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Report No: PAD1238

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$ 300 MILLION

TO

THE REPUBLIC OF INDIA

FOR A

SECOND TAMIL NADU ROAD SECTOR PROJECT (TNRSP II)

March 31, 2015

Transport & ICT Global Practice
India Country Management Unit
South Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective December 31, 2014)

Currency Unit = Indian Rupees

US$1.0 = INR 60

FISCAL YEAR
April 1 – March 31

ABBREVIATIONS AND ACRONYMS

AADT	Annual Average Daily Traffic	GSDP	Gross State Domestic Product
BoQ	Bill of Quantities	HD	Highways Department
BOT	Build-Operate-Transfer	HDM	Highway Development & Management Model
CAAA	Controller of Aid, Accounts & Audit	HQ	Head Quarter
CAG	Comptroller and Auditor General of India	IBRD	International Bank for Reconstruction & Development
CAGR	Compound Annual Growth Rate	ICB	International Competitive Bidding
Capex	Capital Expenditure	ICEP	Institutional Capacity Enhancement Plan
CPS	Country Partnership Strategy	ICR	Implementation Completion and Results Report
CRN	Core Road Network	IE	Independent Engineer
CSC	Construction Supervision Consultant	INR	Indian Rupee
CVC	Central Vigilance Commission	IRI	International Roughness Index
DRO	District Revenue Officer	IUFR/IFR	Interim Unaudited Financial Report
DDO	Drawing and Disbursing Officer	IPF	Investment Project Financing
DEA	Department of Economic Affairs	iRAP	International Road Assessment Program
DPR	Detailed Project Report	IT	Information Technology
EA	Environmental Assessment	KRSDP	Kancheepuram District Road Safety Demonstration Project
EC	Environmental Cell	MDR	Major District Road
EIRR	Economic Internal Rate of Return	M&E	Monitoring and Evaluation
EMP	Environmental Management Plan	MIS	Management Information System
EMF	Environmental Management Framework	NCB	National Competitive Bidding
EPC	Engineering, Procurement, Construction	NGO	Non-Governmental Organization
ESIA	Environment and Social Impact Assessment	NH	National Highway
FM	Financial Management	NIC	National Informatics Centre
FY	Fiscal Year	NPV	Net Present Value
GoTN	Government of Tamil Nadu	ODR	Other District Road
GDP	Gross Domestic Product	O&M	Operation & maintenance
GIS	Geographic Information System	PAP	Project Affected Person
GoI	Government of India	PBMC	Performance-based Maintenance Contract
GoTN	Government of Tamil Nadu	RSELG	Road safety Executive Leadership Group
GRC	Grievance Redressal Committee	PCU	Passenger Car Unit

PD	Project Director	SH	State Highway
PDO	Project Development Objective	SIA	Social Impact Assessment
PIU	Project Implementation Unit	TA	Technical Assistance
PFMS	Project Financial Management System	TDP	Tribal Development Plan
PPP	Public Private Partnership	TMC	Technical Monitoring Consultant
RADMS	Road Accident Database Management System	TNH Act	Tamil Nadu Highway Act
R&R	Resettlement and Rehabilitation	TNRDC	Tamil Nadu Road Development Company
RAP	Resettlement Action Plan	TNRIDC	Tamil Nadu Road Infrastructure Development Corporation
RMS	Road Management System	TNRSP	Tamil Nadu Road Sector Project
RO	Resettlement Officer	USD	United States Dollar
RPF	Resettlement Policy Framework	VGF	Viability Gap Funding
RSMC	Road Safety Management Cell	VOC	Vehicle Operating Cost

Regional Vice President:	Annette Dixon
Country Director:	Onno Ruhl
Senior Global Practice Director:	Pierre Guislain
Practice Manager:	Karla Gonzalez Carvajal
Task Team Leader:	Pratap Tvgssshrk

India: Second Tamil Nadu Road Sector Project (TNRSP II)

Table of Contents

PAD DATA SHEET

India

Second Tamil Nadu Road Sector Project (P143751)

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA

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Report No.: PAD1238

Basic Information		
Project ID P143751	EA Category A - Full Assessment	Team Leader(s) Pratap Tvgssshrk
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 28-Apr-2015	Project Implementation End Date 30-Jun-2021	
Expected Effectiveness Date 01-Jul-2015	Expected Closing Date 30-Jun-2021	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Karla Gonzalez Carvajal	Pierre Guislain	Onno Ruhl	Annette Dixon

Borrower: Department of Economic Affairs			
Responsible Agency: Government of Tamil Nadu			
Contact:	Mr. Anil Meshram	Title:	Project Director, Second Tamil Nadu Road Sector Project
Telephone No.:	(91-44) 2495-4360	Email:	tnrsp1@gmail.com

Project Financing Data(in USD Million)					
[X]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[ ]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	778.20	Total Bank Financing:	300.00
Financing Gap:	0.00		

Financing Source	**Amount**

Borrower	478.20
International Bank for Reconstruction and Development	300.00
Total	778.20

Expected Disbursements (in USD Million)

Fiscal Year	2016	2017	2018	2019	2020	2021	0000	0000	0000	0000
Annual	50.00	50.00	70.00	50.00	50.00	30.00	0.00	0.00	0.00	0.00
Cumulative	50.00	100.00	170.00	220.00	270.00	300.00	0.00	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Transport & ICT

Contributing Practice Areas

Cross Cutting Topics

[ ] Climate Change
[ ] Fragile, Conflict & Violence
[ ] Gender
[ ] Jobs
[X] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Transportation	Rural and Inter-Urban Roads and Highways	80		
Public Administration, Law, and Justice	Public administration-Transportation	20		
Total		100		

☑ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Trade and integration	Trade facilitation and market access	50

Financial and private sector development	Infrastructure services for private sector development	30
Public sector governance	Managing for development results	20
Total		100

Proposed Development Objective(s)

The project development objective is to increase road capacity, enhance quality of maintenance, improve safety and support institutional development of Tamil Nadu's core road network (CRN).

