found that model forecast trips were reduced by 15%, from 12,500 PCUs to 10,600 PCUs.

This would explain part of the discrepancy found in comparison of the model and actual traffic data described above.

The same traffic review additionally identified a further technical issue for trips which were diverted to the Fast Track road. This issue was whether these trips had to travel further, which should have been discouraged in the model claimed to be used. Harvey argued that this could have caused a further 27% drop in traffic. However, we would argue that the "standard" of the road surface in the pre and post diversion routes is a relevant point, and a short rough road leading to a longer well maintained Fast Track would be preferable for making a journey than an overall shorter route that was entirely undertaken on a rough surface. Regardless, the **technical errors identified in the 2010 Review would reduce the traffic forecasted by between 15% and 42%,** substantially reducing the variation between observed and forecast traffic growth.

3.4 Review of Revenue Data

The recommended toll structure noted in the 2008 Study suggested tolls of NRS 10.52/km for cars, light buses and light trucks, NRS 17.11/ km for medium buses and trucks, and NRS23.68/km for heavy trucks (in 2008 prices) are implemented. As discussed in Section 2, the 2008 Study suggested that the toll should be collected on an open system with two barriers; one on the Nijgadh (Km 75.0) to Budune (Km 47.7) section of the road, and one on the Budune to Kathmandu (Km 0) section of the road. Movement along the Hetauda to Budune spur road and the Nijgadh to Pathlaiya East-West Highway would not be tolled.

Additionally, there would be an interchange at Shripur (Km 55.5), which would result in local traffic between Hetauda and Shripur (which would utilise 7.7km of the Fast Track road) also being untolled. Additional future interchanges are proposed at Kulekhani (Km 16) and Malta (Km 22). The layout for these, and their impact on traffic/revenues for the road have not been analysed as these have only been proposed for future consideration.

This toll system should result in effective capture of the majority of traffic which will use the Fast Track road. Exceptions are those listed above (spur roads and local traffic to/from Shripur). In addition, there is the potential for avoidance of the Nijgadh – Budune toll by traffic using the Pathlaiya – Hetauda route and connecting spur road instead. This could be a significant issue with the proposed toll collection system; the quality of the Pathlaiya to Budune via Hetauda road will not be significantly slower than the Fast Track route via Nijgadh, particularly once the Budune to Hetauda spur is upgraded, so it may appear to attractive to vehicle owners/operators to save on the cost of one toll section. This potential issue, and the associated potential loss of revenue, should be carefully considered within traffic/revenue forecasts. If deemed significant, one way to capture the revenue would be to also toll the Budune-Hetauda link, although this will have ramifications on local traffic and may not receive stakeholder approval.

Beyond this discussion of the effectiveness of the toll system and users' propensity to pay the stated toll levels (discussed earlier), **further analysis of the revenue forecasts given in the 2008 Study is not possible**. This is due to a number of factors which make cross-checking and analysis of revenue figures difficult:

- Traffic flows are detailed by two categories; Passenger and Freight, but toll levels are described by more than two categories. It is **unclear how the toll levels have therefore been applied to the traffic flows in order to generate the revenue forecasts**, and 'observed' breakdowns could not be used due to differences in diversion propensity between vehicle types to and away from the Fast Track road.

- Some calculations, including for traffic forecasts, are made on the **basis of distance travelled and not on the basis of traffic**; specifically via the Nijgadh to Budune or Budune to Kathmandu road sections. This again makes cross-checking of revenue forecasts difficult.
- Finally, some calculations are made **on the basis of vehicles, while some are based on PCUs**. Tolls are payable on a vehicle basis. This again makes cross-checking and analysis of revenue forecasts difficult.

As a result, it is not possible to comment on whether the revenue forecasts are likely high, low, or are likely to be correct. It is also not possible to state whether they are consistent with the traffic forecasts given.

3.5 Conclusions

Overall, this review and previous reviews have identified a number of issues with the 2008 traffic and revenue forecast for the Fast Track Feasibility Study:

- Lack of clarity and detail in the write-up of the study resulting in uncertainties regarding methodology used, quality of data forecast, and reduced ability for stakeholders to verify and provide further analysis on the data.
- Underlying issues with the methodology of the study including oversimplified reliance on GDP as a driver for normal traffic growth, lack of consideration of generated international traffic, and unfeasible ramp up times.
- Technical errors identified in the data in 2010.
- Lack of detail regarding revenue calculations and forecasts which prevents calculation cross-checking, sensitivity or scenario analysis.

These issues are further compounded by 2 further factors:

- The divergence of the forecasts of annual traffic growth from actual traffic growth, with the model forecasting significantly higher traffic growth even in a no-Fast Track scenario.
- It has been 6 years since the forecast was initially completed. During this time there are likely to have been significant changes in local conditions, data availability, and traffic modelling approaches.

As a result, we would conclude that the traffic and revenue forecasts from the 2008 study are **not of sufficient quality, relevance or age** to be used in relation to future development of the Project, and that a **new assessment of traffic and subsequent traffic and revenue modelling should be undertaken**. The key components of such an assessment are:

- New traffic counts and “Origin-Destination” surveys across a sufficiently broad area to encompass all traffic which may be impacted by the road;
- Toll range analysis including cost saving calculations for road users which include fuel, operation and maintenance cost savings in addition to revenue implications for commercial road users of potential improvements to vehicle utilisation;
- Willingness to pay analysis including review of alternative toll-payment behaviour in Nepal, and vehicle user/manager surveys;
- Traffic growth factor analysis for normal, generated and induced traffic, including appropriate consideration of local variations and complexities;
- Traffic model creation, calibration, testing and sensitivity analysis;

A more detailed discussion of proposed next steps for traffic and revenue forecasting for the Project are outlined in Annex 6.

Finally it should be noted that there are some areas where the 2008 Study underestimated demand, which may be picked up in any re-assessment. Certain classes of traffic may have been underestimated, particularly induced and generated traffic; and toll levels and willingness to pay may have previously been underestimated.

4 Assessment of institutional capabilities

4.1 Introduction

This chapter provides a high level assessment of the Nepalese enabling environment for PPP, largely based on the information gathered during the field visit in Kathmandu in June 2014 and on the review of documents made available by the Client. The purpose of the assessment is to highlight institutional issues which are likely to constitute challenges, if not obstacles, for a successful implementation of the Project as a PPP.

This chapter commences with an overview of Nepal's institutional capabilities with regards to PPP, including details of the specific institutions involved in policy development, project development, and financial management. In Section 4.3 we then review and gauge the strength and effectiveness of these institutions, with analysis of resulting implications for the Project.

4.2 Overview of institutional arrangements

We have reviewed the capabilities of institutions involved in PPPs in the transport sector from the perspective of three key functions - policy development and enforcement, financial management and project development support. On this basis, the existing institutions in Nepal can be grouped as set out in the Table 4.1. Each of these functions, and the relevant institutions' role, is discussed in more detail below.

Table 4.1: Key institutions involved in PPP – transport sector

Key functions	Institutions
Policy formulations, disseminations, monitoring, enforcement	Public Procurement Monitoring Office (PPMO) National Planning Commission (NPC) Board of Investment Nepal (IBN)
Project Development and structuring	Ministry of Physical Planning and Works (MoPIT) Board of Investment Nepal (IBN)
Financial Management	Ministry of Finance

Source: ICF elaboration

4.2.1 Policy development, dissemination, monitoring and enforcement

Institutions such as the Public Procurement Monitoring Office and the National Planning Commission are involved in the formulation and monitoring of PPP policies, laws and regulations:

- The PPMO, directly under the Prime Minister, is the guiding body responsible for procurement policy formulation and the implementation and monitoring of effective public procurement system, including PPP processes;
- The Public Procurement Act, enacted in 2007, provides guidelines for all major public procurement processes, and seeks to ensure that these are open, transparent, objective, reliable and fair - by promoting competition and accountability. The Act was designed to improve governance during procurement processes within public entities, and to ensure equal access to government procurement opportunities to all producers and service providers.

- The Act on Private Financing in the Build and Operation of Infrastructure (BOOT Act) was enacted in 2006 and provides overarching guidelines for private sector investment into infrastructure within Nepal. The Act lists a series of contracting modalities through which PPPs can be pursued within Nepal, and details the procurement process that the GoN must go through in order to award a PPP contract. The Act specifies that PPP concessions can be awarded for a maximum of 30 years and can be extended once for a further 5 years, and that the maximum investment from GoN in a project can be 25% of the total project cost.
- In 2011 the White Paper on PPP was prepared under the auspices of the National Planning Commission by a Committee which included representatives of Line Ministries, and Agencies of the GoN;
- The Investment Board Act (2011) empowers the Investment Board of Nepal (IBN) to enable and promote the economic development of Nepal by creating an investment friendly environment within Nepal and by promoting, mobilising and managing PPPs, domestic and foreign private investment.

4.2.2 Project development, structuring capabilities

Key institutions involved in the PPP structuring are the MoPIT and the Investment Board of Nepal:

- The **MoPIT** is responsible for the development of the national transport network in Nepal and it was the contracting authority that lead the PPP procurement processes which were attempted in recent years.
- The **Investment Board Nepal** was established in 2011 for creating an investment-friendly environment and for mobilizing and managing public-private partnership, cooperative and domestic and foreign private investments required for the development of infrastructure and other sectors. The IBN can identify priority areas for investment, manage the project evaluation and selection process, and provide incentives to potential investors. The IBN's members include the Prime Minister, ministers for Finance, Industry, Energy and Physical Planning, as well as Governor of the Nepal Rastra Bank and a representative from the National Planning Commission. The Investment Board is currently focused on the implementation of a 900 MW Hydropower project.

4.2.3 Financial management

The Ministry of Finance (MOF) has a right of approval for PPP projects, and the timing of this approval should occur before the procurement process has begun. However there is not a separate route for PPP project approval, assessment of financial risks from Government's perspective and/or value for money evaluation.

4.3 Assessment of institutional capabilities

4.3.1 Summary of evidence

A summary of the assessment of Nepali's PPP institutional capabilities is set out in Table 4.1, and discussed in more detail below.

Table 4.1 Summary assessment of institutional capabilities

PPP policy development, dissemination and enforcement	PPP project development support	Financial management

■ Some institutional overlap between this and other roles, particularly for the Investment Board Nepal ■ There are limited incentives for MoPIT to follow the PPP route for capital spending ■ Overall there is no clear PPP route and no enforcement of the PPP policy ■ There is limited PPP policy dissemination among line ministries and other stakeholders.	■ The role of the IBN is not recognized and the Board is not empowered ■ Potential conflicts of interests do not facilitate coordination and collaboration between MoPIT and IBN ■ There is a limited knowledge base and understanding of PPP arrangements	■ The MoF has right of approval before procurement process ■ Unclear whether there is full appreciation of risks arising from contingent liabilities for the Government

Source: ICF elaboration

4.3.1.2 *PPP policy development, dissemination and enforcement*

Regardless of the formulations of the Acts, Regulations and Policies described in Section 4.2 and which set the legislative framework for PPP activities, the following issues have been observed in relation to the PPP institutional capabilities in Nepal:

- There is a **lack of clear delineation between institutions** with regards to responsibilities and process for PPP. This is particularly the case with the Investment Board of Nepal, whose role overlaps significantly with other bodies.
- **Limited PPP policy enforcement**. Lessons learnt from international best practice certainly recognize that some degree of PPP enforcement is necessary for the success of any PPP program. Depending on the local and institutional context, there are different solutions. For example, in the UK, the UK Treasury enforces the government sponsoring authorities to pursue PFI as a basis of capital expenditure across sectors. India has also recently begun enforcing policies and regulations to integrate identification of potential PPP projects at the planning and design stage itself, by the relevant national and sub-national line departments. We are not aware of any prescriptive guideline that institutions are bound to follow in Nepal when dealing with PPP arrangements. Overall, it seems that the policy enforcement function is not fully defined or implemented.
- **Limited PPP policy dissemination**. It is important that PPP policy implications are well understood, particularly (but not only) at the Line Ministry level, as they are the contracting authorities for PPP arrangements. On the basis of our discussions with several stakeholders, it seems that the level of dissemination of the PPP policy and guidelines is not sufficient to ensure understanding of PPP arrangements across all the institutions involved.

4.3.1.3 *PPP project development support*

In assessing the relevant roles of MoPIT and the IBN, we have made the following observations:

- **Limited PPP capability sits within the MoPIT.** Previous assessments[1] and reviews have highlighted the limited capabilities of the MoPIT to execute PPP projects, and the need to strengthen such capability. On the basis of our consultations and on the evidence of the most recent PPP attempt which was led by the MoPIT, it is our view that the institution's PPP capabilities have not significantly improved since 2008. We are not aware of any PPP technical assistance program the MoPIT – or other institutions- participated into, and international transaction advisers – who may have contributed knowledge transfer to the institution - have not been involved in the procurement process for the Project. With the exception of a few Performance Based Maintenance Contracts (see section 6.2) the MoPIT does not have PPP experience.
- **Lack of track-record of the Investment Board.** The lack of experience in structuring and negotiating PPP arrangements contributes to the limited expectations on the ability of the IBN to deliver the Project within a PPP arrangement. The Investment Board is currently focused on the implementation of a 900 MW Hydropower project for which, with donors' assistance, efforts to improve transaction expertise, both financial and legal, has been made. Still, the Investment Board's capability to execute PPP projects has yet to be proven.
- **Unclear attribution of roles and responsibilities suggests limited support and sponsorship from the Government.** The Investment Board Act, approved in 2011, explicitly states that irrespective of existing laws, the investment required for implementation of certain kinds of projects, including "Fast track road" should be made under the Act. However, there appears to be confusion regarding roles, responsibilities and approvals; the representative of the Investment Board we met mentioned that a request has been submitted to the Cabinet to empower the Board itself to manage the procurement process for the Project and the Cabinet's response reiterated that the Board already was empowered by the Act itself to manage the investment. Nevertheless, the Investment Board was not involved in the 2012/13 PPP procurement for the Project, and on the basis of consultations, the MoPIT does not seem to recognize any authority nor capability to the Investment Board in relation to the Project.

4.3.1.4 *Financial Management*

While the Ministry of Finance has been identified as providing approval for PPP budgets, we have noticed the following issues:

- **Unclear management of contingent liabilities.** While the MoF is ultimately responsible for fiscal issues arising from any PPP project, there does not seem to be a distinct approach to evaluating and managing government guarantees for projects, such as loan guarantees or other contingent liabilities. There does not appear to be a formal assessment at any level of government of the fiscal risks created by contingent liabilities, that is, created by different forms of guarantees (explicit or implicit) that might be issued on specific PPP contracts. This issue can be partially explained by the very limited PPP experience in Nepal.
- According to the BOOT Act, the GoN is able to contribute up to 25% of total project costs for a PPP. However, our review suggests that it is not well

[1] Assistance for Reviewing and Facilitating a Public Private Partnership in the Transport Sector in Nepal, December 2008, Castalia Strategic Advisors

understood whether this refers to pre-operation project costs only (i.e. covering construction costs only). If so, this would be a limitation on the implementation of some forms of PPP contracting option within Nepal, such as Availability BOTs (as described in Section 7 and Annex 8).

4.3.2 Recent development

According to media reports[2], the GoN has commissioned consultants including Deloitte Touche Tohmatsu India and Total Management Services to draft a PPP Policy. This policy is believed to include the recommendation of the formation of a PPP Approval Committee under the Ministry of Finance to approve the financing of PPP projects, and a PPP Centre, to appraise, prioritise, and manage the procurement of PPP projects. The policy additionally promotes the contribution by GoN of viability gap funding to support projects, and details the process, roles and responsibilities for PPP initiation and management in cooperation with the Ministry of Finance and National Planning Committee.

This proposed policy was not mentioned at all in any of our recent consultations with representatives from GoN including the MoF, MoPIT, DoR, NPC or IBN, despite the potentially game-changing implications that such a policy could have on formalising and improving Nepal's enabling environment for PPP. This suggests that there may be limited sponsorship or awareness of the new draft policy within the parties that we had consultations with.

4.3.3 Implications for the Project

In 2008 it was assessed that, given the limited experience in PPPs, the lack of expertise within the public sector of PPP arrangements and the lack of capacity within Nepal's institutional bodies to manage a project as technically and financial complicated as Fast Track, it was too early for the country to attempt the execution of the Project under a BOT arrangement without significant capacity building efforts and development. Since 2008, **the country's PPP capability has not improved enough to suggest different conclusions and recommendations compared to those provided in 2008.**

Nepal's institutions do not seem to be sufficiently strong, experienced and knowledgeable to successfully procure and negotiate with the private sector as complex and large project as the Project in a BOT/Concession or other PPP arrangements which requires substantial risk allocation to the private sector and the need for significant project structuring.

As a result, the evidence from our high-level assessment suggests **a lack of clear political high level support for the PPP approach**. Overall our observation would be that despite having put in existence a legislative framework for PPP, there appears to be no real commitment from the GoN to implement a PPP program and even less to follow the PPP route to implement the Project.

Such an issue is actually a major impediment to a successful implementation of the Project as PPP - with a substantial risk allocation to the private sector - which would require instead widespread support, including senior level sponsorship from the Government.