Components

Component Name	**Cost (USD Millions)**
Component A: Network Improvement	746.45
Component B: Institutional Capacity Enhancement	11.00
Component C: Road Safety	20.00

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	**Rating**
1. Political and Governance	Low
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate
7. Environment and Social	Substantial
8. Stakeholders	Substantial
9. Other	
OVERALL	Moderate

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	

Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36	**X**	
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50		**X**
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Allocation of Responsibilities	**X**		CONTINUOUS

Description of Covenant

Tamil Nadu to vest the responsibility for implementation of Components A and B in the Highways Department, Sub-component C.1 and C.3 in the Transport Department; and Sub-component C.2 in the selected District administration.

Name	**Recurrent**	**Due Date**	**Frequency**
Implementation Committee /Units	**X**		CONTINUOUS

Description of Covenant

Tamil Nadu to maintain: (i) an Empowered Committee, (ii) a Steering Committee, and (iii) a Project Implementing Unit (PIU) for the carrying out of their respective implementation responsibilities under the Project.

Name	**Recurrent**	**Due Date**	**Frequency**
Additional Cells and Units (ICERS Cell, RSELG, RSMC, RSIU, and RSCIU)	**X**		CONTINUOUS

Description of Covenant

Tamil Nadu to establish and maintain: (a) an Institutional Capacity Enhancement and Road Safety Cell (ICERS Cell); (b) a Road Safety Executive Leadership Group (RSELG); (c) a Road Safety Management Cell (RSMC); (d) a Road Safety Implementation Unit (RSIU); (e) a Road Safety Corridor Implementation Unit (RSCIU).

Name	**Recurrent**	**Due Date**	**Frequency**
Ind. Engineer, Tech. Monitoring Consultants & RAP Impl. Support Agency	**X**		CONTINUOUS

Description of Covenant

Tamil Nadu to select, engage and maintain qualified/experienced: (a) independent Engineer; (b) monitoring consultant (Technical Monitoring Consultant); (c) NGO/or social mobilization consulting firm (RAP Implementation Support Agency).

Name	Recurrent	Due Date	Frequency
Third party audit consulting firm	X		CONTINUOUS

Description of Covenant

Tamil Nadu to select, engage and maintain, services of a qualified/experienced third party audit consulting firm (TPAC) to carry out semi-annual audits on financial management performance, procurement decisions and contract administration, contract performance, and compliance with statutory/regulatory requirements and safeguard documents.

Name	Recurrent	Due Date	Frequency
Safeguard Documents	X		CONTINUOUS

Description of Covenant

Tamil Nadu to (a) carry out the Project in accordance with the Safeguard Documents (i.e. EMF,RPF,EIA(s), EMP(s),SIA(s),RAP(s)); and (b) refrain from initiating any procurement process until the proposed activities have been screened as per the EMF and RPF, and the respective EIA/EMP and SIA/RAP have been prepared and approved.

Name	Recurrent	Due Date	Frequency
Pre-Construction requirements	X		CONTINUOUS

Description of Covenant

Tamil Nadu to ensure that all government permits and clearances are obtained and all pre-construction conditions imposed by the governmental authorities have been complied with, all resettlement measures have been fully executed; and roadside plantation plan have been prepared.

Name	Recurrent	Due Date	Frequency
Contractor's Obligations	X		CONTINUOUS

Description of Covenant

Tamil Nadu to ensure that each contract for civil works and/or concession contract includes the obligation of the contractor/concessionaire to comply with the relevant Safeguard Documents.

Name	Recurrent	Due Date	Frequency
Safeguards Monitoring	X		CONTINUOUS

Description of Covenant

Tamil Nadu to (a) maintain monitoring and evaluation protocols and record keeping procedures to enable supervise and assess the implementation of/compliance with safeguards documents, and (b) furnish to the Bank, quarterly reports prepared by the respective Independent Engineers or Technical Monitoring Consultants, and the RAP Implementation Support Agency on general compliance with the safeguard

Name	Recurrent	Due Date	Frequency
Mid- term impact evaluation study		31-Mar-2018	

Description of Covenant

Tamil Nadu to carry out a mid-term impact evaluation study identifying weaknesses and/or delays in the implementation of the Safeguard Documents, and recommending rectification of these.

Name	Recurrent	Due Date	Frequency

Independent assessment report		30-Jun-2021	

Description of Covenant

Tamil Nadu to hire a consultant to carry an independent assessment of (a) implementation of, and compliance with, the safeguard documents; (b) the social and environmental impact of the Project activities; and (b) the results of the mitigation or benefit-enhancing measures applied.