Recent developments in the legislative framework, such as the draft PPP Policy suggests some steps might be being taken to enable the implementation of a PPP program and to establish a PPP process for project screening and approval. As a

[2] Govt prepares draft of PPP Policy, The Himalayan Times, 6/4/2014, available at http://www.thehimalayantimes.com/printNepaliNews.php?id=411008

result, Nepal may be undergoing improvements in its PPP enabling environment which might contribute to increasingly successful implementation of PPP projects. However, the complexity, large size and political relevance of the Project, raise concerns regarding the suitability of the Project for PPP pilot implementation.

Finally, we emphasize that the above considerations and concerns on the PPP enabling environment do limit the PPP options for the Project but do not lead us to conclude that there is no room for private sector participation in the Project. Instead, feasible options for PPP contractual arrangements are explored in Chapter 7.

5 Review past attempts at PPP

There have been three prior attempts to develop the Project through PPP procurement processes; in 2008, in 2010, and in 2012. Each of these procurement attempts failed. Below we discuss the overall details of each procurement attempt, and analyse the potential causes of their eventual failures.

5.1 2008 PPP attempt

5.1.1 Overview of 2008 Procurement Attempt

The first time the GoN attempted a PPP procurement for the Fast Track Project was in 2008. The project was proposed by the Ministry of Physical Planning and Works (MoPPW; the precursor to MoPIT) to private investors as a BOT Concession. Key features of the PPP structuring and procurement are set out in Box 1 below.

Box 1 - 2008 BOT Procurement Attempt

The 2008 BOT Procurement attempt was initiated via a two stage open competitive tendering process, in-line with the requirements of the BOOT Act:

- The Expression of Interest for bidders was issued with a 30 day deadline on 3rd June 2008. Several bidders requested extensions to this timeline but were denied.
- EOIs were evaluated on the basis of a large number of technical, financial and experience criteria. It has been suggested that the complexity of the evaluation process deterred some potential bidders from submitting their EOI.

The concession period was set at 30 years (including construction period of 3 years) with an option to extend for a further 5 years. The PPP structure proposed during the procurement attempt delegated the vast majority of project risks and responsibilities to the private sector:

- The private sector was expected to be responsible for all design, construction, operation and maintenance costs, estimated at US$886 million, with no funding or subsidies from GoN. GoN would provide support to acquire land leases for the project and would lease these for a 'symbolic' amount.
- All traffic and revenue risks would remain with the private sector and the GoN would not provide any guarantees or safeguards.
- There was no clear delegation of legal, political, regulatory or macroeconomic risks between the public and private sector within the EOI documents.

Three consortia initially expressed interest in the project; Everest Bank with Gammon India, Landmark Worldwide Company and Reliance Infrastructure. Two; Landmark and Reliance were shortlisted to the proposal stage, but the procurement process was halted before a proposal was selected.

Source: 2008 procurement documents, ICF analysis and Castalia Strategic Advisors[3]

This procurement attempt for construction of the Fast Track Road was not successful. The expression of interest stage failed to attract the interest of leading toll road companies around the world, nor even of leading firms which were already operational in Nepal in other sectors. One such firm, Dragados, already operated in the hydropower sector in Nepal and had significant global experience of toll roads, but did not request the EOI document package from the MoPPW.

[3] Assistance for Reviewing and Facilitating a Public Private Partnership in the Transport Sector in Nepal, December 2008.

In addition, consultants who reviewed the procurement exercise pointed out that neither of the firms leading the two shortlisted consortia was operating a toll road at the time of the procurement process:

- Reliance - had been awarded a toll road concession in India but it was not yet operational;
- Landmark Worldwide - a Korean real estate developer, which brought toll road management experience only through one of its sub-consultants.

As a result of the limited private sector interest in the Project, and the inexperienced nature of the only shortlisted consortia, the procurement attempt was cancelled.

5.1.2 Issues with 2008 Procurement Attempt

A review of the bidding process and of the PPP structuring of the projects highlighted several key factors which appear to have contributed to the failure of the PPP attempt. These can be grouped as follows:

- Procurement related issues
- PPP structure related issues

A summary of the issues identified with the 2008 procurement attempt are detailed in Table 5.1 below.

Table 5.1 Overview of Key Issues with 2008 Procurement Attempt of Fast Track

Issue	Impact
Procurement-related Issues	
Value for money from competitive process not being maximized	Project not seen as credible by experienced investors resulting in poor quality responses and limited competition
EOI documents did not provide clear PPP strategy or risk allocation	High risks and uncertainties perceived by investors resulting in few, poor quality responses.
Short and impracticable schedule for procurement	Investors did not have sufficient time to put together experienced consortia resulting in few, poor quality responses.
Limited institutional capacity for PPP management by GoN	Weak procurement process reduced likelihood of attracting strong, experienced, competitive bidders.
PPP structure/ market- related Issues	
Instability of credit markets	Experienced bidders unable to bid
Aggressive traffic and toll rates forecast	Project viability regarded as marginal and high risk; deterring bidders and increasing likelihood of failure
Lack of financial support from GON	Project viability regarded as marginal and high risk; deterring bidders and increasing likelihood of failure
Unclear risk allocation and PPP structuring	Experienced bidders deterred from bidding.

Source: ICF's elaboration – based on Consultant's review

The above factors were pointed out in the report prepared for the World Bank by Castalia Strategic Advisors (as cited above). In particular, the outcome of the 2008 process highlighted that the **limited GON institutional capacity** to manage the procurement process and future concession was a key impediment to successful implementation of PPP projects within Nepal, and that there was a **real need to strengthen Nepal's institutional and regulatory capacity in relation to PPP** before attempting a subsequent competitive process.

Castalia noted this, and additionally detailed several strategic measures which would begin to address the key structuring issues related to the Project, as described in Box 2 below. Lessons learnt from this process and recommendations in their report led to certain improvements in the PPP procurement process within Nepal, including the drafting of a contract agreement for a subsequent PPP procurement attempt. However, as described in Box 2, many of these recommendations were not heeded at all.

5.2 2010 PPP attempt

From consultations with stakeholders we were advised that the GoN competitively tendered the Project once again in 2010. Following the bidding announcement, which was once again issued by MoPPW, potential bidders were given 60 days to submit their Expressions of Interest[4]. Once again, the procurement was based on a BOT concession as defined under the BOOT Act, with a concession term of 30 years. While the BOOT Act allows for the GoN to contribute up to 25% of total project costs, it is unclear whether specific financial support was promised within this tender.

However, according to stakeholder feedback, several local firms lodged a complaint with the Commission for Investigation of Abuse of Authority (CIAA) arguing that the requirements for eligibility within the tender were adverse to local firms.

These complaints resulted in cancellation of the tender process and stakeholders suggested that under future procurement attempts, any bidding Consortium should have a minimum percentage of local firm participation. During our consultations we were advised that consortia with at least 20% participation by local partners would be required, but evidence was not provided. From our own analysis of procurement documents for the later (2012) procurement attempt, we note that consortia would be rewarded up to a maximum of 10% for equity contributions from Nepali partners.

5.3 2012 PPP attempt

The last attempt to develop the Project under a PPP structure was initiated in 2012 and terminated in 2013. For this attempt, an external local consultant was hired by the GoN to support the procurement process and the contracting authority managing the process was the MoPIT.

We had consultations with the former Director of the Project who was in charge of the procurement process –after EOI stage- with the MoPIT and with stakeholders and other institutions such as the Investment Board of Nepal, who are supposed to play a key role in the promotion and development of private sector participation in large infrastructure projects in Nepal.

[4] Kathmandu Post (28/12/2010): http://www.ekantipur.com/the-kathmandu-post/2010/12/28/metro/ktm-nijgadh-fast-track-bidding-process-to-resume/216582/

5.3.1 Improvements from 2008 Attempt

From the 2008 experience, some lessons were learnt and some improvements made to the procurement process. Key features and key differences in the PPP process and structuring between the 2008 and 2012 procurement attempts are summarised in Table 5.2.

Table 5.2 Summary of PPP Contracting Process and Structure in 2012 and 2008

Item	2012 Process	Compared to 2008
PPP arrangement	BOT/Concession	Same as in 2008
Length of concession	30 Years with potential 5 year extension	Same as in 2008 due to strict definition in BOOT Act.
Financial viability	Subsidy of up to 15% of total project costs offered by GoN	Improvement over 2008 when no financial commitments or subsidies were offered by GoN
Risk allocation	Draft contract in place with risk allocation. However, risk is overwhelmingly allocated to private sector	Improvement - Lack of risk allocation in 2008
Procurement schedule	3 months – subsequently extended	Improvement – 30 days in 2008 and 60 days in 2010

Source: ICF elaboration on basis on data and information collected during desk review and consultations

5.3.2 Outcome of 2012 Procurement Attempt

Notwithstanding some improvements in the PPP process and structuring, the outcome of the 2012 procurement attempt was disappointing:

- Nine firms acquired the EOI bidding package;
- Four firms submitted an Expression of Interest;
- Three firms were shortlisted – Reliance, IL&FS and Larsen & Toubro;
- Two firms attended the bidding conference;
- None of the bidders submitted a proposal.

5.3.3 Private Sector View of 2012 Procurement Process

As part of our high level review process, we undertook consultations with a representative of Infrastructure Leasing & Financial Services Transportation Networks (IL&FS), who were one of the shortlisted bidders during the 2012 procurement attempt for the Project. Their feedback has provided us with valuable insights into the private sector view and experience of various aspects of this procurement attempts, including the procurement process, the project structuring, and the nature of the Project itself.

5.3.3.1 Private Sector View of 2012 Procurement Process

IL&FS has the following feedback regarding the 2012 procurement process for the Project:

- The procurement documents had been produced with the support of a local consultant and were of a similar style and format to those that IL&FS had worked with for other international projects. IL&FS was therefore largely comfortable with their content and structure.

- IL&FS noted that expertise and experience with PPP projects within the GoN was limited. They additionally felt that there was some caution amongst public sector staff regarding PPP implementation due to adverse experiences with PPP projects in the past (largely hydroelectric power projects). However, IL&FS noted that attitudes and receptiveness towards PPP contracting modalities appear to have improved over the period since their first discussions with GoN representatives regarding the Project in 2012.

5.3.3.2 *Private Sector View of Project Structuring*

As described above, the 2012 procurement attempt used a full toll BOT structure for the proposed concession. IL&FS noted that:

- They perceived the full toll BOT structure with the 15% grant proposed by GoN to be unsuitable for the Project due to concerns over economic viability and market risks.
- They recommended to GoN at the time of the procurement, that they would not be able to proceed on this basis, and recommended instead one of the following options:
  - Restructuring of the project into an annuity BOT, with IL&FS paying for and managing the design, construction and operation of the road in return for annuity payments with a fixed and guaranteed return on their investment;
  - The GoN increasing their proposed grant to provide viability gap funding of 40% of project costs. This would be an increase from the 15% proposed in the procurement documents. During discussions with GoN, IL&FS were told that 20% funding might be possible, but that 40% would not be possible due to limitations from the BOOT Act. We note that the BOOT Act actually allows for public sector investments in PPP projects of up to 25%;
  - Structuring the PPP as a revenue sharing BOT, whereupon the GoN would provide a minimum revenue guarantee to IL&FS in order that they could guarantee payment of basic interest payments on their project debt.
  - Apart from financial allocations, IL&FS noted that they were comfortable with the remaining risk allocations between the public and private sectors as specified by the procurement documents.

5.3.3.3 *Private Sector View of Project Characteristics*

IL&FS gave several useful insights regarding their view of the Project's characteristics:

- IL&FS had significant concerns with the traffic and revenue forecasts given by the 2008 Study; having performed some of their own assessments and traffic studies, IL&FS suggested that estimates for the 2008 Study could be as much as three times higher than their own estimates. They therefore had significant concerns over the project's economics, resulting in their above suggestions of either an annuity BOT or a revenue sharing BOT structure for the Project.
- It was interesting to note that while IL&FS had significant concerns with the road's short term revenue generating ability (and the traffic estimates), they had confidence in the Project's long term potential. Their representative noted that they believed toll receipts would be sufficient from years 7-10 onward to make the Project viable, and that revenue growth in the medium to longer term would likely be significant.
- IL&FS did not have significant concerns regarding the construction risks of the Project. They noted that they had completed projects in similarly difficult areas in

the past and that their contractors had also studied the Project designs and specifics and were comfortable with the construction risks involved.

- IL&FS did however, have concerns with the local financing environment within Nepal and noted that they had expected to not be able to raise more than USD200million of the total project debt within Nepal. This was due to immature local capital markets which had limited experience of:
  - long term debt investments (longer than 10-15 years);
  - PPP-specific investments; including those with split responsibilities and risk allocations between the public and private sectors; and
  - proposed capital raising instruments, including infrastructure bonds.
- Finally, IL&FS noted that discussions and GoN actions surrounding the Tunnel Road (as detailed below) presented additional concerns to them during the procurement process.

5.3.3.4 *Current Appetite for Fast Track*

As a result of their various concerns regarding the Project's economic viability and traffic/revenue risks, IL&FS pursued further discussions with the GoN to explore alternative project structures. These were not entertained beyond initial discussions, and as a result IL&FS chose not to submit a proposal for the project.

However, IL&FS expressed continued interest in the Project due to their view of its long term potential:

- In recent months IL&FS have further proposed to GoN their suggestion of an Annuity BOT structure for the Project, but media reports suggest that this proposal has been declined[5].
- IL&FS reiterated their view that near term traffic/revenue receipts were high risk, but that they expected these risks to decline after the Project is operational for 7 years or so. A structure which would reduce their exposure to the short term traffic risks would therefore continue to be attractive to IL&FS, such as a revenue sharing BOT combined with additional viability gap funding from GoN.
- IL&FS suggested that the long term viability of the Project may make it suitable for donor grant or loan funding, and noted that they had had productive conversations with IFC who expressed interest in investing equity in the Project.

5.3.4 Key Causes of 2012 Procurement Failure

Several factors have been mentioned as contributors to the lack of private sector appetite from private investors during the 2012 procurement attempt and its subsequent failure:

- Excessive traffic and market risks;
- Unsolicited proposal submitted by a Nepali consortium for the 'Tunnel Road';
- Marginal Project economics and insufficient commitment from the GoN to provide the required subsidy;
- Short bidding schedule; and
- Insufficient marketing among international investors

[5] Himalayan Times: MoPIT rejects Annuity Model (18 June 2014). Available at http://www.thehimalayantimes.com/printNepaliNews.php?id=418580

These are described in more detail below. On the basis of the review of bidding documents and meetings with stakeholders, it is our view that the first three factors; 1) the lack of risk mitigation strategy for traffic risk, 2) the rumours about the 'Tunnel Road' and 3) the lack of clarity on financial commitment from the GoN, are the main factors which resulted in the lack of response to the RfP.

5.3.4.1 *Excessive Traffic and Market Risks*

As detailed in Section 3, there are significant weaknesses in the traffic and revenue forecasts included in the 2008 Study including errors in the technical data, limitations in the forecasting methodologies, and an overall lack of clarity in the write-up of the report. Even without such weaknesses, traffic and revenue forecasts are typically one of the largest sources of risk in a PPP toll road due to the importance of financial returns for a private sector party with a potentially large debt burden.

As a result, uncertainties around the traffic and revenue forecasts were seen as a significant source of risk for bidders in the 2008 procurement attempt. This was recognised and acknowledged in the 2008 report by Castalia, and subsequently risk mitigation strategies, including partial or full risk sharing of traffic risks with GoN were suggested. These were not followed during the 2012 procurement attempt when, once again, the private sector was expected to bear full responsibility for traffic and market risks. During the bidders' conference for the 2012 attempt these concerns were raised once again by the private sector, but the GoN took no action to address these concerns. This inaction is likely to have largely contributed to the high risk perceived by the private sector.

5.3.4.2 *Kathmandu – Kulekhani – Hetauda Tunnel Road (the 'Tunnel Road')*

The 'Tunnel Road' is a proposed 57 km mountain road along an entirely new alignment connecting Kathmandu with Hetauda in the south. Hetauda is situated midway between Kathmandu and the Indian border, and a connecting road between the two cities has been under discussion for many years in order to significantly shorten the time and distance required to travel from the high valley floor of Kathmandu to the foot of the Churia Hills near Hetauda. Presently the distance of the existing circuitous route from Kathmandu to Hetauda, along the all-weather Mahendra Highway is 227 km, and takes about 6 to 8 hours to drive. The older Tribhuvan Rajpath road is only 133 km, but follows a much more severe alignment which is largely unsuitable for freight or larger vehicles. This route can also take up to 8 hours due to its steep turns and unstable alignment which frequently results in road blockages due to landslides. The proposed 'Tunnel Road' would take only an hour to cover the distance, and would include three new tunnels. It is worth noting that the alignment of this road is relatively similar to Alternative 2B (the Kulekhani route) as considered in the 2008 Study, albeit with a different start point.

A private company named Nepal Purbadhar Bikas Company Limited (NPBCL) made an unsolicited bid to the GoN to construct the Tunnel Road. The GoN appears to have responded favourably to this bid, subsequently signing a Memorandum of Understanding for a 30 year concession agreement between the government and NPBCL in June 2013. Under this concession, NPBCL would build and operate the road, before transferring it to government ownership in 2043.