Name	Recurrent	Due Date	Frequency
Expenditures for land acquisition and resettlement and rehabilitation	X		CONTINUOUS

Description of Covenant

Tamil Nadu to ensure that all land acquisition required for the purpose of the Project and any compensation, resettlement and rehabilitation payment to the displaced persons in accordance with the provisions of the RAP(s) are financed exclusively out of Tamil Nadu's own resources

Name	Recurrent	Due Date	Frequency
Grievance Redressal Mechanism		30-Sep-2015	

Description of Covenant

Tamil Nadu to establish, maintain and operate district-level and state-level grievance redress mechanisms for the filing of any resettlement and rehabilitation complaints, and a state-level grievance redress mechanism for all other aspects of the Project.

Name	Recurrent	Due Date	Frequency
Enforcement of Road traffic laws and regulations	X		CONTINUOUS

Description of Covenant

Tamil Nadu to ensure that the eligible expenditures under Comp C are used exclusively for enforcing the road traffic laws and regulations and not for: (a) enforcing any non-road traffic-related laws or regulations; (c) supporting the investigation, prosecution, and/or enforcing of judgments that target individuals; and (c) purchasing arms or ammunition or training any personnel in the use of these

Conditions

Source Of Fund	Name	Type
IBRD	Implementation Units	Disbursement

Description of Condition

Funds for Component C (Road Safety Management) to be disbursed once the ICERS Cell, the RSMC, the RSIUs and the RSCIU have been established.

Team Composition

Bank Staff

Name	Role	Title	Unit
Pratap Tvgssshrk	Team Leader (ADM Responsible)	Sr Transport. Spec.	GTIDR
Shanker Lal	Procurement Specialist	Senior Procurement Specialist	GGODR

Arvind Prasad Mantha	Financial Management Specialist	Financial Management Specialist	GGODR
I. U. B. Reddy	Safeguards Specialist	Senior Social Development Specialist	GSURR
Krishnan Srinivasan	Team Member	E T Consultant	GTIDR
Kumudni Choudhary	Team Member	Program Assistant	SACIN
Martin M. Serrano	Counsel	Senior Counsel	LEGES
Rachel S. Palmer	Team Member	Program Assistant	GTIDR
Sita Ramakrishna Addepalli	Safeguards Specialist	Senior Environmental Specialist	GENDR
Sri Kumar Tadimalla	Team Member	Sr Transport. Spec.	GTIDR

Extended Team

Name	Title	Office Phone	Location
A.K. Swaminathan	Consultant		Chennai
Martin Small	Consultant		
Rashi Grover Kashyap	Consultant		
Vinod Kumar Gautam	Consultant		

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
India	Tamil Nadu	Chennai		**X**	

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required ?	Consulting services to be determined

India: Second Tamil Nadu Road Sector Project (TNRSP II)

I. Strategic Context

A. Country Context

1. **Among India's states, Tamil Nadu is the 6th most populous state and ranks 4th in terms of economic importance.** The state contributed to about 8.6% of the country's Gross Domestic Product in 2013-14[1] and over the past five years (2008-14), its Gross State Domestic Product (GSDP) has grown at an average of about 8% per annum, which is higher than the national average (of about 6%). The state's per capita income has grown at a Compound Annual Growth Rate (CAGR) of almost 8% over the period 2008-14, to reach Indian Rupee (INR) 62,589, which is about 57% higher than the national average (INR 39,904).

2. **Transport infrastructure serves as the linchpin for other major sectors underpinning the State's GSDP.** About 62% of the GSDP comes from the services sector, with predominant contributions from Trade, Hotels & Restaurants, Real Estate, Ownership of Dwellings & Business, and Transport Storage & Communication—all of which involve significant movement of goods and people.[2] The industry sector, which accounts for 30% of the GSDP, is dominated by mining, quarrying, construction, automotive and textile sub-sectors, which are transport-intensive and spread across the state. In comparison, the agriculture sector contributes only 7.4% to the GSDP, but plays a significant role in providing direct employment; nearly 50% of the state's workforce consists of commuters, cultivators and agricultural laborers spanning large geographical areas across the state. Thus, the demand for transport infrastructure is expected to increase with GSDP growth.

B. Sectoral and Institutional Context

3. **The Highways Department (HD) of Tamil Nadu is responsible for managing about 62,000 km[3] of the state's road network,** which comprises National Highways (NH, 4,974 km, 8%), State Highways (SH, 11,594 km, 19%), Major District Roads (MDR, 11,289 km, 18%) and Other District Roads & Sugarcane Roads (ODR, 34,160 km, 55%).[4,5] Of these, NH, SH and MDR broadly serve as arterial networks carrying sizeable share of freight and passenger traffic, whereas ODR mainly serve the purpose of providing connectivity and access to rural areas.[6] The HD is organized mainly along the lines of function, funding or schemes, e.g., separate wings