According to NPBCL, a concession agreement was signed between the company and the GoN on the 14th May 2013 which included the following terms:

- GoN will assist in the acquisition of private land for the Tunnel Road, and will make available government/public land to the project under rental or lease

- GoN will allow the project owner to collect required debt and capital in foreign currency and, in accordance with the Foreign Direct Investment and Technology Transfer Act (FDITTA) allow repatriation of interest, principle, dividends or share capital invested
- The GoN will not charge or receive a royalty for the duration of the concession period for the Tunnel Road.
- The GoN will not issue a license to any other projects that will impact the viability of the Tunnel Road project **except for the Kathmandu Nijgadh Fast Track**
- The GoN will not nationalize land, building, instruments and infrastructure associated with the Tunnel Road project.

In 2012 NPBCL estimated that the cost of constructing the Tunnel Road would be RS 35 billion (USD365m at current exchange rates) and that construction would be completed by December 2016. NPBCL initially intended to fund the construction costs with a debt: equity split of 50:50, including an initial public offering to raise Rs 7 billion (USD 73million) for 40% of the company's shares.

The construction license for the tunnel was issued on the condition that financial closure was achieved within 1 year, by 16th May 2014. On 15th May 2014 NPBCL submitted its financial closure document to GoN, suggesting a reduction in the proportion of its equity from 50% to 20% and reporting that project funding had been difficult to secure due to the high construction costs associated with the road's tunnelling, bridges, other structures and extensive rock excavation requirements. In addition, press reports suggest that NPBCL had only collected cash contributions of Rs 252 million (USD 2.6 million) and had not signed any loan agreements by this date, although the company had received 'commitments' of Rs 1.7 billion[6] (USD18 million) in equity funding.

The GoN has formed a technical committee to review the financial closure documents submitted by NPBCL, but their conclusions have not yet been released. The GoN would be able to extend the deadline of financial closure of the deal if it chose to do so, but can similarly cancel the concession agreement without penalties if it is deemed that NPBCL have failed to achieve the required deadline.

The released news of the Government's intention to enter into a concession agreement for the Tunnel Road during the bidding process for the Project is likely to have negatively impacted the bidders' project risk perception in several ways:

- **Increase uncertainty on traffic forecast:** since the Tunnel Road is a competitive route from Kathmandu to Hetauda, the Project traffic risk has increased, due to uncertainties about how traffic will be distributed between routes and due lack of regulation on toll rates;
- **Doubting Government's commitment:** the private sector is well aware that government support – both political and financial – is needed for a large infrastructure project like the Fast Track Road. Even though the Tunnel Road has not yet achieved financial close and may be unlikely to do so, bidders may have doubted the degree of GoN's commitment to support the development of the Project since apparently an alternative solution has been pursued and supported already.

[6] "NPBCL Fails To Achieve Financial Closure For Tunnel Highway", Republica (24/5/2014)

To our knowledge, concerns on the implication of the Tunnel Road on the Project were raised by bidders during the bidding process and the GoN failed to address them.

5.3.4.3 *Marginal Project Economics and Lack of Clarity on Financial Commitment*

Under the BOOT Act, the GoN is able to contribute up to 25% of the total project cost for a joint investment with the private sector, and in the Call for EOIs issued by GoN in July 2012, the GoN noted that the project would be developed on a BOT basis under the BOOT Act. However, in the RfP for the project, the GoN noted that any grant amount payable by the GoN to the Concessionaire as equity support would 'be limited to not more than 15% of the total pre-operation cost of the Project'[7], while our consultations with the private sector suggest that 20% was expressed as the absolute maximum in verbal discussions with GoN. Two factors concerned bidders in relation to this:

1. The relatively low cap (15%) on the level of proposed government support versus the maximum allowed in legislation (25%), in combination with the sizeable project risks is likely to have made the project appear unfeasible to potential private sector bidders.
2. The lack of clarity on financial commitment (15%, 20% or 25%) by the GoN concerned bidders and suggested a lack of political desire to see the project succeed. We have been advised that these concerns were communicated to GoN at the bidders' conference.

5.3.4.4 *Other Considerations*

Several other factors have been highlighted during our consultations which may have had an impact on the 2012 procurement attempt:

- The overall marketing of the bid tender was poor, and did not follow the guidelines outlined in the Castalia report. This may have affected the number and quality of firms requesting the EOI documents. However, this does not explain why some of the nine bidders who had access to the EOI documents chose not to bid;
- The time for submission of proposal was initially 3 months. While this was shorter than recommended, the submission deadline was subsequently extended several times, most recently for an additional 3 months. Overall time for submission was eventually 8 months. While it could be argued that the uncertainty about the deadline for submission may have hindered the bidding process to some extent, 8 months is sufficiently long enough and it would be difficult to argue that the schedule for the submission might have been a key reason for the failure of the PPP attempt.

Box 2 - Failure to follow advice to improve Nepal's PPP Processes

[7] Request for Proposal (RFP) for Kathmandu-Nijgadh-Pathlaiya Terai/Madhe Expressway Project on Public Private Partnership/BOT, June 2012.

Although the 2012 attempt saw some improvements to both the enabling environment for PPP in Nepal and in the PPP procurement structures, there are multiple examples of where the GoN has ignored recommendations for improvement by international consultants, potential donors, potential developers, or other stakeholders:

- The 2008 Study recommended the creation of a Highway Board and Road Management Company to support PPP procurement and improve Nepal's enabling environment for PPP. These recommendations were re-emphasised by the 2008 report by Castalia Strategic Advisors, but the advice has not been fully followed.
- The 2008 Castalia Report and feedback from interested bidders, including IL&FS have requested some form of revenue guarantee or revenue risk sharing between the public and private sectors. This has not been pursued by GoN
- The 2008 Castalia Report recommended construction risk mitigation options for future procurement options. These recommendations were not followed.
- The 2008 Castalia Report recommended that realistic procurement schedules are used, allowing investors 60 days to submit an EOI, and 6 months to respond with proposals. This advice was not initially followed during the 2012 attempt.

Source: 2008 Study, Consultant conversations, and Castalia Strategic Advisors

5.4 Key Takeaways and Implications for Next Steps

Nepal has tried and failed 3 times to implement the Fast Track road under a PPP strategy over the last 6 years. Reviewing these attempts, and the causes of their failures suggest that the Fast Track road has some key project-specific PPP structuring challenges which have significantly impeded the GoN's ability to procure the Project. The two most impactful challenges appear to be:

- **Significant market risks**; namely traffic and revenues risks, and the apparent unwillingness of the private sector to assume such risks;
- **Marginal/lack of financial viability** of the Project from a private sector perspective. This is clearly linked to the Project's sizeable market risks, as well as to the large capital investment required.

In the face of these challenges, the PPP structure proposed during the 2012 procurement attempt was an improvement compared to 2008, as it included a capital grant of up to 15% of construction costs from the Government. However, it still did not address the Project's market risks, and further, did not go far enough to mitigate the marginal viability of the Project to create appetite for investment.

However, while the project related risks above certainly represent an obstacle to private sector investment, further PPP structuring options could further mitigate these challenges and, in turn, increase private sector interest. Such options could include revenue sharing mechanisms, or through increasing the GoN capital contribution to the maximum permitted under the BOOT Act. These and other suggestions were made by Castalia in 2008, and further suggested by bidders who raised concerns on the above points during the latest procurement attempt, as described in Box 2.

As a result, it is therefore worth considering the following questions:

- ***Why is it that attempts and recommendations to improve the PPP structure have not been taken by the GoN?***
- ***Has there been sufficient commitment from the GoN to make the Fast Track project happen?***

We would argue that aside from Fast Track's project-related issues, the severe lack of PPP capabilities and expertise within Nepal significantly constrains the ability of the GoN to develop workable PPP solutions to this, and other, projects.

Furthermore:

- **There is no evidence of intent from the GoN to improve its PPP capabilities.** Actions taken between 2008 and 2013 have been the result of ad hoc and sporadic interventions and were not part of a PPP program aimed to strengthen capabilities of public institutions, to develop a PPP project pipeline and to execute pilot projects. While the drafting of a PPP policy may herald a change in this respect, the fact that this was not mentioned to us in concerning;
- **Donors have not been involved in the procurement process** and support from donors as transaction advisers for the Fast Track procurement has not been sought, although a local consultant was hired by the GoN to assist in drafting the RfP documents for the 2012 procurement attempt. Donors' support may have contributed to increased confidence in the process on the part of the private sector and, if involved as investor in the transaction may have helped to de-risk the project, thus acting as a catalyst for private sector involvement;
- **Some issues which could have been addressed have not**: the problematic traffic forecasts, their associated risks and their deterrence of private investors became apparent after the 2008 PPP attempt. As described in Box 2 above, solutions and risk mitigation strategies were suggested but these were neither developed and nor was additional evidence provided to improve confidence in the 2008 traffic forecast results.
- **'PPP does not work' is the only lesson** which seems having been learnt. There seems to be a general consensus that the failures of the previous procurement attempts demonstrate that the Project can only be developed as a public project. Specifically, after the failure of the last attempt the MoPIT, the DOR and apparently the National Planning Commission itself are all considering the re-allocation of the Fast Track project to the fiscal budget and to develop the project internally.

Given all of the above, both project-related and procurement-related issues are impediments to a successful implementation of the Project as a BOT/Concession. These issues appear to be highly related to the degree of institutional PPP capacity and government's willingness to make PPP happen; both of which we cannot confirm are sufficiently present in Nepal.

6 Review of Previous Contract Management Approaches in Nepal

This Chapter will review the different contract types currently in use within Nepal's road sector, and will assess recent experiences using performance based contract approaches within the roads sector. We will then consider resulting implications for the Fast Track Project.

6.1 Road maintenance in Nepal

6.1.1 DOR Maintenance

The Department of Roads (DOR) is responsible for the maintenance of approximately 10,000 km of strategic road network. The maintenance is mainly carried by contracting out services to individuals, for routine maintenance, or to local contractors for recurrent, periodic and emergency works.

The DOR operates through divisions, each of them responsible for approximately 300km of roads. Those Divisions manage the procurement of maintenance services, which is expected to be in accordance with the Procurement Act.

For much of the 1990s and early 2000s, Nepal's road maintenance was undertaken through a Swiss-funded Strengthened Maintenance Division Program. This was a nationwide system of daily road maintenance by local communities, where individual villagers were commissioned to maintain a specific stretch of road up to 3km in length. These villagers were known as 'lengthworkers', and at the peak of this program the Department of Roads employed 1,600 such workers earning up to Rs 150 (USD1.60) per day to clear drains, fill potholes, clear road shoulders and sweep highways. For periodic repair work, the DOR divisions would contract out responsibility for up to 50km of road on an annual basis, while emergency repairs would be contracted as required.

A summary of currently mostly used maintenance contracts is set out in Table 6.1.

Table 6.1 Summary of road contract types in Nepal

Maintenance	Description	Type of contract
Routine	Clean/Grass cutting	Yearly contract with individuals for 3 km length
Recurrent	Bitumen work/ Road fixing/any ingredient to be added to roads	Yearly contract –local contractor- procurement in line with Procurement Act
Periodic	Re-sealing/Overlay to be carried out every 6 six years	On yearly basis each Division contracts the maintenance out for approximately 50 km
Emergency	Off the road	As needed- contracted out by Division in charge

Source: ICF on the basis of consultations with DOR

6.1.2 Funding for maintenance

Funding for maintenance is provided by the Nepal Road Board (NRB) which manages funds allocated to maintenance by the GoN.

According to consultations, the maintenance of the SRN would require NRS8.5-9.0 billion per year. However, our consultations with stakeholders suggest that the NRB disburses only approximately half of the required amount to the DoR each year.

6.2 Experience in Performance-Based Maintenance Contracts

6.2.1 Overview of Performance Based Maintenance Contracts

Performance-Based Maintenance Contracts (PBMCs) are one of the most broadly used forms of PPP, and have been increasingly popular within roads sectors worldwide. Under this form of contract private sector parties are engaged to achieve a specific outcome, and are paid depending on their success in achieving that outcome, regardless of the work required to achieve it. In the case of a performance maintenance contract for a road, a PBMC would specify the quality and performance parameters to which the road must be maintained to (via detailed metrics such as road evenness, number of potholes, maximum hours of lane closure etc.), as opposed to specific actions that the private sector must undertake (e.g. to repair 10 pot holes). These contracts provide scope to the private sector to fulfil the work required in the most cost-effective and efficient manner possible, and therefore enable private sector innovation and cost/time efficiencies to be harnessed within public sector projects. Further description of the characteristics of PBMCs is included in Annex 7.

6.2.2 Key Features of Nepal's Performance-Based Maintenance Contracts

In order to increase the efficiency and effectiveness of its road maintenance programs, Nepal undertook a pilot program of PBMCs in 2003[8]. Since then, Nepal has had some limited experience of PBMCs within the road sector, most of which has been through contracts that have been implemented with donors' support:

- The World Bank funded Road Maintenance Development Project (RMDP) piloted a 2 year PBMC for the Naryani Bridge – Butwal Road (114km) from June 2003.
- The RMDP also piloted 5 year PBMCs for Pathlaiya to Fuljore (75km) and Hetauda to Fuljore-Chaurahwa (75km) in June 2005.
- The ADB funded Road Network Development Project (RNDP) piloted 5 year PBMCs in Kohalpur-Gadda Chauki starting in October 2005 (4 contracts totaling 205km)
- The RNDP also piloted a 5 year contract from Hetauda to Narayani Bridge (77km) from April 2007 onwards.

There have additionally been several smaller size contracts – from 30 to 50 km - which have been procured in subsequent years. Table 6.2 summarizes key aspects of the PBMCs issued for roads in Nepal.

Table 6.2 Summary of PBMC structures in Nepal

Maintenance Type	Contract Term	Procurement Process
Re-sealing + Routine/Recurrent	1 – 2 years 3 years	Public procurement in line with Procurement Act Technical evaluation of bidder's competence

[8] Thesis on Assessment of Performance Based Maintenance Management Contract of road project in Nepal, Abhiman Das Mulmi (2013)

6.2.3 Implementation Issues associated with Nepal's PBMCs

The bidding process to award PBMCs is designed within the framework set out by the Procurement Act and its Rules and Regulations, selected details of which are summarized in Box 3. The PBMCs have largely been structured with two phases; an initial set of works paid on a quantity basis in order to get the road into proper condition, followed by the performance based contracts to keep the road at those specifications for the contract duration.

Box 3 - Summary of Nepal's Public Procurement Act, 2007

Nepal's Public Procurement Act was introduced in order to ensure that all major public procurements undergo competitive bidding, and in so doing reduce corruption, collusion and excessive charges for government projects.

Specific provisions of the Act include:

- Except in certain circumstances, procurement should be completed via open bids using either a one or two stage bidding process.
- Two stage bidding should be implemented where it is not feasible fully define the technical aspects of a project at time of invitation, or where the works or services are of a complex nature to warrant bid discussions.
- Bidding documents should contain detailed, minimum information including the nature of procurement, qualification criteria (where appropriate), bidders' instructions, bid selection methodology, and the validity of the bid.

Source: ICF

Under consultation with stakeholders, we were advised that evaluation criteria for construction contracts under the Public Procurement Act are interpreted as follows:

- **Value of contract lower than Rs 6 million** (US$ 63,000): Bidders are required to have a registered business but technical qualifications are not required. The contract is awarded on the basis of the lowest price.
- **Value of contract above Rs 6 million** (US$ 63,000): Bidders are required to have a registered business and some technical qualifications and proven experience are required. The lowest price is not the only evaluation criteria, also technical scoring is considered.

Based on consultations with DOR, **Nepal's experience with PBMCs has been unsuccessful so far**:

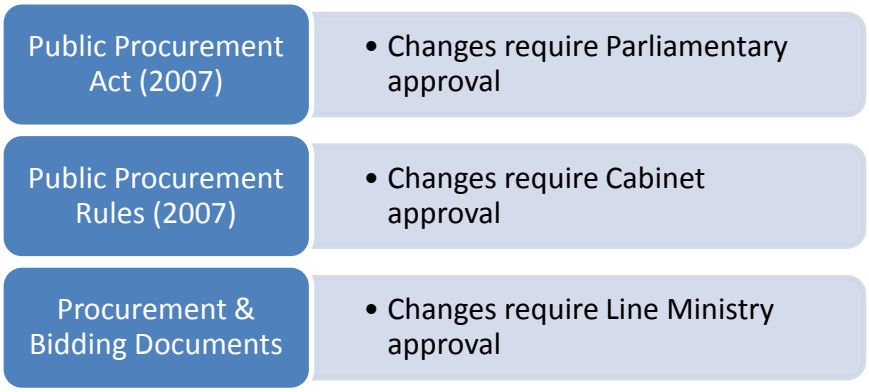
- Contractors have often not provided the required level of maintenance; in some cases, there has been a failure to provide any maintenance work;
- Contractors often were not familiar with the terms and conditions of the PBMCs and expected to be called for services as opposed to schedule the necessary works to meet contractual obligations.

According to the DOR, the key issues with implementation of the PBMC are related to the procurement process and the capability of contractors. The DOR has procured mainly small contracts (those with a total value of less than Rs 6 million (USD63,000) and thus entailing the simpler procurement requirements under the Public Procurement Act) and contractors have often been untrustworthy and proved not to have the required technical expertise to provide good maintenance. Contractual penalties have not solved these issues and the DOR has often chosen to 'educate' contractors on their obligations as opposed to terminating the contract and re-tendering the maintenance service for the road.

It was explained to us that this was because the 'termination and re-tender' solution is not easily workable when contracts have been awarded on the basis of the lowest price, since contractors tend to complain to the Commission for Investigation of Abuse of Authority should the contract be awarded to another contractor at a higher price.

Figure 6.1 summarises the hierarchy of procurement related regulation in Nepal at present, including the various bodies responsible for approving any proposed changes. If, as seems to be the case, there appears to be issues with the implementation of the Public Procurement Act in the context of the PBMCs in Nepal, it may be feasible to address these issues through changes and improvements at any of the stated levels, depending on buy-in by associated GoN institutions (parliament vs cabinet vs line ministries).

Figure 6.1 Summary of Procurement Regulation Hierarchy in Nepal



6.2.4 PBMC in Nepal – Summary of key issues

While Nepal's experience of PBMCs in the road sector has been relatively limited, it has nonetheless been poor to date. Table 6.3 provides a summary of the key issues experienced to date.

Table 6.3 Summary of Key Issues of Nepali PBMCs

Issue	Implications
Bidding on price – small contracts	Poor quality of service providers
Lack of required technical expertise and track record – small contracts	Lack of capability to deliver services
Small value of contracts	Attractive for local firms - no international bidders
Appeal process to Commission for Investigation of Abuse of Authority	Difficult to terminate contracts and apply penalties

6.2.5 Implications for Fast Tack Road

Despite the poor experience of PBMCs in Nepal's road sector to date, lessons can nevertheless be learnt from this past experience:

- Current contractors do not have the required expertise to maintain the Project at the required level – international contractors are required.
- A large contract size will help to attract international firms with more experience in PBMCs;
- The current procurement process and bidding documents need reviewing – evaluation criteria in particular.

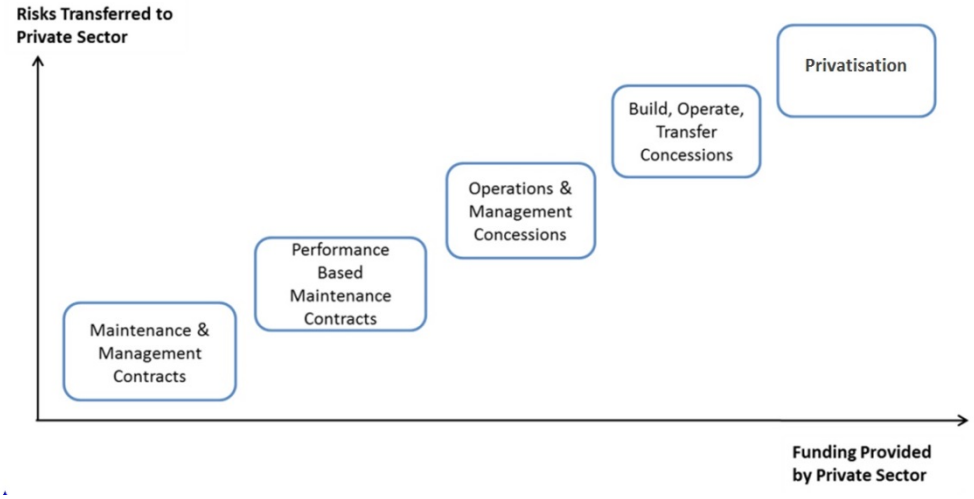
Regardless of the experience with maintenance contracts in the recent years, representatives of the DOR do agree on the need to involve qualified private sector firms in the maintenance of the Fast Track road. Key features for such involvement could include:

- Procurement of PBMCs for an extended period of time – e.g. ten years;
- At least the use of PBMCs to cover the maintenance of bridges and tunnels which are more complex and require *specialised* equipment;
- International firms cooperating with local firms in the first instance in order to build local expertise.

7 Review of Viable PPP Contracting Modalities for the Fast Track Road

Numerous types of PPP contracting options have emerged around the world over the last 40 years, and one of the most useful ways to consider the range of options available for a project is by the extent to which responsibilities and risks are transferred from the public to the private sector. As Figure 7.1 shows, it is possible to consider a spectrum of risk transference between the two parties. At one end of this spectrum, the public sector bears predominantly all risks, responsibilities and costs for a project, while the private sector is involved only through discrete and traditional procurement of specific works. At the other end of the spectrum lies privatisation, where ownerships, costs, responsibility and legal liability for a project transfer entirely from the public to the private sector. In between the two is a broad range of PPP options through which public sector bodies can pass over increasing risks and responsibilities to the private sector.

Figure 7.1 PPP Contracting Options by Risk Transference from Public to Private Sector



Source: ICF

In theory, the Government of Nepal (GoN) could choose any one of the range of options along this spectrum for the development, maintenance and operations of the Fast Track road:

- **Maintenance & Management Contracts** – GoN already has experience of utilising private sector contractors to perform discrete, quantity-defined works on an as-required, short term basis.
- **Performance Based Maintenance Contracts** – Although GoN has had only limited, relatively unsuccessful experience to date, the superior quality of the Fast Track road will require high level maintenance services to ensure continued road quality, and lessons could be learned from both international examples and Nepal's previous experience to structure the contracts effectively.
- **Operations & Management Concessions (OMTs)** – These contracts would enable the GoN to design, fund and build the Project, before bringing in the private sector to take over the operations and maintenance of the road on a performance basis. Contract options for OMTs include:

  - **Expansion/Rehabilitation OMTs** – where the private sector invests significant capital in order to expand and rehabilitate an existing asset that has been built by the public sector, before taking over responsibility for the operations and management of the entire asset. In the case of the Fast Track road, this contracting option could be applied to the 2 stage construction process posited in Section 2.5.
  - **Full Toll OMTs** – where the private sector takes all revenues from tolls in return for performing its operation and maintenance services (i.e. private sector takes traffic/revenue risks).
  - **Availability Payment OMTs** – where the private sector receives a set annuity for performing its services, and where the GoN receives all revenues from tolls (i.e. public sector takes traffic/revenue risks).
- **Build, Operate, Transfer Concessions (BOTs)** – Resembling the PPP options that GoN has already attempted during previous procurements, BOTs place all responsibility for the design, construction, management, maintenance and operation of an asset with the public sector. Concession options for BOTs also vary and include:
  - **Annuity BOTs** – where the private sector receives a fixed periodic payment once the road is constructed and operational, while the GoN receives user revenues from the road (i.e. public sector takes traffic/revenue risks).
  - **Shadow Toll BOTs** – where the private sector receives a payment per user from the GoN for creating and operating the road. This is implemented where there are not sufficient revenues from the asset, but still leaves the private sector bearing traffic risk which has to be mitigated
  - **Revenue Sharing BOTs** – where the private sector and the public sector share traffic risk; the private sector will collect user tolls, but if traffic/revenues fall below a set minimum, the private sector will provide 'top-up' payments to ensure minimum revenue. Conversely, the private sector will receive reduced upside if traffic exceeds certain thresholds (public sector benefits)
  - **Full Toll BOTs** – where the private sector is completely dependent on user tolls for its funding (i.e. private sector takes all market risks)
- **Privatisation** – This is where either an asset, or a company managing an asset under a very long term or indefinite lease concession, is transferred from public to private ownership. Under this option the public sector transfers all risks, revenues and responsibilities for the asset to the private sector.

The broad characteristics, risk and financing implications of each of these 11 options are described in more detail in Annex 7, and are summarised in relation to the Fast Track road Project in Table 7.1.

Table 7.1 Summary of PPP Procurement Options for Fast Track

Procurement Option	Maintenance & Management Contract	Performance Based Maintenance	Operations & Management Concessions			Build, Operate, Transfer Concessions				Privatisation	
			Expansion Concession	Full Toll Concession	Availability Concession	Annuity BOT	Shadow Toll BOT	Revenue Sharing BOT	Full Toll BOT	Build Own Operate	Privatisation
Asset Ownership	GoN	GoN	PS for term. Then GoN	GoN	GoN	PS for term. Then GoN	PS for term. Then GoN	PS for term. Then GoN	PS for term. Then GoN	PS	GoN until sale. Then PS
Contract Term	6 months - 5 years	3-5 years	10+ years	5-10 years	5-10 years	30+ years	30+ years	30+ years	30+ years	In perpetuity	In perpetuity
Party receiving usage fees	GoN	GoN	Variable	PS	GoN	GoN	N/A	PS	PS	PS	GoN until sale. Then PS
Contract Award Basis	Lowest fixed unit fees	Lowest availability payments	Variable	Highest concession fee/ revenue share	Lowest availability payments	Lowest availability payments	Lowest shadow tolls	Lowest min. revenue guarantee	Highest concession fee	Highest concession fee	Highest purchase price
Construction Costs	GoN	GoN	Both	GoN	GoN	PS	PS	PS	PS	PS	GoN
Operational Costs	GoN	GoN	PS	PS	PS	PS	PS	PS	PS	PS	GoN until sale. Then PS
Maintenance Costs	GoN (quantity basis)	GoN (quality basis)	PS	PS	PS	PS	PS	PS	PS	PS	GoN until sale. Then PS
Construction Risk	GoN	GoN	PS	PS	PS	PS	PS	PS	PS	PS	GoN
Operational Performance Risk	GoN	PS	PS	PS	PS	PS	PS	PS	PS	PS	GoN until sale. Then PS
Traffic Risk	GoN	GoN	Variable	PS	GoN	GoN	PS	GoN	PS	PS	GoN until sale. Then PS
Tariff Risk	GoN	GoN	Variable	PS	GoN	GoN	GoN	GoN	PS	PS	GoN until sale. Then PS

PS = Private Sector, GoN = Government of Nepal

8 Analysis of Suitability of Contracting Options for Fast Track

8.1 Introduction

Having performed an analysis of the institutional capabilities of the GoN with regards to PPP projects, and having reviewed at high level the previous PPP procurement approaches for the Project, we now review potential PPP contracting modalities in order to determine those that might be most suitable for future application to the Fast Track road. Components of this review include:

- Section 8.2 provides a discussion of the critical aspects of any future PPP contracting option, prompting consideration of our overall approach to screening;
- Section 8.3 discusses the actual screening criteria selected;
- Section 8.4 discusses in more detail those procurement options which pass these screening criteria; evaluating how they could be applied to the Fast Track Project and using international case studies to identify key success factors.

8.2 Overall Approach to Screening of PPP Contracting Modalities for Suitability to Fast Track

The GoN's latest procurement failure strongly suggests that inadequate mitigation of previously identified key issues with the Project is likely to result in continued procurement failures. As a result we consider that, among the theoretical options set out above, only those contracting options which appropriately consider and mitigate the key project risks should be considered going forward. We therefore review how the theoretical PPP contracting options discussed above may be screened to identify only those most suitable to the Project at this point in time.

As described in Chapter 5, the previous attempts and failures by the GoN to develop the Fast Track project using BOT options have identified both 1) project specific risks (excessive market and construction risks for private sector), and 2) PPP risks (inadequate enabling environment for PPP in Nepal) which have prevented successful development of the project to date.

BOT concession variations can be closely tailored to specifically address project specific issues on a case by case basis. Therefore, and as first recommended in the Castalia PPP viability report of 2008, the project specific issues could theoretically be mitigated using an appropriately structured Revenue Sharing BOT model (as described in Box 2), namely by shifting/sharing market and construction risks to/with the public sector and improving the Project's economics. Financial viability may increase with a financial structure which entails a larger contribution from the Government. This is likely to require a change in the BOOT Act which currently limits the Government contribution to 25% of total project cost.

However, adequate structuring of a BOT concession to address the project's market and construction risks, will not address the second group of factors which, in our view, has prevented the Project from being developed to date under a PPP option; the inadequate enabling environment for PPP in Nepal. Appropriate screening of contracting options must therefore look beyond simply those modalities which enable project risk allocation to be divided between contracting parties.

It is therefore our conclusion that the most suitable procurement options for the Project will be those that **do not require significant private sector involvement, or capital at the start of the project**, but which still afford opportunity for the GoN to access private sector capital and efficiencies within the project. **Delaying the involvement of private sector capital and expertise** until later stages in the project's development will have a number of advantages including:

- **Providing time for the development of Nepal's enabling environment for PPP** and institutional capacity building, without incurring further delays to the development of the Fast Track road.
- **Transferring to the public sector the construction risks** which were previously seen as unacceptable by the private sector
- Enabling the collection of additional information regarding likely traffic flows and acceptable toll levels, and thus **providing critical information on the magnitude of the project's market risks**.

We therefore believe that core to our screening criteria for identifying contracting options most suitable for the Project is the ability to delay the involvement of the private sector until Nepal's enabling environment for PPP has improved.

8.3 Screening Criteria for Identification of Suitable PPP Contracting Options

We therefore suggest that the most suitable PPP procurement options for development of the Project at this stage will be those that pass the following screening criteria:

- **Opportunity for private sector involvement to be delayed from the start of project;**
- **Significant scope for harnessing private sector efficiencies; and**
- **Significant scope for accessing private sector capital.**

Table 8.1 details the 11 procurement options identified in Section 7, and identifies which of the three criteria above each procurement option supports.

Table 8.1 Analysis of Suitability of Procurement Options

Procurement Option	Suitability for Delayed Private Sector Involvement	Scope for harnessing Private Sector Efficiencies	Scope for harnessing Private Sector Capital
Works & Services Contract	✓	×	×
Performance Based Maintenance	✓	✓	✓/×
Operations & Management: Expansion/Rehabilitation	✓	✓	✓
Operations & Management : Full Toll Based	✓	✓	✓
Operations & Management: Availability Payment Based	✓	✓	✓
BOT: Annuity Based	×	✓	✓
BOT: Shadow Toll Based	×	✓	✓
BOT: Revenue Sharing	×	✓	✓
BOT: Full Toll Based	×	✓	✓
BOO	×	✓	✓
Privatisation	✓	✓	✓

8.4 Discussion of Suitable Procurement Options for Fast Track

As Table 8.1 shows, out of the 11 procurement options identified, 4 fit all three criteria discussed above. These are the three types of Operations & Management Concession, and

the Privatisation option. In addition, Performance Based Maintenance Contracts may provide scope for harnessing private sector capital depending on project specific economics. These 5 options, together with how they could be implemented in relation to the Fast Track project are considered in more detail below.

8.4.1 Performance-Based Maintenance Contracts

8.4.1.1 Suitability to Fast Track Project

If the Project were to be developed with a view to using PBMCs once the project is up and running, the GoN would take full responsibility for the road's development, before engaging the private sector to maintain the road to 'as-new' standard for a set contract price through a series of PBMCs. These contracts would provide the private sector contractor with autonomy to design and implement an appropriate maintenance schedule, and would result in periodic fixed maintenance fees from the public sector provided that performance standards are achieved. If the contract term for PBMCs is sufficiently long, periodic maintenance including overlay renewal can be included in the specifications of the contract in order to ensure that the road returns to the GoN in an optimum concession at the end of the concession period.

- **Key advantages of PBMCs are that they:**
  - **Ensure high road quality.** This is of critical importance on the Fast Track road in order to maximise economic benefits of the project.
  - **Enable access to specialist private sector skills**. The longer term nature of performance contracts compared to individual works contracts may attract international experts with required skills. Given that the Fast Track road will be the first expressway of its kind within Nepal, such skills may not be held by local contractor firms.
  - **Enable access to private sector efficiencies** in the road's maintenance and management; minimising service related disruption to the road.
  - **Achieve cost savings**. Estimates suggest that performance related maintenance contracts can be up to 20% cheaper over their lifetime than equivalent maintenance procured through traditional methods.
  - **Cap maintenance costs and provides budget certainty**
- **The main disadvantages of PBMCs are that they:**
  - **Require public sector to provide capital** to cover all design, engineering, construction and operations costs
  - **Increase likelihood of cost and time overruns** during design, construction and operations processes due to absence of private sector involvement
  - **Expose the public sector to traffic and revenue risk** on the project.
  - **Require operations management by the public sector**, diverting resources from other projects and requiring key operations resources within the public sector.
  - **Have not been well-implemented in Nepal in the past**. Lessons must be learnt from international examples – see Box 4, Box 5, and Box 6 – and previous domestic experience in order to ensure prior failures are not repeated. However, the 'as-new' condition of the road before contract start, together with the use of contract packages that are sufficiently large to attract international contractors should serve to improve PBMC implementation.