[1] Source: Data-book Compiled for use of Planning Commission, July 2014, Government of India.
[2] ibid.
[3] Of these, the National Highways are mostly funded and managed in coordination with the central government.
[4] Two other corporations – Tamil Nadu Road Infrastructure Development Corporation (TNRIDC) and Tamil Nadu Road Development Company (TNRDC) - are also engaged in road sector projects, albeit in a limited role, as mandated by the state government from time to time; TNRIDC focuses on the development of road and bridge infrastructure in industrial areas, whereas TNRDC focuses on a few Public Private Partnership (PPP) projects.
[5] The remaining stretches - village & other roads - are managed by the local governing bodies at the village or municipal levels, mostly under the purview of the Department of Rural Development and are funded through a variety of state or central-sponsored schemes and credit lines such as, for example, Pradhan Mantri Gram Sadak Yozana (PMGSY) and Rural Infrastructure Development Fund.
[6] In tune with this, while the NH comprises only double-lane (56%) and multi-lane (43%) roads, the SH includes mostly double-lane (87%, but including roads with non-standard configurations, e.g., insufficient roadway width), whereas the majority of MDR are intermediate lane (56%) and that of ODR are single lane (89%). Source: http://www.tnhighways.gov.in/about.html.

responsible for Planning, Construction & Maintenance, Quality Assurance & Research, National Highways, National Bank for Agriculture and Rural Development (NABARD) & Rural Roads, Tamil Nadu Road Sector Project (TNRSP), etc. Since its establishment in 1946, the HD has nearly doubled the road network.

4. **State's achievements in the road sector.** Over the last decade, the Government of Tamil Nadu (GoTN) and its HD, in collaboration with the World Bank,[7] has accomplished the following:

a) *Enhanced the capacity and quality of road network:* The size of the primary network comprising of NH, SH and MDR has expanded by nearly 50%, from 18,375 km to 27,857 km; and within the Core Road Network (CRN) comprising of SH and MDR, the percentage of roads with less than 2-lane width has decreased from 60% to 38% and the percentage of roads in poor condition has reduced from about 35% to 8%. The enhancement of capacity, as evidenced in the TNRSP I, is beneficial to the road users, agricultural producers, roadside communities, industries, transport operators and tourists, as it results in (i) better connectivity leading to higher levels of economic activity and tourism and hence greater employment opportunities; (ii) lower freight and passenger transport costs enhancing the competitiveness of tradable sectors economy, providing economic and social benefits to the communities; and (iii) improved access to urban industrial consumption centers enhancing agricultural sector productivity and incomes.

b) *Increased expenditure:* During the Ninth Plan Period (1997-02), the GoTN on an average spent INR 6.5 billion (USD 108 million) per annum in the sector. In comparison, road sector expenditure during 2009-14 increased from INR 36.9 billion (USD 615 million) to INR 54.8 billion (USD 913 million), at a CAGR of 11%.

c) *Enhanced allocations to maintenance:* Maintenance of roads has been receiving positive attention in terms of increasing allocations over the years. Over the last five years, the expenditure towards maintenance increased at a CAGR of 18% and, at around 48% of the total expenditure is almost equaled the expenditure on asset creation and upgrading. Similarly, allocations for maintenance have progressively moved up to match 100% or more of the norms indicated by the Finance Commission of India, which is a significant achievement in comparison to many other states. Here is noteworthy that the pattern of expenditure of these increased allocations seems to have significant room for improvement, as explained in the next section on challenges.

d) *Improved road safety performance:* Some of the notable efforts included (a) launching of a Road Safety Policy and Road Safety Fund; (b) increasing the number of patrol vehicles and removal of about 300 black-spots; and (c) implementing a Road Accident Database Management System (RADMS).[8] Consequently, the number of fatalities from road accidents per 10,000 registered vehicles reduced from 19 in 2003, to 11 in 2012.

[7] The first Tamil Nadu Road Sector Project (TNRSP I) extended loan support of about USD 400 million for the upgradation of 724 km of roads, periodic maintenance of 1,030 km of roads, and several road safety and institutional strengthening initiatives, during 2003-2012. In the Implementation Completion and Results Report (ICR), the project outcome and also the performances of the Borrower as well as the Bank were rated as Satisfactory.

[8] This accident database management system is now operational with coordinated use among the Police, Transport and Highways Departments and is well-recognized as a best practice referred to by many other states.

5. **The road sector in Tamil Nadu is facing three notable challenges: inadequate and suboptimal investments, insufficient implementation capacity for large-scale projects and poor road safety.** Over the last decade, the state government made significant progress in addressing these challenges. Yet, these challenges remain, due to the rapid economic growth of the state, the consequent increase in the number of vehicles and the demand for road transport. A brief description of the proximate challenges and how GoTN and HD are planning to address them is provided below.

a) **Investments lagging behind demand:** During the last decade, while the length of the NH, SH and MDR in Tamil Nadu increased by about 50%, the number of registered vehicles in the state increased by 160%. In a recent study, the Indian Institute of Technology, Chennai, have estimated that augmenting capacity of nearly 2,900 km of relatively higher-traffic carrying segments – constituting just about 13% of the state's CRN – alone would require about INR120 billion (USD 2 billion). According to the state's Vision 2023 document, the road sector investment requirements over the next 10 years are estimated at INR 900 billion (USD 15 billion). As against these estimates, the annual capital expenditure (capex) for the entire sector currently stands at INR 24 billion (USD 400 million).