8.4.1.2 *Lessons on Implementation of PBMCs from International Experience*

The successful implementation of PBMCs in the USA and Brazil below provide several takeaways for the application of PBMCs for the Fast Track road:

- **Bid selection for PBMC must include pre-qualification or technical bid evaluation** phases, and should not be based on lowest bid price alone. In Nepal, the DoR should seek to procure any PBMCs using the large contract type under the Public Procurement Act (i.e. using both qualitative and quantitative evaluation criteria) in order to avoid issues where lowest cost bidders who do not perform under a contract complain to CIAA if replaced by higher cost bidders.
- **PBMCs should bundle together road stretches of sufficient length, and be of sufficient contract term** to attract professional, experienced and high quality contractors to bid. Given the relatively short length of the Fast Track road, this would suggest that just one contractor could be sought to manage the entire road length. Contract terms of at least 5 years should be used to ensure adequate contract value, and contract terms of at least 10 years, including at least one mandatory periodic maintenance/overlay cycle may be optimal, as such a system would ensure that the GoN resumes control of the road in good condition at the end of the concession period.
- The DoR should define a **clear, detailed monitoring program and explicit performance indicators** prior to contract procurement in order to ensure clarity for all stakeholders on how performance will be assessed.

Box 4, Box 5, and Box 6 below set out international examples of PBMCs, including details of lessons that could be learned for the Fast Track Project.

Box 4 - Brazil's CREMA Contracts

Brazil's has approximately 60,000km of paved federal roads, of which almost 70% were first paved during a road construction boom from 1965 to 1985[9]. Road maintenance was initially addressed through force account contracts (labour, materials and overhead billing on an as required basis), before being gradually transitioned to a series of defined service and materials contracts with the private sector. Severe budgetary issues during the 1990s, culminating in 25 out of Brazil's 27 states having to restructure their debt with the government in 1998, led to progressively less and less funding available for maintenance of the road network, and by 2000 much of the federal road network was in a severe state of disrepair.

As a result, state governments and the World Bank developed the concept of performance based road maintenance and rehabilitation contracts known as CREMA contracts in 2000 (Contrato de Reabilitacao e Manutenacao), and began implementation of the contracts across 9,750km of the federal paved road network in 2001.

Brazil's CREMA contracts had several defining characteristics:

- Centralised designs, bidding process documents, performance specifications and rehabilitation standards were written; reducing contract procurement times and preventing unjustified expensive redesigns, while leaving scope for contractors to define their own management programs.
- Maintenance contracts were bundled together to improve procurement processes; contract lengths were increased from 80-130km to 450-600km, and contract terms were increased from 1.5 years to 5 years.
- Contract payments were fully performance dependent, based on detailed performance

[9] Performance Based Contracts in the Road Sector: Towards Improved Efficiency in the Management of Maintenance and Rehabilitation – Brazil's Experience. Eric Lancelot (March 2010)

indicators.

While some problems appeared with the earliest CREMA contracts, Brazil's overall experience of transitioning to performance based maintenance contracts has been highly positive. **The unit cost of rehabilitation works under CREMA contracts have been 25-30% lower than those under traditional procurement options, while maintenance unit costs have been 34% lower**. Meanwhile, road conditions have also proved superior for those sections maintained under CREMA contracts. These outcomes were both achieved with a **reduction by a factor of 7 in the number of procurement biddings** managed by state and federal departments, significantly reducing workload on procurement units.

Source: Lancelot, March 2010

Box 5 - Performance Based Maintenance Contracts in Virginia

In an effort to provide cost effective, high quality transport infrastructure, the Virginia Department of Transportation (VDOT) introduced a comprehensive performance based contracting approach to road maintenance in 1996. Under these contracts contractors are expected to produce a maintenance management program to address the maintenance requirements outlined by VDOT as defined by a clear and comprehensive suite of performance specifications.

Key contract and bidding details:

- 5 year contracts
- Covered preventive maintenance, minor maintenance repairs and routine maintenance
- 2 stage sealed bidding process; technical proposals evaluated first, and then only for those deemed to have acceptable technical proposals would financial bids be opened.
- Technical Scoring Process:

Criteria	Max Score
Organizational Structure, History and Key Personnel	10
Quality Management Plan	15
Routine Maintenance Operations Plan	20
Emergency Operations & Incident Management	20
Customer Service, Timeliness Requirements & Tracking Plan	10
3rd Party Damage: Accounts Receivable Claims Process and Reporting	5
Use of Small Business	20

- Contracts awarded to the 'lowest responsive and responsible bidder'[10]
- Performance measured by specified performance indicators; both 'asset quality' and 'timeliness' related.
- Timeliness penalties imposed for late maintenance performance; withholding penalties imposed for maintenance quality non-performance.
- More than 2 consecutive or 3 total quarterly evaluations of <90% on timeliness compliance or the same for maintenance compliance in a 2 year period can trigger default clauses.

[10] Case Study: Performance-based Management and Maintenance of Roads in the USA. Quiroz, 2008

A 2011 review of Virginia's experience with PBMCs suggested that the **contractor outperformed VDOT in most evaluation categories**. However, it was noted that payments must be tied to actual performance, and that a detailed baseline condition is required in order to evaluation performance[11].

Source: Quiroz, 2008, Ozbek & de la Garza, 2011

Box 6 - Evaluation Criteria for PBMCs in Washington D.C.

Washington DC began a pilot PBMC for its road sector with coverage of 119km of federal roads in 1999[12]. The evaluation criteria and weights used in their bid selection process was:

Factor Type	Details	Weighting
Technical	Experience, knowledge & understanding of issues relating to preservation & maintenance of the assets. Soundness of technical approach for meeting the performance measures for all assets referenced.	20%
Staffing, Quality Control, Quality Assurance, Management	Staffing Plan	5%
	Management Plan	5%
	Quality Control/Quality Assurance Plan	5%
Past Performance	Extent to which the Prime Contractor's & subcontractors' past performance on similar asset preservation, maintenance, & management contracts demonstrates a likelihood of successfully performing all of the tasks required	15%
Cost	Extent to which proposed costs are realistic & reflect the likely overall cost to the government over the term of the contract	50%

Source: Zietlow, 2007

8.4.2 Operations & Maintenance Concessions

8.4.2.1 Suitability for Fast Track Project

If the Project were to be developed with a view to using an OMT concession the GoN would once again take responsibility for the road's development. Once the project is completed and operational, the GoN would then operate and manage the project during its initial ramp up period. Traffic, toll and revenue data should be carefully collected for this period in order to inform traffic and revenue forecasts for the next 30 year period, before involving the private sector.

A PPP procurement process to source a concessionaire to take control and responsibility for the project on an OMT basis could then be started. Such a concession would, depending on the nature of the road and traffic at that point, take the form of one of the three options; Expansion OMT, Full Toll OMT or Availability OMT, as discussed above and described in Annex 7.

[11] Comprehensive Evaluation of Virginia Department of Transportation's Experience with its First Performance-Based Road Maintenance Contract, by Ozbek and de la Garza, 2011

[12] Cutting Costs & Improving Quality through PB Road Management and Maintenance Contracts – The Latin American and OECD Experience. Gunter Zietlow, 2007

- **Key advantages of all types of OMT contracts are that they:**
  - **Enable GoN to recoup a proportion of capital costs** on the project after a relatively short period through private sector concession fees, whilst still providing the GoN with time to improve the enabling environment for PPP in Nepal.
  - **Ensure high road quality and service levels**. This is of critical importance on the Fast Track road in order to maximise economic benefits of the project.
  - **Leverage private sector efficiencies** in road maintenance, toll collection, and operations management.
  - **Provide multi-year budget certainty and visibility**. Public sector should have few additional costs associated with the road once concession has been implemented.
  - **Reduce need for repeated procurement processes** due to long term contracts. Given the inefficiency of many government procurement processes in Nepal, this could provide significant cost savings.
  - **May be attractive to a broader number of firms than BOT concessions** due to the absence of construction risks and smaller deal size. This could increase the competitiveness of the tender process and drive additional cost efficiencies. In addition, given that the private sector believes that traffic risks will decline significantly after the first 6 years, structuring the project as an OMT with traffic/revenue protection for the early years of the Project's existence may further increase the number of firms interested in the concession.
- **Key disadvantages common to all Operations & Management Concessions are that they:**
  - **Require the public sector to provide capital** to cover all design, engineering, construction and operations costs
  - **Increase the likelihood of cost and time overruns** due to absence of private sector involvement in design, construction processes.
  - Require a **complex procurement process** for the concession due to the need to carefully design and specify required performance standards, inspection schedules and performance penalties.

8.4.2.2 *Lessons on Implementation of OMTs from International Experience*

A review of the various international case studies of OMT concessions for road projects (see Box 7 - Box 11) enables us to draw several conclusions with regards to the Project:

- Firstly, these experiences demonstrate that it is feasible for the public sector to realise significant value from existing brownfield road assets. Such a transaction, if appropriately implemented, could enable the GoN to borrow donor funds to design and build the asset, before repaying at least part of these funds through subsequent OMT concession sale.
- Such projects enable more accurate traffic forecasts to be generated following real traffic data on the road during its ramp up period. This can support higher bids for the concession contract that would have been possible for a greenfield BOT concession
- There is a need to appropriately regulate or structure concessions in order to protect users from inappropriate toll increases..
- An expansion based OMT may prove highly suitable for the Fast Track project given the technical viability of a 2 stage construction process.

Box 7 Operations and Maintenance Concessions in India

Operations and management concessions on brownfield toll roads are a relatively recent development within the PPP framework, and have been **pioneered by the National Highways Authority of India** (NHAI). The NHAI is primarily responsible for India's national highways, which, at 79,000km in length account for just 1.7% of India's total road network but carry 40% of its road traffic[13].

Prior to 2009, NHAI used to manage separate tenders for tolling and operations & maintenance services, typically on the basis of one year contracts. However, owing to a lack of funds for maintenance, and following successful BOT concessions for many new roads around India, in 2009 NHAI decided to launch tender processes for multi-year OMT concessions. From 2009 until 2013, NHAI awarded 19 OMT concessions covering a total of 2,860km of highways. The concessions are typically 9 years in length, and bids are awarded on the basis of highest revenue sharing or royalties by the concessionaire with NHAI.

Owing to the **perceived success and value for money of the OMT concessions** granted to date, NHAI has launched a further 8 tenders during 2013-14, covering 1,295km of highways.

Source: CRISIL Research, November 2013

8.4.2.3 *Specific OMT types which could be applied to the Fast Track Project*

As described in Annex 7, there are 3 different types of Operations & Maintenance Concessions which may be suitable for the Project:

- Expansion/Rehabilitation OMT
- Full Toll OMT
- Availability OMT

Each of these types involves a different degree of risk allocation to the private sector and, in turn, different financial implications for the parties involved. The suitability of one option versus the other ones can be assessed, at an appropriate stage in the Project's lifecycle, taking into account several factors including:

- Traffic and revenue risk;
- Need for additional investment;
- Expertise developed among DOR; and
- Need for funding.

Assessment for which of the above forms of OMT would be most suitable for the Project could be carried out a few years after operations of the Project begin, using consideration of the above factors. At this stage we provide below some high level considerations on the suitability of each approach and some takeaways from international experience.

Expansion OMT Concession

As discussed in Section 2, it is feasible for the Fast Track road to be completed in two stages. In the first stage, a new road would be constructed from Kathmandu to Budune to Hetauda, and the existing 2 lane highway from Hetauda to Pathlaiya would be upgraded to a 4-lane expressway. This phase would still cut estimated journey times from Kathmandu to Birgunj significantly, and would involve completing much of the complex engineering work of the Fast Track route. Subsequently, the expressway could be completed through a second

[13] Assessment of Operate-Maintain-Transfer (OMT) and Toll Collection market for Road Projects in India, CRISIL Research, November 2013

phase of development, with construction of a new road from Budune to Nijgadh, and upgrading of the existing 2 lane Nijgadh – Pathlaiya road to a 4 lane expressway.

Due to the feasibility of splitting the construction of the road into two segments, it would be possible to apply an expansion based OMT concession to the project whereby the GoN would undertake design, engineering and construction of the first stage, before then tendering out operation of the road, and its expansion through stage 2 to a private sector concessionaire.

This procurement option would have a number of credible advantages:

- It would **split capital investment costs between the private and public sectors**. This may make it more attractive to the private sector than a BOT concession, whilst still limiting the capital required from GoN.
- **Traffic and toll data from the operational ramp up phase of the first stage of the road would** inform revenue forecasts for the second stage, de-risking revenue forecasts and feasibly making the concession more attractive to the private sector. As traffic risk has been noted as a key issue for the private sector, this ramp up period could be critical for enabling private sector involvement.
- It would enable **private sector efficiencies in the design and construction** of stage 2 to be harnessed.

Box 8 Rehabilitation of India's East Coast Road

An interesting case study of an expansion/rehabilitation based OMT concession is that of the **East Coast Road (ECR) in India**. This road, running 166km from Chennai in the north to Cuddalore in the south links a number of major tourist destinations, fishing villages and coastal towns and is regarded as one of India's most scenic coastal routes. The road was created by linking several village roads along the coast during the 1990s, and was funded by a US$24m loan from the Asian Development Bank (ADB). However, just two years after completion, the road had suffered rapid deterioration due to lack of resources for maintenance[14].

In order to rehabilitate and maintain the road while minimising funding contributions from the local road authorities, a 50:50 joint venture was formed between the investment arm of the Government of Tamil Nadu and IL&FS, the private infrastructure development firm. This company was then awarded a Rehabilitate, Improve, Maintain, Operate and Transfer (RIMOT) concession for the road. Under this concession the joint venture was tasked with performing major upgrade works on the ECR, and with then managing its maintenance and operations. The concession was awarded for a period of 30 years, and the concessionaire was guaranteed a fixed 20% return on outstanding costs of upgrading and managing the road. The concession was financed via Rs510 million in debt funding from IL&FS, and investments were subsequently to be recouped via tolls and advertising. In the event that these revenue sources were not sufficient for the concessionaire to achieve its fixed 20% return by the end of the concession, the concession contract allowed for its term to be extended until the return had been achieved.

After an early hiccup in financial performance caused largely by political pressures on the concessionaire to not increase tolls as much as permitted in the concession agreement, the RIMOT concession of the East Coast road has been deemed to be a success. Upgrading and renovation works on the project were completed in 10 months, **significantly quicker** than the 24-36 months taken by similar projects managed under traditional public sector procurement processes, and the road has continued to be maintained to a high standard since.

Several key factors have been attributed to the success of this concession. Firstly, while significant

[14] PPPs in road renovation and maintenance – A case study of the East Coast Road Project, by Rajan, Siddharth and Mukund

capital investments were required for the upgrading of the road, the complexity of the renovation works was relatively low, and so the construction risk was acceptable to the private sector. This meant that the private sector was happy to contribute the majority of the project's capital enabling the project to be highly leveraged with a debt to capital ratio of 0.83 in 2002. This helped to keep the cost of capital for the project low, whilst forcing cash flow, operations and maintenance efficiency. Secondly, **traffic growth on the toll road has exceeded forecasts**. This is a significant departure from the common traffic underperformance associated with many greenfield BOT projects, and is likely to have been largely due to knowledge of traffic flows on the road prior to the start of the concession.

Source: Rajan, Siddharth and Mukund

Full Toll OMT Concession

Robust traffic data and toll receipts during the Fast Track's initial ramp up period may enable the GoN to choose to tender the project under a Full Toll OMT Concession. Under this option, private sector operators would bid to operate and manage the concession on a completely independent basis; recouping their costs and required return on investment through tolls collected from road users. The preferred bidder under this tender process could be the operator proposing the highest value bid to the GoN on the basis of upfront concession fees and toll fee revenue sharing.

Under this procurement option, the GoN would be able to **discharge full fiscal responsibility** for the project from point of operation onwards. This would free up budget, procurement and operational capacity within the GoN. In the event that the preferred bidder offers revenue sharing, this option would also enable GoN to **retain exposure to positive revenue performance** while absolving it of downside performance risks.

Box 9 The Chicago Skyway Concession

The Chicago Skyway Bridge, a 12.6 km toll road linking two key service routes in Chicago, was first built in 1958 and was subsequently operated and maintained by the City of Chicago for almost 50 years. In 2004, a concession for the operation and management of the road was awarded to the Skyway Concession Company, a consortium comprising of Cintra and Macquarie Infrastructure Group. The consortium paid an upfront fee of US$1.83 billion for the 99 year concession term[15], under which they were granted the rights to all toll and concession revenue on the road, and the right to increase tolls on the roadway by fixed amounts from the 5th year onwards. The City of Chicago used the proceeds of this concession to repay debt, create reserve accounts, and to fund alternative projects. In the 10 years since the concession was awarded, although traffic has underperformed expectations, toll increases have enabled continued financial performance. Despite some negative feeling regarding the cost to consumers of the increasing tolls and the use of sale proceeds by the local authority, the concession has been largely regarded as successful.

Source: Pagano, 2009, ICF research

Box 10 Brisbane's Go Between Bridge

The Go Between Bridge in Brisbane, a 4 lane tolled bridge linking Brisbane's outer suburbs, is another example of a Full Toll OMT Concession, which also enables the public sector to retain some upside exposure to higher than expected traffic levels. Construction of the bridge began in 2008 and

[15] Public-Private Partnerships (PPP) in Transportation: An Analysis of Alternatives, Pagano (2009)

was completed in July 2010, and the AU$338m construction costs were entirely funded by Brisbane City Council. The City Council then engaged a private contractor to perform tolling services for an interim period (2010-2014), before a 50 year concession for the bridge was sold to Queensland Investment Corporation. This concession gave Brisbane City Council a significant upfront payment, in addition to upside revenue exposure if the expected traffic volume of 24,000 vehicles per day is exceeded.