b) **Sub-optimal expenditure patterns:** In the recent years, a sizeable portion of the capex is being channeled towards the 'lower-traffic' rungs of the network.[9] Such emphasis on capacity expansion of 'lower' rungs of the network contributed to improved road access but it also resulted in underinvestment in capacity expansion of the 'upper' rungs of the network with high-traffic. Currently, the relatively high-traffic segments of the CRN are being maintained by providing strengthening coats at 1-3 year intervals (under the head of maintenance) instead of more appropriate practice of undertaking structural interventions and capacity expansion (under the head of capex).

c) Also, most capital expenditures are small-size, traditional item-rate contracts. For example, in 2011-12, the HD has spent nearly INR 18.6 billion (USD 310 million) towards upgrading of roads. This amount was spent on a total of 5,342 km of the road network, in the form of 2,675 Bill of Quantities (BoQ)/item-rate contracts, implying an average contract size of about INR 6 million (USD 0.1 million), covering a mere 2.5 km.[10,11] Using this highly fragmented approach leaves a negligible impact and involves tackling a needy corridor through small stretches over several years, resulting in rapid road degradation and constant maintenance. Equally significantly, these contracts are prone to high transaction costs, offer limited scope for harnessing economies of scale/technology, and have little incentives for containing time and cost overruns or optimizing life cycle costs.

[9] During 2009-14, nearly 60% of the INR 61.4 billion expenditure towards capex was directed towards widening/strengthening road stretches mainly in the MDR and ODR segments. The remaining amount was spent mostly on structures such as flyovers, bridges and Road/Rail-Over-Bridges.

[10] Usually, the type of interventions under these contracts involved improving geometric deficiencies, widening of culverts, improving junctions etc. at specific locations and may not include comprehensive rehabilitation/widening measures over the entire length.

[11] In a similar vein, it had spent nearly USD 76 million towards maintenance of 4,148 km of the road network through 2,672 annual maintenance contracts (with an average size of USD 0.03 million covering 1-2 km).

d) **Low implementation capacity:** In recent years, the capacity of HD for managing upgradation activity has increased but only up to about 800 km/year whereas to be able to achieve GoTN's Vision 2023 of upgrading about 20,000 km[12] of roads over the next 10 years, HD would need to more than double its implementation capacity.

e) **Road safety:** In India, road traffic is rated the number one killer of males aged 15-29. The estimated socio-economic cost of road related injuries is over USD 50 billion per annum. In Tamil Nadu, the recorded fatalities on roads increased by almost 60% over the last decade – from 9,570 in 2005 to 15,545 in 2013. Tamil Nadu currently ranks in the top five states in terms of road accidents, fatalities and injuries, accounting for about 13.8% of total accidents and 12% of persons killed in road accidents in India.[13] In 2012, Tamil Nadu had 22 fatalities, per every 100,000 people, which is double the national average of 11 fatalities. An analysis of a recent review of the management and capacity of the state government and its various agencies engaged in the road safety agenda has underscored that the core issue underlining road trauma is that state roads have not been designed to accommodate the increasing number of vehicles and traffic flow. The study also concluded that the state's capacity to respond to road safety challenge does require substantial augmentation across and through more coordinated involvement of multiple stakeholder departments such as Transport, Police, Highways, Health and Education not only at the state level but also at lower operational levels such as districts and corridors.

6. **GoTN is conscious that the aforementioned challenges pose significant risk to the achievement of its plans for** improving the capacity, quality and safety of the State's CRN, through an ambitious program , entitled "Tamil Nadu State Highway Development Program (TNSHDP), " which aims to strengthen and widening 4,000-5,000 km of high-traffic segments of the CRN during the next 3-4 years. Accordingly, it has developed a multi-pronged strategy with the following key elements; and sought Bank's assistance in implementing the same.

a) *Address the accumulated investment needs of high-traffic stretches* through priority capital expenditure interventions;
b) *Adopt better contracting arrangements* that encourage economies of scale and offer stronger incentives for performance, e.g., Engineering Procurement Construction (EPC), Build-Operate-Transfer (BOT) and long-term Performance-Based Maintenance Contracts (PBMC), and bolster implementation capacity through harnessing the services of the private sector;[14]
c) *Enhance institutional capacity of the HD* through (i) organizational restructuring, acquisition of new skills and training, to be able to better manage the new contracting arrangements; and (ii) mainstreaming the capacity enhancement measures initiated during TNRSP I, through the Project Financial Management System (PFMS), Road

[12] About 2,000 km into 6/8 lane Expressway corridors and modernization of an additional 5,000 km of SH into 4-lane highways and 16,000 km into 2-lane roads with paved shoulders.
[13] Source: Road Accidents in India, 2012, Ministry of Road Transport and Highways
[14] Under the previous World Bank funded project, the HD spent nearly USD 330 million to upgrade 724 km of the SH network (with contract sizes ranging from USD 50 to 150 million, each covering approximately 100 to 400 km). The International Roughness Index (IRI) on these project roads, at 2.88, was substantially lower than the 5.28 observed on a selected sample (240 km) of non-project roads. Equally importantly, the improvement of an entire strategic corridor of 700 km (with several bypasses and bridges) was clearly perceptible and widely appreciated by all the stakeholders.