Source: ICF research

Availability OMT Concession

From our consultations with the private sector, it is generally perceived that traffic risk will decline significantly after the 6-7 years of Project operations. It may therefore be that the GoN could operate the Project for such time until market risks are sufficiently reduced to enable a Full Toll BOT to be procured.

As a worst case however, if market risk is still too significant to attract private sector interest to the Project, the GoN might consider an Availability OMT concession model.

Under this option, private sector operators would tender bids to purchase the rights to operate and maintain the road in return for periodic, fixed rate availability payments. Subsequent tolls collected by the operator would then be returned to the public sector, or retained and offset against the periodic availability payments. The preferred bidder under the tender process should be selected as the bidder willing to pay the highest concession fee, or requiring the lowest availability payments from the GoN.

The key advantage of this procurement option is that it achieves i**ncreased private sector interest in the concession tender due to absence of market risk**. Many toll road PPPs developed globally over the last 20 years have run into difficulties due to over forecasting of road traffic toll receipts during the bid process resulting in overly optimistic bids. As public sectors are incentivised to select bids presenting the highest returns to them, this has led to many toll road projects which have relied on overly optimistic traffic forecasts and have subsequently got into financial difficulties when toll revenues missed expectations. This is, in fact, one of the main causes of failure in toll road PPPs[16] and notable examples include the Cross City Tunnel in Sydney were receivers were appointed 16 months after the road opened due to traffic of 35% of forecast levels[17], and the South Bay Expressway outside San Diego which entered Chapter 11 bankruptcy protection in 2010 after 23,000 vehicles used the route in 2009, 38% of pre concession forecasts[18].

In contrast, by retaining traffic and toll risk with the public sector, availability OMTs insulate the private sector from market risks, and therefore may be more attractive to the private sector, leading to a larger number of tender bids, and a more competitive tender process. However, due to the higher cost of private sector funding compared to public debt, an availability based OMT concession may be more expensive over the life of the project than alternative procurement options. Entities seeking to implement this option will therefore look to the private sector to achieve cost savings to offset the higher cost of project funding.

[16] Toolkit for Public-Private Partnerships in Roads & Highways, PPIAF, 2009

[17] Toll Roads: Big Trouble Down Under, Infrastructure Journal, January 2013

[18] Drop in Traffic Takes Toll on Investors in Private Roads, Wall Street Journal, November 2013

Box 11 – Birmingham Highways Maintenance & Management

Availability and Shadow Toll based Operations & Maintenance Concessions are extremely popular in the UK, where the wide-sweeping Private Finance Initiative (PFI) encourages the transition of previously public services to the private sector[19].

In 2010, Amey was awarded a 25 year availability payment based concession to provide highways maintenance and management on 2,500 km of roads around Birmingham. This concession had no upfront fee, but has a lifetime value of GBP2.7Bn to Amey, and also includes the maintenance and operations of 100,000 street lights and more than 850 highway structures and bridges. Birmingham City Council was driven to awarding the concession after a severe build-up of maintenance backlogs and declining performance standards across the council's road network.

Source: Akbiyikli and Eaton

8.4.3 Privatisation

8.4.3.1 Suitability for Fast Track Project

The final option which may be suitable for a delayed onset PPP for the Project is that of Privatisation. This option would involve GoN designing and building the full extent of the Fast Track road, through a fully public-owned road management company (special purpose vehicle). This company would be granted the right to operate and manage the road under a long term concession, the renewal options for which would subsequently grant the company with attractive renewal options and right of first refusal on renewals.

Once the road is operational, and having monitored and recorded traffic and revenue data during the road's ramp up stage, the GoN would then look to sell permanent ownership of the road management company to a private sector purchaser. This purchaser would then become responsible for the road's operations, maintenance and management from then onwards for the long term, and in return would be the sole beneficiary of all associated revenues and cash flows. If structured appropriately, the renewal options of the road management company's concession rights would provide the private sector confidence in approximate control of the road in perpetuity, whilst still affording the public sector some degree of control over use of the asset to ensure public rights are not mismanaged.

- **Key advantages of this procurement option include:**
  - It enables GoN to **fully monetise the Fast Track asset** shortly after its investment, freeing up capital for alternative projects whilst still providing the GoN with time to **improve the enabling environment for PPP** in Nepal.
  - It **fully absolves GoN from any ongoing fiscal or operational responsibility** for the road; freeing up capacity for alternative projects.

- **Specific disadvantages of this procurement option include:**
  - **Loss of control by GoN of a strategic transport asset**. While the GoN may still be able to bear some influence on matters relevant to public interest through concession renewal and by establishing a strong regulatory body, some decision making control on toll rates, expansion and availability would be lost.
  - The GoN may **miss out on long term economic upside** associated with the project by permanently selling off the asset.

[19] Operating and Maintenance (O&M) Management in PFI Road Projects in the UK, Akbiyikli and Eaton

– Privatisation can be **politically controversial**, and has few precedents within Nepal for all asset classes.

8.4.3.2 *Lessons from Implementation of Privatisation from International Experience*

While full privatisation of road assets has been limited globally to date, there are several examples of privatisation of toll road companies with long/indefinite dated concessions to control the underlying roads. These examples (see Box 12 and Box 13) provide some useful lessons for application to the Fast Track road:

– Public sector development followed by toll road company privatisation can be an effective way to achieve a return of capital to the public sector whilst still protecting public interests in strategic transport assets.

– However, care should be taken to evaluate potential purchasers on a qualitative basis (e.g. through financial, management and strategic plans), rather than solely on the basis of greatest capital return to the public sector, in order to ensure appropriate stakeholder management by the new asset owner.

– Clear political approval should be achieved for subsequent use of funds from any sale to 1) minimise potential for corruption of windfall assets, 2) avoid claims of inappropriate or adverse spending of funds by public and government stakeholders.

Box 12 - North Luzon Expressway

The North Luzon Expressway was built by the Government of the Philippines in the early 1970s, and the concession for the toll road was held by state owned Philippine National Construction Corporation (PNCC) from 1973. However, with increasing economic growth, traffic volumes, frequent flooding, and insufficient maintenance, the road had become poor, congested and slow by the early 1990s.

The Government of the Philippines therefore looked to partial-privatisation of the toll road in order to access additional financial resources to expand and rehabilitate the road. In 1995, the state owned company PNCC, transferred its concession rights to the road to Manila North Tollways Corporation (MNTC), which itself was a joint venture between PNCC on behalf of the public sector, and First Philippine Infrastructure Development Corporation (FPIDC), a subsidiary of Benpres Holdings Corporation.

MNTC, using its equity contributions from the private and public sectors, together with loans from the Asian Development Bank, went on to rehabilitate and upgrade the expressway. This included the rehabilitation and widening of several stretches of the road and implementation of a full computerised tollway management system. Total rehabilitation capital costs came in close to initial estimates (USD384.5 million versus USD377.5 million originally forecast), suggesting private sector project management efficiencies were utilised effectively, although operations were delayed due to some issues on the public sector side (delays to right-of-way acquisitions from the Government and in payment of equity contributions from the public sector). MNTC's concession rights have been extended to make up for these delays.

Source: ICF research

Box 13 – Toll Road Company Privatisation in France

While permanent asset disposals within the roads sector are not very common globally, there has been a comprehensive program of toll road company privatisation in France which provides a useful comparator for Nepal.

France has a long history of toll roads; the first concession for a toll road was granted in 1955, and more than three quarters of the motorway network are now tolled[20]. Originally (during the 1950s and 1960s), toll road companies were entirely public; being structured as companies but with only public-bodies as their shareholders. Since the 1970s however, France has begun to experiment with private and public-private structures for toll road concessions and toll road companies, and in the early 2000s, the French government began to increasingly spin off shares in many of the public toll road companies to the private sector.

By 2006 this process was complete for 3 of the leading toll road companies in the country; ASF, SANEF and APRR, with their shares being held entirely by the private sector including banks, infrastructure funds and insurance companies. Funds from the privatisation process were used to fund road investments by the Agency for the Finance of Transport Infrastructures[21]. The bidding process for each of the three companies was in 3 stages;

- Firstly the French government issued details of the concession packages and invited indicative bids. These bids had to be accompanied by a business plan and an industrial plan. The business plan included detailed financial assumptions and plans, while the industrial plan was required to include a series of management and strategy initiatives regarding labour issues, stakeholder engagement and stakeholder management.
- Following review of the indicative bids and plans, bidders were shortlisted and invited to submit firm bids.
- Finally, the French Government met with bidders to review offers, and then announced a winner for each concession.

As a result of the detailed plans submitted in the first stage of the bidding process, winning bids were not awarded on the basis of price alone, but on quality and strategy also. This differs to the shorter term privatisation of various toll roads in the USA, where the highest bid wins. This has important implications for subsequent toll management; with toll users in the US example being subjected to rapidly increasing tolls, while toll increases in the French example were much more limited.

Source: PPIAF and Bel & Foote

[20] Toolkit for Public-Private Partnerships in Roads & Highways, PPIAF, 2009

[21] Tolls, Terms and Public Interest in Road Concessions Privatization: A Comparative Analysis of Recent Transactions in the USA and France. Bel and Foote, 2009

9 Conclusions & Next steps

9.1 Conclusions

Nepal has been trying to develop an express route from Kathmandu to the Indian border for over 40 years. As a landlocked country with poor transport infrastructure, the project has clear economic benefits for the country. However, the Project also entails very significant capital investment, and successive efforts to develop the Project through a PPP format have failed. This high level review has analysed Nepal's current institutional environment and the previous procurement attempts for the development of the Fast Track road, in an effort to determine appropriate next steps for the advancement of the Project.

Our key conclusions from this study are:

- The Fast Track Project is both **very technically challenging and high risk**, due to the mountainous terrain, the high capital cost of construction, and the lack of comparable complex engineering experience within Nepal. The 2008 Study included a detailed feasibility study which suggested a best option alignment for the route. While many of the risks of the Project were considered within the 2008 Study, review of this previous work identified weaknesses in methodology. This, together with identification of further risk mitigation options, could be pursued through the **commissioning of a supplementary feasibility study/preliminary design**. In particular, a new study could explore route realignment options which could reduce project costs and risks by minimising tall/long bridge and unnecessary curves on the route through the use of short tunnels, viaducts and short bridges. A supplementary feasibility study would also include the assessment of new cost estimates for the Project; a requirement given the cost methodology inadequacies that were found in the 2008 Study.
- **Traffic and revenue forecast.** The traffic and revenue forecasts underpinning future financial projections of the road are crucial to the appropriate structuring of the Project. Given that we have identified **significant weaknesses in the write-up and methodology of the 2008 traffic and revenue studies**, in addition to the fact that these studies are now 6 years old, we would **recommend that new studies are undertaken** as part of a supplementary feasibility study for the Project.
- **Enabling environment for PPP.** Through stakeholder consultation and desk reviews we have carried out an analysis of Nepal's enabling environment for PPP by reviewing relevant institutions, processes, tasks and track record. While we note that there has been some improvement and development in the enabling environment over recent years, we argue that **conditions in Nepal continue to be unsupportive of PPP activity** due to insufficient delineation of institutional responsibilities and roles, a lack of capabilities within the relevant stakeholder bodies, and, above all, a seeming **lack of political will for PPP** within the Government of Nepal. We believe that unless this is addressed, Nepal's enabling environment will be a significant impediment to the implementation and success of large scale PPP projects.
- **Previous PPP attempts**. Separately, we have reviewed in detail the prior PPP attempts for the development of the Fast Track road. This review has demonstrated both project-specific and PPP procurement related issues that we believe were responsible for the prior failures. However, while there are mechanisms through which the project-related issues can be addressed, **we see Nepal's weak PPP environment and lack of government willingness to support the Project as being severe limiting factors for the future implementation of the Project**. This was evidenced by a) the review of the enabling environment as discussed above, 2) the lack of attention to recommendations for PPP improvement by numerous stakeholders since the failure of the first PPP attempt in 2008, 3) the Government's behaviour regarding the Tunnel road, and 4) the consensus viewpoint that we received from GoN stakeholders that 'PPP doesn't work'.

- **Experience in Maintenance Contracts.** Our review of Nepal's limited, but poor prior experience with performance based maintenance contracts within the roads sector serves to caution us further. While many of the issues with the PBMCs may have been due to specific factors; inexperience amongst road contractors in particular, the review also suggests that the procurement process might not be designed in the most effective way and **capacity building in relation to executing bids under the Public Procurement Act is required** to ensure that bids can be selected according to both quality and price without fear of recrimination by the CIAA. Changes to either the Procurement Act or the Rules and Regulations might be required to improve the effectiveness of the procurement process.
- **PPP Options.** There is a very broad array of PPP procurement options which could, theoretically, be applied to the Fast Track road Project. However, given the weaknesses in Nepal's enabling environment for PPP and the lesson learnt from the failed attempt in 2012, we are doubtful that a successful PPP implementation with substantial risks allocated to the private sector is likely to be feasible for now. There is nevertheless room though to engage the private sector in the Project and it would be appropriate to do so. **We recommend that PPP options that facilitate delaying private sector capital requirements for the short term are more suitable** as they would allow time for 1) improvements to Nepal's enabling environment and 2) reduction in the key Project risks (construction and market risks) that have concerned the private sector to date. Such procurement options include:
  - **Performance Based Maintenance Contracts**;
  - **Operations and Maintenance Contracts**; either with or without transfer of market risks from the public sector to the private sector, and with or without public sector capital investment for a second phase of development of the Project; and
  - **Privatisation options**, where a public toll road company is spun off into private ownership once the project has achieved a stable operating level.

9.2 Next Steps

Following our high level review of the material provided by the World Bank, by other publicly available information, and following our consultations with certain stakeholders in Nepal and internationally, we recommend the following next steps in order to take the Project forward.

9.2.1 Commission of Supplementary Feasibility Study and Preliminary Design

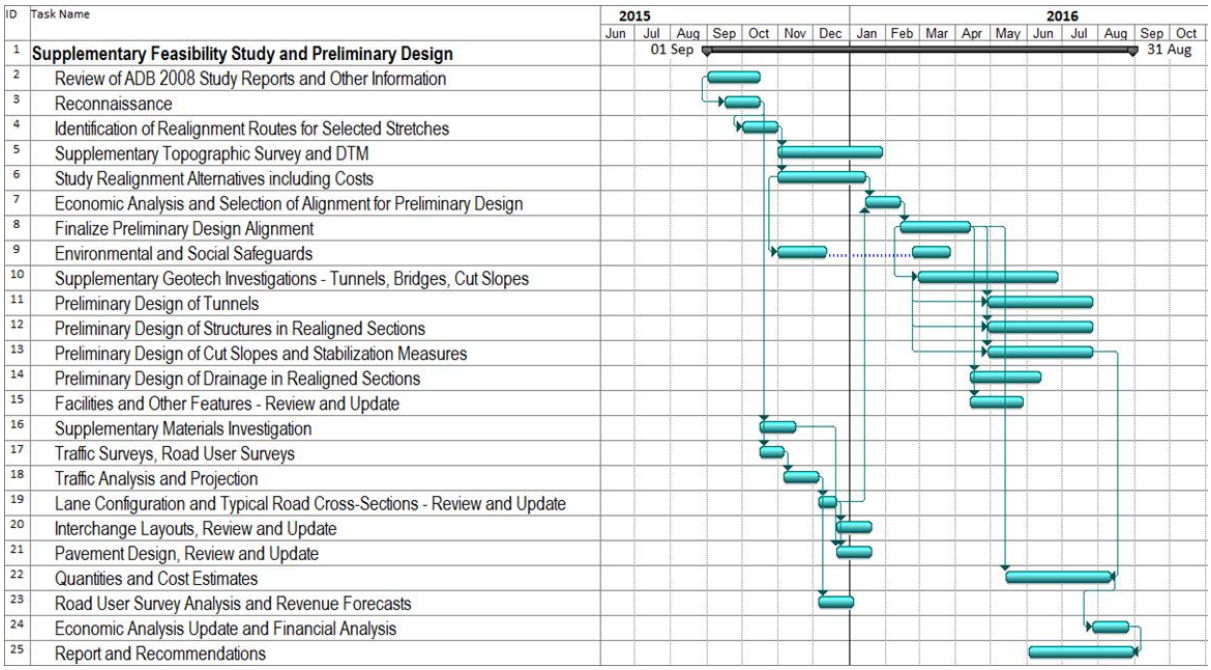
Based on the 6 year period which has elapsed since the previous feasibility study, together with the numerous methodological and numerical concerns and weaknesses identified above, we would recommend that the first priority in seeking to progress with the development of the Fast Track Project is for a supplementary feasibility study and preliminary design to be commissioned. Such a study would include the following components:

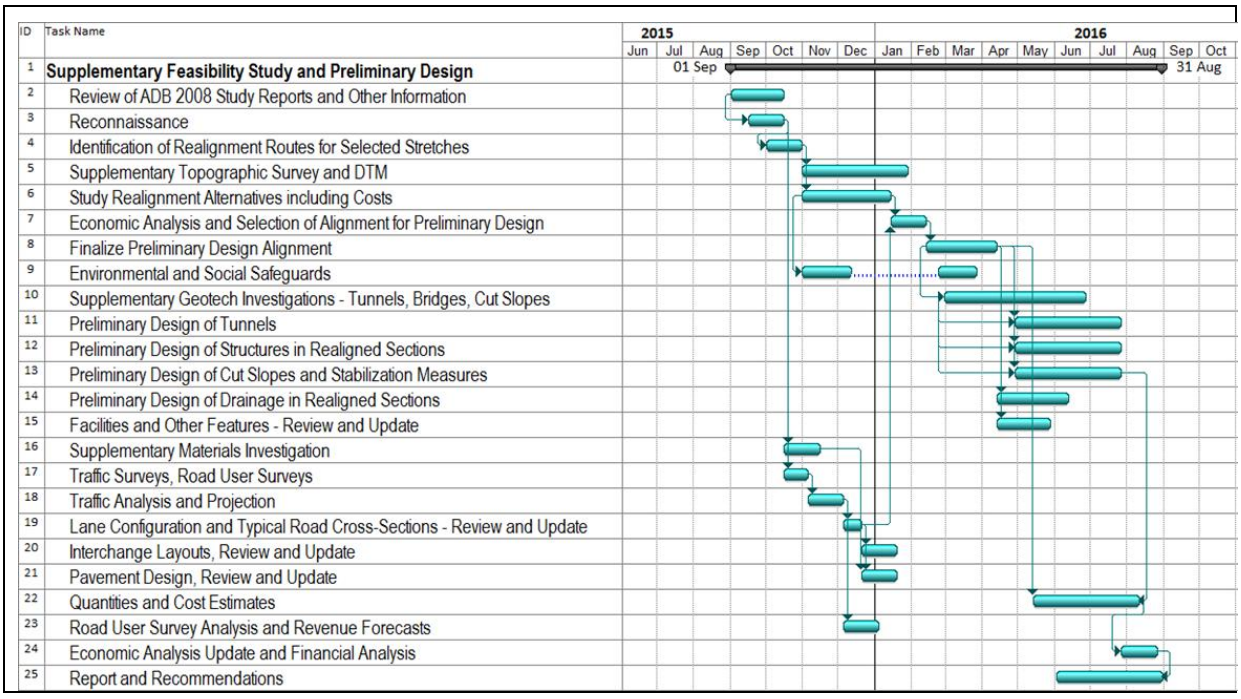
- A new technical and design study encompassing the following items:
  - A supplementary topographical survey;
  - A supplementary geotechnical investigation;
  - A new route alignment analysis, including realignment option assessment and feasibility evaluation;
  - Development of preferred realignment option to preliminary design stage; and
  - Consideration of suitability of preferred realignment design to 2 stage construction process.
- A new traffic and revenue study including the following components:

- New traffic counts and “Origin-Destination” surveys;
- Toll range analysis including appropriate cost/benefit analysis for road users;
- Willingness to pay analysis including review of alternative toll-payment behaviour in Nepal;
- Traffic growth factor analysis for normal, generated and induced traffic, including appropriate consideration of local variations and complexities; and
- Traffic model creation, calibration, testing and sensitivity analysis;

A summary of the tasks required during a supplementary feasibility study is shown in Figure 9.1 together with an indicative timeline, while detailed recommendations for a new traffic and revenue forecast is included in Annex 6. As the timeline below suggests, we estimate that a supplementary feasibility study would take approximately 1 year to complete, and would allow for all of the weaknesses identified with the 2008 Study to be addressed. Thereafter, our estimations for projected design, procurement and construction of the Project are summarised in Annex 7.

Figure 9.1 Indicative Tasks and Timeline for Supplementary Feasibility Study & Preliminary Design





9.2.2 Detailed Analysis of PPP Environment within Nepal

This high level review has noted particular weaknesses and areas for concern within Nepal's institutional capabilities and enabling environment for PPP. However, the nature of this engagement has ensured that this is a rapid assessment review only, and, as demonstrated by the lack of discussion of the proposed PPP Policy during our discussions with GoN stakeholders, may have missed key facts or information due to inappropriate scheduling. As a result, we recommend a more detailed and proactive analysis of Nepal's PPP environment. This would:

- Assess in detail the level of sponsorship for PPP within GoN's institutions.
- Assess the detail and potential impact of the proposed PPP Policy on Nepal's enabling environment.
- Propose options for improvement of the enabling environment including capability building within institutions, delineation of roles and responsibilities between stakeholders, and documentation of international best practice for PPP project identification, screening and development.

This review and analysis could be done simultaneously with the supplementary feasibility study and preliminary design, so that after a period of one year, the GoN and associated stakeholders have both a more comprehensive view of both the Project, and of Nepal's institutional capabilities.

9.2.3 Reassess PPP Procurement Options

Once the feasibility study and PPP review have been completed, we suggest that it would be appropriate to reassess viable PPP procurement options for the Project once again. This is because:

- Updated economic analyses and financial assessments of the Project are needed to accurately assess Project risks, financial investments required, and to therefore assess the potential roles for the public and private sectors.

- Reviewed traffic studies and revenue forecasts could assuage or confirm private sector concerns regarding the market risks of the Project; confirming or otherwise the need for revenue and market risk sharing between parties.

Scenario modelling at this stage; given the severe limitations of the cost and revenue data identified will provide little to no insight. In contrast, once input data has been reviewed and improved, scenario modelling of alternative procurement options will be an extremely useful tool to determine the most suitable procurement options for the Project, and the levels of support required from the GoN and other stakeholders.

Annex 1 Meetings and Field Visits in Nepal

Date	Meeting Purpose / Attendees	Consultant Attendees
9 June 2014, AM	Kickoff Meeting	Gabriella Bazzano (GB) Nihal Alagoda (NA)
9 June 2014, AM	DoR Meeting: Mr Arjun Jung, DOR Er Sanjaya Kumar Shrestha, DOR Mr Shiva Prasad Nepal, GESU Ms Meera Joshi Ms Rama Shrestha	GB, NA
9 June 2014, PM	MoPIT Meeting: Mr Saroj Pradhan	GB, NA
9 June 2014, PM	Birendra B Deoja, Independent Transport Specialist/ Chairman NEPCA.	GB, NA
10 June 2014	Field visit to the Project Site	NA
10 June 2014, AM	Investment Board Nepal Meeting: Mr Ashish Gajurel, IBN	GB
10 June 2014, AM	Ministry of Finance Meeting: Mr Bhuwan Karki, MOF	GB
10 June 2014, PM	MoPIT Meeting: Mr Bishnu Om Bade	GB
10 June 2014, PM	Mr Ananta Acharya, DG/Forfor Fast Track Director	GB
10 June 2014, PM	Mr Tuk Lal Adhikari, ITECO Nepal Ltd	GB
10 June 2014, PM	Mr A.N. Bhandary	GB
11 June 2014, AM	DoR Meeting	GB, NA
11 June 2014, PM	DFID Meeting	GB, NA
11 June 2014, PM	WB Meeting	GB, NA
12 June 2014, AM	DoR Meeting	NA
12 June 2014, PM	RBN Meeting	NA
12 June 2014, PM	NPC Meeting	NA
12 June 2014, PM	ITECO Meeting	NA

Annex 2 Photographs From Site Visit, 10 June 2014

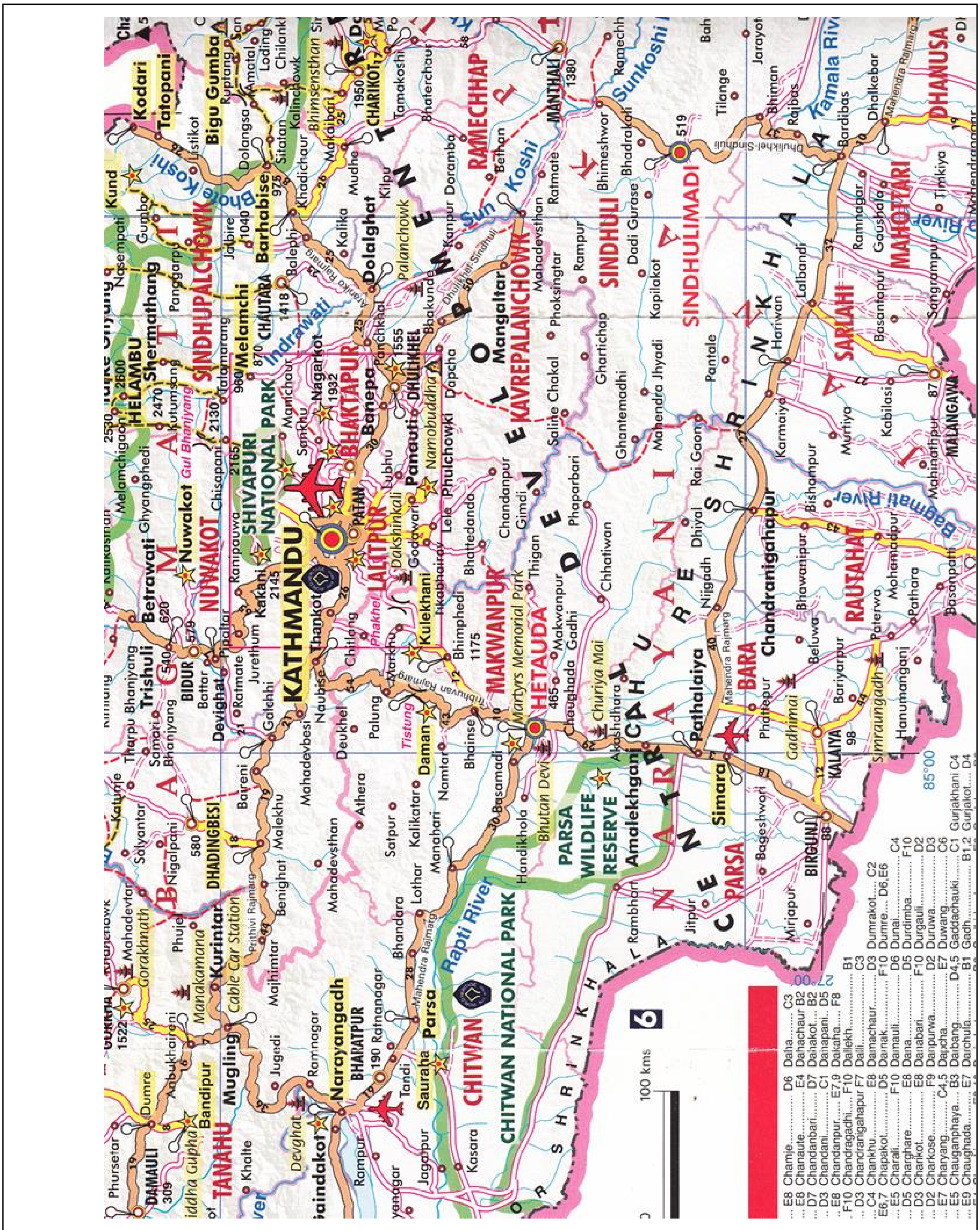
Photo 1: Access Track opened by the Nepal Army on Right Bank of Bagmati River, around Km9-10 of Fast Track.

Photo 2: Cut-slope Failure blocking the Army Track on the Right Bank of Bagmati River, around Km9-10 of Fast Track.

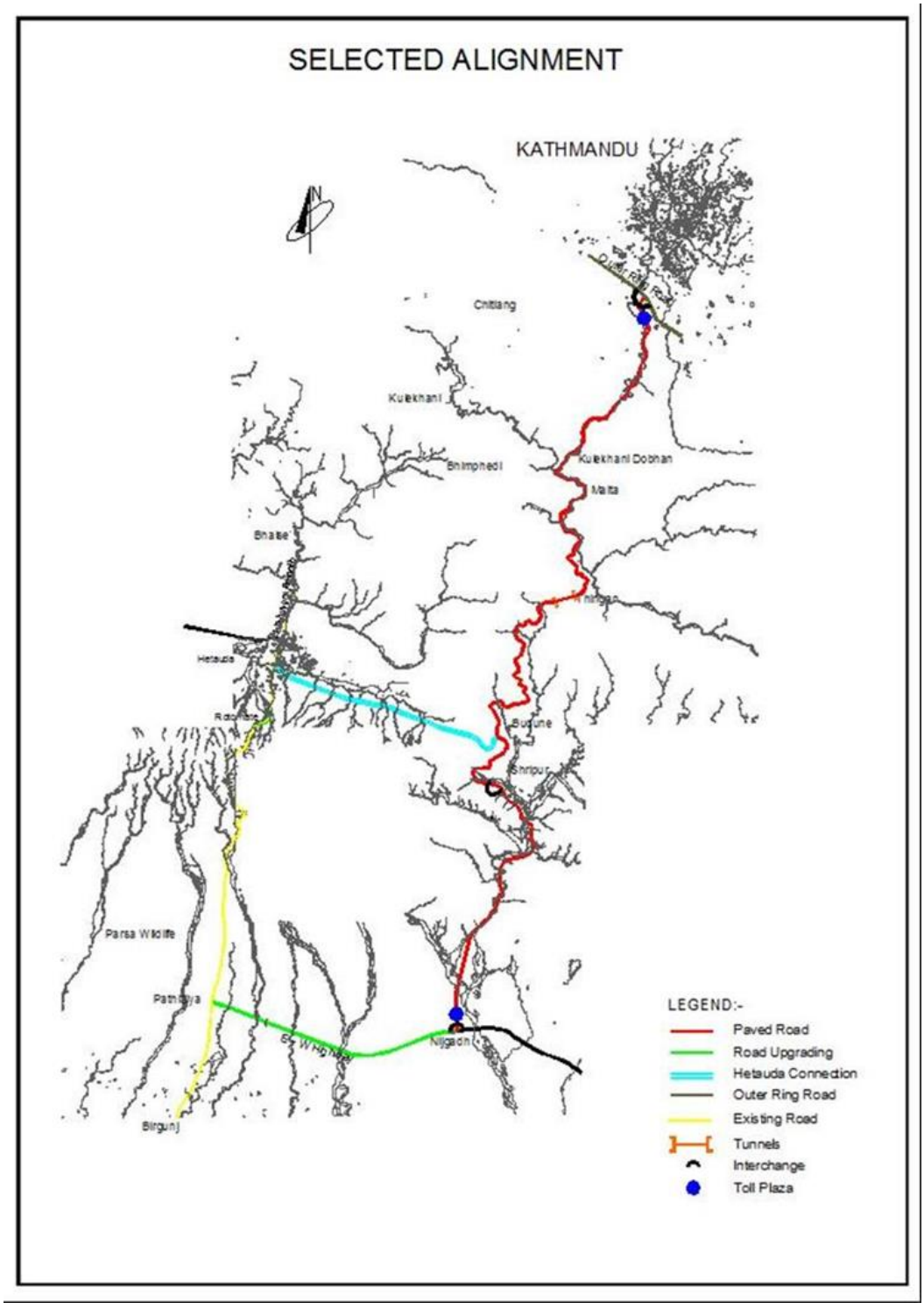
Photo 3: Looking Upstream along the Bagmati River Valley at the confluence of Kulekhani River. The Fast Track Carriageway is split here, with the Northbound on the Right-bank and the Southbound on the Left-bank.

Photo 4: Looking Downstream along the Bagmati River Valley at the confluence of Kulekhani River. The Fast Track Carriageway is split here, with the Northbound on the Right-bank and the Southbound on the Left-bank.

Annex 3 Map of Project Area



Annex 4 Recommended Alignment



Note: Abstract from ADB Feasibility Study and Preliminary Design, May 2008

Annex 5 Asian Highway Design Standards

Table 4. Asian Highway design standards

Highway classification		Primary (4 or more lanes)				Class I (4 or more lanes)				Class II (2 lanes)				Class III (2 lanes)			
Terrain classification		L	R	M	S	L	R	M	S	L	R	M	S	L	R	M	S
Design speed (km/h)		120	100	80	60	100	80	50		80	60	50	40	60	50	40	30
Width (m)	Right of way	(50)				(40)				(40)				(30)			
	Lane	3.50				3.50				3.50				3.00 (3.25)			
	Shoulder	3.00		2.50		3.00		2.50		2.50		2.00		1.5 (2.0)		0.75 (1.5)	
	Median strip	4.00		3.00		3.00		2.50		N/A		N/A		N/A		N/A	
Min. radii of horizontal curve (m)		520	350	210	115	350	210	80		210	115	80	50	115	80	50	30
Pavement slope (%)		2				2				2				2 - 5			
Shoulder slope (%)		3 – 6				3 – 6				3 – 6				3 - 6			
Type of pavement		Asphalt/cement concrete				Asphalt/cement concrete				Asphalt/cement concrete				Dbl. bituminous treatment			
Max. superelevation (%)		10				10				10				10			
Max. vertical grade (%)		4	5	6	7	4	5	6	7	4	5	6	7	4	5	6	7
Structure loading (minimum)		HS20-44				HS20-44				HS20-44				HS20-44			

Notes: Figures in parentheses are desirable values.
Minimum radii of horizontal curve should be determined in conjunction with superelevation.
The recommended width of the median can be reduced with the proper type of guard fence.
The Parties should apply their national standards when constructing structures such as bridges, culverts and tunnels along the Asian Highway.