Management System (RMS), Road Accident Database Management System (RADMS) and Geographic Information System (GIS);

d) *Mobilization of additional resources* through user charges, e.g., tolls, and gradually moving away from the multilateral funding support; and
e) *Improve Road Safety* through a coordinated, inclusive and result-oriented road safety strategy and action plan.

7. In keeping with the aforementioned plans and preferences of GoTN, the proposed project is focusing mainly on improving (a) capacity and maintenance of priority roads; (b) the institutional capacity through improved policies, operational systems and procedures; and (c) road safety.

8. **GOTN's commitment to reforms:** GoTN attaches high importance to economic and social infrastructure services and has gradually increased allocations from the exchequer to improve these services. For example, GoTN established a separate Fund entitled Tamil Nadu Urban Development Fund, to boost municipal infrastructure services. In a similar vein, as the mobilization of additional resources has become imperative for sustainable provision of electricity, it implemented a massive revision of power tariffs – by 37% (after 10 years). In the road sector too, under the aegis of TNRSP I, GoTN restructured the functions of the HD and created a robust platform for Information Technology (IT) use in improving efficiency and decision making, through development of applications focusing on road asset management, project finance & management, and road accident database management.

C. Higher Level Objectives to which the Project Contributes

9. The previous World Bank assisted road project in the state had contributed to notable expansion of capacity of the state highways and also contributed to the state's ability to better manage highway development and maintenance and road safety. The proposed follow-on project is based on those accomplishments and is aimed at addressing the challenges that the state is currently facing. Specifically, the project would support GoTN in implementing a more sustainable strategy involving (a) innovative contracting structures (EPC, PPP and multi-year PBMC) with scope for greater efficiency and attention to maintenance; (b) gradual shift towards more optimal allocation of expenditures for capacity expansion and maintenance; and (c) more coordinated approach to road safety at the state and field levels.

10. The project is consistent with the World Bank Group's Country Partnership Strategy which was discussed at Board on April 11, 2013 (Report number 76176-IN). The project envisions achievement of improved road services through better practices in asset management, planning, budgeting and road safety, mobilization of additional resources and enhanced private participation. These are expected to contribute to improve *transport connectivity* – and the associated benefits of improved access, growth, competitiveness and opportunities for employment and trade – a key development outcome envisaged through the strategic engagement in the area of *integration* as part of the CPS. In addition, the improved roads and road services are likely to catalyze the employment shift from agriculture to services and manufacturing and stimulate optimization of locational choices for firms and generate better trading efficiencies and competitiveness.

11. The project fits nicely with the Finance-Plus vision underpinning the Bank's engagements in India through supporting inter alia: (i) use of better contracting approaches (e.g., EPC, PPP and PBMC); (ii) capacity enhancement via enterprise-wide mainstreaming of IT-based decision-support systems and procedures; and (iii) multi-sector interventions to improve road safety at the state and district levels.

12. The Bank is uniquely positioned to support these initiatives based on relevant experience[15]. This follow-on project would allow the GoTN and Bank to build on the development partnership spanning the areas of roads, urban infrastructure, health and Tsunami works and consolidate key initiatives from TNRSP I in the areas of institutional strengthening and road safety.

II. Project Development Objectives

A. PDO

13. The project development objective is to increase road capacity, enhance quality of maintenance, improve safety and support institutional development of Tamil Nadu's core road network (CRN).

B. Project Beneficiaries

14. Primary beneficiaries include the communities, industries, and businesses within the area of influence of the proposed project roads in the CRN, through a combination of reduction in travel time and costs and improved road safety. The planned enhancements to the policy framework, operating environment and the institutional capacity of agencies engaged in road development, maintenance and road safety are expected to benefit the users of the remaining roads in due course.

C. PDO Level Results Indicators

15. The achievement of the PDO will be measured by the following indicators:

- Indicator 1: Increase in roads in good and fair condition as a share of total classified roads
- Indicator 2: Reduced average travel time on project roads
- Indicator 3: Reduced average Vehicle Operating Cost (VOC) on project roads
- Indicator 4: No increase in number of annual fatalities from road accidents on project roads

16. The project's results framework is presented in **Annex 1**.

[15] The World Bank implemented similar projects: National Highways Interconnectivity Improvement Project (EPC contracts), Andhra Pradesh Road Sector Project (PBMC and Road Safety Demo corridors), and Second Karnataka State Highway Improvement Project (modified-annuity type PPP concessions).

III. Project Description

A. Project components

17. The project supports the GoTN's broader state highway development initiative, through three components: (A) Network Improvement; (B) Institutional Capacity Enhancement; and (C) Road Safety as described below. The details are placed in **Annex 2**.

18. **Component A: Network Improvement (Total Cost: USD 746.45 million; IBRD Loan: USD 274.45 million):** The project will support the upgradation and/or maintenance of selected roads within the state's core road network in two phases, through three contracting approaches as explained below.

- *Upgradation and maintenance through EPC contracts (Sub-component A1):* construction of civil works for widening and upgrading of approximately 430 km of roads of CRN, to two-lane with paved shoulders standards through EPC contracts, with maintenance for a 5-year period after the construction.
- *Upgradation and maintenance through PPP concessions (Sub-component A2):* construction of civil works for widening and upgrading of approximately 145 km of roads of CRN, to four-lane standards and maintenance during the concession period, with the option of tolling; and
- *Maintenance through Multi-year Performance-based Maintenance Contracts (Sub-component A3):* Maintenance of approximately 600 km of CRN for a 5-year period.

19. This component will support a portion of the cost of the civil works and the associated activities including (a) transaction advisory, supervision of quality control, and advisory services; and (b) land acquisition, resettlement & rehabilitation, shifting of utilities. Also, the project roads will be designed and implemented with particular attention to achieving better road safety outcomes especially the vulnerable road users.

20. **Component B: Institutional Capacity Enhancement (Total Cost: USD 11 million; IBRD Loan: USD 8.8 million):** This component aims to implement the Institutional Capacity Enhancement Plan (ICEP) developed by the HD and approved by GoTN. The project will support (a) *policy level actions* and commitments to improve both mobilization and allocation of resources in the road sector and (b) *operational level initiatives* to enhance enterprise-level efficiency through (i) process improvements; (ii) organizational restructuring; (iii) sustaining investments in IT infrastructure; and (iv) Training & Knowledge Management. This component includes mainstreaming and integrating the key IT-based systems i.e. RMS, PFMS and RADMS. The assistance from the component will be used for goods and consulting services to implement the operational level initiatives and to establish and operate an information system for monitoring achievements with respect to policy commitments, institutional capacity and implementation effectiveness. This component relies on a variety of systems and process improvements, organizational restructuring, IT interventions and capacity building through training and knowledge transfer. The results of these efforts will be measured through completion/implementation of these measures and impact on actual improvements achieved in project implementation.

21. **Component C: Road Safety (Total Cost: USD 20 million; IBRD Loan: USD 16 million):** In addition to the provisions for better road safety on project roads, the project will support achievement of improved road safety, at two levels, in line with the recommendations of the recent review of the State's road safety management capacity, as explained below.

22. First, at *the state level*, GoTN's capacity to achieve better road safety will be enhanced through a combination of strategic and operational interventions. At the strategic level, the focus will be on development of a comprehensive road safety strategy, delineating the roles, responsibilities, investments and other initiatives of various stakeholder departments involved in the road safety agenda, viz., Transport, Police, Highways, Health, Education and local bodies. At the operational level, the project will support implementation of the road safety strategy including through assistance in planning, investments and monitoring and evaluation. Specifically, focusing on areas/gaps identified during the safety management capacity review, this component would support inter alia (a) awareness and promotion, results framework, monitoring & evaluation, research, training and knowledge transfer through advisory assistance, (b) better enforcement and compliance (Police and Transport) and, (c) integrating the RADMS with the road management system and the health system and mainstreaming it, through complementary investments. These efforts will be channeled through a Road Safety Executive Leadership Group (RSELG) supported by a Road Safety Management Cell (RSMC), both with participation from the multiple stakeholder departments in the road safety agenda. Of these, RSELG is expected to oversee, guide and provide leadership to the overall road safety policies and interventions, whereas RSMC is expected to play a more operational role in terms of implementing various initiatives and serving as the secretariat to RSELG. The component will also support engagement of technical/subject matter experts to assist RSELG and RSMC.

23. Second, at the field level i.e. in two districts and a corridor, the project will support designing and implementation of road safety improvement initiatives, to demonstrate how multiple stakeholder departments could achieve better outcomes through coordinated efforts and investments. Thus bringing together the needs and priority areas of various stakeholder departments, this initiative will support (a) design of comprehensive program of investments and other interventions covering inter alia effective management of roadside safety issues, speed management, risk-targeted patrol plans, campaigns, promotion of helmet-wearing, trauma services etc.; and (b) implementation of that program. As in the case of the state level, the participation of the multiple stakeholder departments will be achieved through a district/corridor-level Road Safety Implementation Unit (RSIU) for the district demonstration projects and a Road Safety Corridor Implementation Unit (RSCIU) for the corridor demonstration project, drawing upon representatives of the various stakeholder departments, under the overall leadership of the Collector (administrative head of the District) and the Transport Department respectively.

B. Project Financing

24. This project will be supported under an Investment Project Financing (IPF) instrument, using an IBRD Flexible Loan of USD 300 million with LIBOR plus a variable spread, and annuity repayments with a final maturity of 29 years including a grace period of 7 years.

25. The total cost of the project is estimated at the equivalent of USD 778.20 million. This includes costs of construction of works, post-construction maintenance, maintenance works, physical and price contingencies, supervision, project management, land acquisition,

resettlement and rehabilitation, utility shifting, environmental management, consulting services and goods. The Bank loan will contribute to construction works, maintenance works, physical and price contingencies, supervision, management, and other consultancy services and goods related to the Institutional Capacity Enhancement and Road Safety components. The percentages of costs that will be contributed through the Bank loan are (a) 50% of costs of construction works and associated physical and price contingencies for EPC contracts; and (b) 50% of estimated costs of construction works and associated physical and price contingencies, for PPP concessions; and (c) 20% of costs for PBMC maintenance works, and (d) 80% of costs for all consultancies and goods under the project and for works under the Road Safety Component.