Note: Abstract from Intergovernmental Agreement on the Asian Highway Network, Annex II

Annex 6 Recommended Next Steps for Creating Revised Traffic and Revenue Estimates

As discussed in Chapter 3, key methodological and review flaws limited the usefulness and reliability of the 2008 study of traffic and revenue potential for the Project. As a result, we suggest that the work is substantially updated and redone. The bulk of a new study would comprise development economic analysis in combination with transport planning in order to research and understand the potential drivers of future growth of traffic in the corridor, and to establish robust forecasts. Further it would require both disciplines to establish practical toll levels taking account of the benefits the new road brings to vehicle operations, and the likely sensitivity of potential users to a range of tolls.

Specific work items are detailed below. As new traffic surveys are required, there may be seasonal restrictions impacting when the work can be undertaken.

- **Inception and data review**

Review available trend data on growth of traffic, the economy, vehicle licenses by vehicle type, and development. Review availability of categories of data including development by area and trends in cross border traffic. Discuss development plans and potential commercial schemes. Review Highway Investment plans and improved surfacing which may affect traffic forecast. Produce summary work plan and list of assumptions for infrastructure and economic growth.

- **Create time series using 2008 and 2014 data**

Analyse additional files from the 2008 study which have not been available during this analysis including a) the zone plan; b) the highway network, coding and diagram; c) the OD data collected, the raw collected data, with expansion and the matrices; d) the detailed traffic counts. Produce time series of traffic and vehicle flows

- **Traffic surveys**

Perform traffic counts and “Origin-Destination” surveys (ODs) at particular sites. The OD sites should be sufficient widely-cast to pick-up all movements which might use the road. A separate site at the Indian Border is suggested in order to understand this category of traffic.

- **Catchment analysis**

Check current travel times, distances and road conditions for movements within the region where there is a possibility that traffic might divert to the new road.

- **Review potential tolls ranges**

Analyse cost savings for road users to determine viable range for toll setting. For buses and goods vehicles these cost savings should consider the potential improved utilization of vehicles, in addition to the reduced operating costs arising from generally shorter distances and improved and smoother running speeds.

- **Review willingness to pay**

Review toll-payment behaviour elsewhere in Nepal. Plan and conduct surveys of road users including bus and goods vehicle fleet managers, and car users. It is important to address these surveys to vehicle routing decision makers, as car drivers may be employees, and not the beneficiary of improved time or maintenance savings. This may be conducted during the OD survey. Establish “Value of Time” estimates for all types of road users. The increase over time as the economy grows also needs to be considered.

- **Review traffic growth factors.**

Growth of existing traffic will depend on trip purpose (as determined in OD surveys). Forecasts should be based on trend forecasts of the economy, land use and vehicle

licenses, in as much detail as possible. Forecasts growth of existing traffic should be "natural" without the impact of the new road.

- **Review of generated and induced traffic growth factors.**

Generated and induced traffic occurs when the presence of the road is a catalysing driver of new activities and travel demands, separately and in addition to natural growth in traffic demands over time. One possible method to forecast these sources of growth is to benchmark the Project to other cities/routes with improved access.

- **Create and calibrate traffic assignment model**

Model calibration to ensure that the base year (2014) has correct volumes of traffic prior to any growth forecasts. Assignment procedure uses parameters on time and operating costs by vehicle type to examine generalised costs for paths through the road network. Flows should be produced by vehicle type.

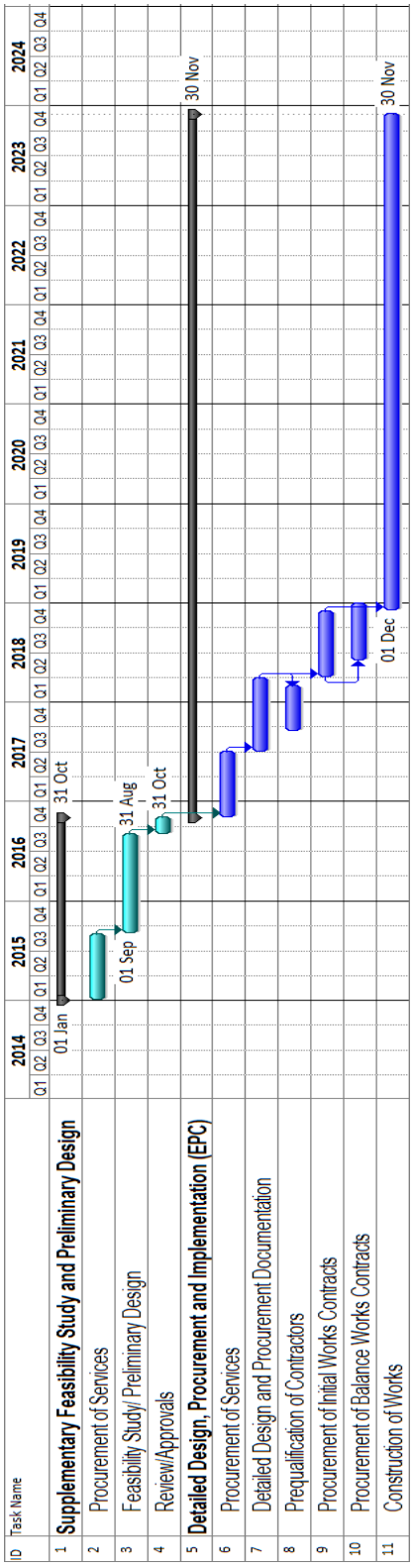
- **Generation of travel forecasts**

The calibrated model will then be forced to derive forecasts of the various traffic types. The assignment approach from base year will include analysis using a diversion curve and values of time to forecast diversion between the tolled road and untolled alternatives, and to establish generalized costs for these two cases.

- **Presentation of results.**

Overall forecasts, including flows by vehicle type and system entries into the toll road, should be presented on all links in the network. Sensitivity tests should be carried out on toll levels to show variation in volumes. Travel demand forecasts should be broken down by category and the impact of alternative assumptions or growth estimates should be reviewed to give comfort on robustness. High-Low ranges of traffic potential should also be reviewed.

Annex 7 Indicative Timeline for Project Implementation under EPC



Annex 8 Overview of PPP Contracting Options

A8.1 Traditional Procurement Options: Maintenance & Management Contracts

Traditional forms of public sector procurement typically involve little risk transference to the private sector, and typical contracts in the road sector include works and services contracts for road maintenance. For these procurement options the private sector is engaged by the public sector to complete a specific set of tasks, often with explicitly defined inputs, and where payment is according to completion of the defined tasks; in the case of a maintenance contract this could include the procurement of road surface maintenance services where payment is made depending on the number of potholes repaired.

For this contract type, the public sector retains ownership of all project assets, remains responsible for the overall costs, operations, management and legal liabilities of the project, and is the sole beneficiary of any revenues that arise. In contrast, the private sector carries no risks associated with the broader project, and is only responsible for its specific tasks. Contract length is likely to be short; from 6 months to several years, and the contract is likely to be quantity based, involving fixed fees based on unit prices. Bidding success from commercial parties is likely to be based on the lowest fixed fees for specific tasks, and penalties for late or sub-standard work may be included in the contract terms.

These forms of contacts can provide an effective way for the public sector to utilise specialist and technical skills from the private sector, but do little to harness private sector efficiencies, innovation, or capital into projects.

A8.2 Performance Based Maintenance Contracts

Under a performance based contract, private sector parties are engaged to achieve a specific outcome, and are paid depending on their success in achieving that outcome, regardless of the work required to achieve it. In the case of a performance maintenance contract for a road, the contract would specify the quality and performance parameters to which the road must be maintained to (via detailed metrics such as road evenness, number of potholes, maximum hours of lane closure etc.). These contracts provide scope to the private sector to fulfil the work required in the most cost-effective and efficient manner possible, and therefore enable private sector innovation and cost/time efficiencies to be harnessed within public sector projects.

Performance based contracts may require periodic investment by the private sector in order to minimize overall costs for the engagement, and as a result are typically longer than standard maintenance contracts; 3-5 years duration is common. Payment for the private sector's services will be in the form of a regular annuity payment, also known as an availability fee, which will be payable regardless of work done, provided that the asset has been maintained to the predefined standard. The bidding process for a performance based contract will typically involve the private sector party proposing the minimum annuity payment or 'availability fee' that they would require from the public sector to achieve the required output.

By engaging the private sector through this form of contract the public sector is seeking to harness operational efficiencies and project management innovation by the private sector. Estimates suggest that cost savings of at least 20% can typically be achieved through performance based maintenance contracts on roads compared to traditional procurement options[22]. In the process, the public sector transfers all risks associated with the maintenance of the road to the private sector, on the assumption that the private sector is better able to manage these risks. However, all remaining project risks (including

[22] Practical Steps for Developing an Availability Payment Road Concession, Pinsent Masons, 2011

construction, operation, environmental, regulatory and financial risks) remain with the public sector under this procurement option.

A8.3 Operations & Management Concessions

In a logical progression from the performance based maintenance contract, the next step to increasing private sector participation in a public sector project is for the private sector to take on the responsibility and control for the operations management, in addition to the maintenance management, of a fully completed project. This is typically procured through an Operations and Management Concession, also known as an Operate – Maintain – Transfer bid (OMT). Under this procurement option, the public sector is once again fully responsible for the design, build and completion of the project, and retains ownership of the project assets for their lifetime. However, once the project is completed and operational, the private sector will then engage a private sector party to take over control and management for the concession period. At the end of the concession term, operational responsibility for the asset returns to the public sector once more.

Depending on project specifics, there are a number of possible variations of OMTs:

- **Option 1: Rehabilitation/Expansion OMT**

In the event that a project built, owned and operated by the public sector requires capex investments for its expansion or rehabilitation, a form of OMT concession can be implemented which includes the private sector supplying the investment required for the additional capital works, and managing the process of upgrading the infrastructure. Once complete, the private sector will then operate and manage the expanded/rehabilitated project. Depending on project specifics, the private sector may require availability payments from the public sector or may collect user fees from the asset users.

- **Option 2: Full Toll OMT**

If there are user revenues associated with a project (for example user tolls for a toll road), the private sector may pay the public sector an upfront fee in return for the right to operate and manage the project. The private sector would then recoup their costs and return on investment via user fees for the asset. It should be noted that this procurement option is most popular where there is significant confidence in user revenues for a project, for example where road tolls are accepted by users and where traffic can be forecast with a high degree of certainty.

- **Option 3: Availability Payment OMT**

If there are no user revenues associated with the project, or if the private sector is unwilling to bear the market risk associated with user revenues, the private sector may be paid for their operations and maintenance services via periodic 'availability payments' from the public sector. In similar to payments for the performance maintenance contract, these payments will be subject to the project assets being operated and maintained to predefined standards. The procurement bid process will likely be based on the private sector willing to accept the lowest availability payments for the service.

Contract terms will vary significantly between these different types of concession. For all three options, asset ownership will remain with the public sector for the duration of the concession period, and costs of initial construction and of operation and management during the initial ramp up period will be borne by the public sector before transferring to the private sector. The contract term for these concessions is typically in the range of 10-30 years, with those projects which require the private sector to invest significant capex for the rehabilitation or expansion of an asset typically having longer concession terms than those that do not.

Risk allocation between the public and private sector also varies significantly between the different options. For example, the availability payment concession is explicitly structured so

as to apportion market risks to the public sector, while full toll concessions transfer all market risks to the private sector. Similarly, while the public sector bears construction risks for the initial project construction under all 3 options, the private sector then bears construction risks associated with subsequent rehabilitation or expansion works under the final option.

A8.4 Build, Operate, Transfer Concessions

Under a Build Operate Transfer (BOT) Concession[23] the private sector takes responsibility for all aspects of a project, including its design, construction, management, maintenance and operation. Asset ownership, legal responsibility, and the majority of the project's risks transfer to the private sector for the duration of the contract term, and at the end of the concession full operational rights and title for the asset return to the public sector.

Under a BOT concession, significant investment is required from the private sector in order to fund the initial design and construction of the project. This reduces the need for public sector investment, but the higher cost of capital for private sector parties compared to the public sector may result in higher overall cost for the project. In many cases, this increase in costs is countered by increased efficiencies and cost savings that the private sector is able to identify by having autonomy in the design, build and operation of a project compared to being engaged for specific tasks within the project cycle only.

In the case of toll roads, there are two specific market risks which must be considered; traffic risk, which refers to the number of vehicles which will use the road once built, and tariff risk, which refers to risks associated with toll collection and enforcement. BOT concessions for toll roads are frequently structured in a variety of ways in order to vary the allocations of traffic and tariff risks between the public and private sectors depending on project specifics. Key structure variations include:

- **Annuity BOT**

Under an annuity BOT, the private sector is willing to design, build, finance and operate the project, but is either not able, or not willing, to absorb any market risk in relation to usage of the project. This may be due to a lack of user revenues for the project (for example if the road does not have toll charges), or even if user charges are present may be due to uncertainty in the traffic forecasts or tariff acceptance by users. As a result, under an annuity BOT contract the private sector party recoups their costs through availability payments from the public sector. As in the case of Availability OMT concessions these are payable only if the project asset is available for use in a predetermined condition, and the private sector party will be financially penalized for late or sub-quality delivery or maintenance.

- **Shadow Toll BOT**

Under a Shadow Toll BOT, the private sector is willing to accept traffic risk for a project, but there are no user revenues. As a result the public sector will pay 'shadow tolls' to the private sector, based on the actual usage of the asset, and at a fixed price per user. As with the Annuity BOT this structure penalizes the private sector in the event of late delivery of the project. However, where the Annuity BOT protects the private sector from market risks, the Shadow Toll BOT leaves the private sector fully exposed to variations in usage level compared to forecasts. Shadow Toll BOT concessions are commonly structured in bands, with a base case of revenue payable by the public sector to the private sector regardless of traffic levels in order to ensure that the private sector is always able to service its debt. Successive bands will then result in increasing payment tolls to the public sector in the event of higher traffic levels, and which result in additional returns for the private sector party. The highest band under a shadow toll BOT often has a toll rate of zero payable to the private sector, capping their upside to very high traffic levels and limiting cost increases for the public sector.

[23] We include all types of BOT in this category including Design Build Operate, Design Build Finance Operate Maintain, Build Operate Transfer, Build Transfer Operate etc.

- **Revenue Sharing BOT**

Under this option, user revenues (tolls) are paid by the asset's users, and the private sector is willing to take some, but not all of the traffic and revenue risk within the project. As a result, the private sector collects the tolls, but the public sector provides a minimum revenue guarantee, so that availability payments are subsequently made by the public sector to the concessionaire in the event that user revenues drop below the threshold amount. To offset the cost of this guarantee, the private sector concessionaire will also share a portion of user revenues above a maximum threshold with the public sector. In this way the private sector is protected to the downside with regards to traffic and revenue risk, but their returns are additionally capped to the upside. This model is often popular with project developers in order to ensure bankability of the project, as the minimum revenue threshold will be designed to ensure that debt repayments are always possible, regardless of user revenues.

- **Full Toll BOT**

Under a Full Toll BOT, the private contractor receives payment solely through user tolls of the asset, and receives no payments or guarantees from the public sector. This leaves the private sector bearing all traffic and tariff risks. Given the very high initial capital expenditure costs that toll road projects commonly require, such a structure is normally unpopular amongst developers without high confidence of road usage and toll payment, very long concession terms, or some form of subsidy or viability gap funding from the public sector at the start of the concession term.

A8.5 Privatisation

The final procurement option that can be considered on the spectrum of PPP options on the basis of risk transferal to the private sector is privatisation. This is where the public sector relinquishes complete control, responsibility and ownership of the asset to the private sector, additionally passing over all components of revenue or trade potential associated with the project.

There are two variations of this procurement option, depending on the point in the project cycle that privatisation occurs.

- **Build Own Operate Concession**

Under a Build, Own Operate (BOO) concession, the private sector takes control of a potential project at the planning stages, and is then fully responsible for all aspects of its development and operation in perpetuity. Under this option the public sector is not required to provide any funding, design, management or operational oversight of the project, leaving funds available for alternative public uses.

- **Privatisation**

Under a Privatisation option, the public sector is responsible for designing, constructing, and initially operating and managing the infrastructure asset. Once the asset has been operating for a certain period, by which stage its commercial, operational and maintenance performance should be well understood, the public sector may choose to effect a sale of the asset, in its entirety, to the private sector, or of a special purpose vehicle with the right to manage the asset for the long term. Under this option the public sector must commit significant funds to construct the project, but then may be able to realize significant value from the privatisation sale relatively soon after.

For each of these options the public sector is able to realise significant value from a project; either before or after its construction. The public sector is additionally able to transfer many risks and responsibilities associated with the project to the private sector. On the downside however, privatisation may result in complete loss of control of an asset other than through subsequent regulation, and can therefore be unpopular for assets seen as strategic to a government or economy.