26. The GoTN will cover all the remaining and related costs of construction works, maintenance works, and consultancies including land acquisition, resettlement and rehabilitation, shifting of utilities, Operation & Maintenance (O&M) expenses (in case of EPC), viability gap funding or construction cash support and annuity payments (in case of PPPs). The table below presents the detailed project costs for each component, along with respective portions to be met through financing from the Bank and GoTN. For the Network Improvement Component, USD 100.4 million is envisaged to be first mobilized by the selected concessionaire during the construction period and paid back by the GoTN in the form of annuity payments during the operation & maintenance period.

Table 1: Project Cost and Financing (USD million)

Component	Cost including Contingencies	Bank Financing	GOTN Financing
A – Network Improvement	**746.45**	**274.45**	**472.0**
B - Institutional Capacity Enhancement	**11.0**	**8.8**	**2.2**
C - Road Safety	**20.0**	**16.0**	**4.0**
Total Project Cost	**777.45**	**299.25**	**478.2**
Front End Fee	**0.75**	**0.75**	**0.0**
Total Financing Required	**778.20**	**300**	**478.2**

C. Lessons Learned and Reflected in the Project Design

27. The project builds on experience gained in various completed and ongoing lending operations focusing on development of roads at the national as well as state level – including the first Tamil Nadu Road Sector Project – and the Bank's analytical work in the sector.

28. Robust planning and preparation, including through good quality Detailed Project Reports: Many highway contracts including those financed by the Bank routinely face time and cost overruns that are attributable to inadequate attention to preparation activities, such as design, land acquisition, Resettlement & Rehabilitation (R&R) and utility shifting. This risk is being mitigated through following a structured, time bound plan for completing major preparatory actions – in tandem with major procurement actions such as, invitation for bids and award of contracts. The Detailed Project Reports (DPR) are being prepared by expert consulting firms based on best-in-class Terms of Reference and a transparent, competitive selection process and involvement of local field-level staff of HD.

29. Replication of best practices and preservation of capacities: The first Tamil Nadu Road Sector Project demonstrated HD's potential to successfully prepare and implement large-scale civil works delivering better riding quality and reduced travel time. The Implementation Completion Results Report at the end of first TNRSP underscored the importance of preserving – and building upon – this potential by progressively shifting the GoTN's allocations to the road sector towards larger contracts with scope for greater economies, impact and adopting more efficient risk sharing arrangements.

30. Eschew traditional item-rate contracts for construction and the associated maladies of significant time and cost overruns and neglect of maintenance: All the upgradation works are being taken up through EPC+maintenance contracts or PPP concessions, wherein the construction and maintenance responsibilities are clubbed under a single contract. Furthermore, major risks related to design, time, and cost overruns are transferred to the contractor and payments are linked to outcomes, thereby providing stronger incentives for provision of better services to road users, pursuit of investment, operational efficiency and optimization of costs over the contract life cycle. In case of maintenance, similar objectives are being sought to be achieved through multi-year maintenance contracts wherein payments are linked to performance.

31. There will be better coordination between civil works and land acquisition/ resettlement execution, if implementation is carried out by the same agency: In order to reduce time and cost overrun in implementation, there will be close coordination between civil works and land acquisition implementation. In order to maintain this and expedite the land acquisition and resettlement implementation, appropriate authority in land acquisition matters have been delegated to the staff of the PIU.

IV. Implementation

A. Institutional and Implementation Arrangements

32. Agency-wise Responsibilities: The HD will be implementing the project through a Project Implementation Unit (PIU). The PIU is headed by a Project Director, staffed with engineers, support personnel of the HD and complimented with staff of the Finance, Revenue and Environment Departments. The HD will be the overall custodian of the project planning, budgeting, and progress of project components. PIU will be directly responsible for all aspects of the network improvement component. The HD and the Transport Department will be responsible for the implementation of the Institutional Capacity Enhancement and Road Safety components, respectively. An Institutional Capacity Enhancement and Road Safety Cell within the HD headed by a Superintending Engineer will carry out the day-to-day implementation of the activities under the Institutional Capacity Enhancement and Road Safety Components. In implementation of the road safety component, the Transport Department and the HD will coopt other stakeholders departments, i.e. Police, Health and Education Departments and relevant District Administration.

33. Oversight and Coordination Mechanisms**:** GoTN has established an Empowered Committee to make policy decisions, resolve inter-departmental issues, and guide the HD in implementation of the project. The Empowered Committee, comprises of the Chief Secretary, the Principal Secretaries of the Finance and the Highways & Minor Ports Departments and the

Project Director, is headed by the Honorable Minister of Highways & Minor Ports. The GoTN constituted a Steering Committee to make all procurement decisions, periodically review the implementation of the project, resolve emerging issues, and provide necessary guidance to the PIU. The Steering Committee is headed by the Principal Secretary, Highways and Minor Ports Department and comprises of the Principal Secretary, Finance Department, the Project Director and the Chief Engineer (Construction & Maintenance) of the HD.

34. The detailed description of the project implementation arrangements are provided in **Annex 3**. An Implementation Support Plan is provided in **Annex 4**.

B. Results Monitoring and Evaluation

35. The results monitoring and evaluation framework will have four main components:

36. **Results Framework:** The Results Framework in Annex 1 will be used to monitor and evaluate the achievement of the PDO and the indicators. The results will be reported at least twice a year as part of the Bank's Implementation Support missions.

37. **Monitoring of Road Upgradation and Maintenance contracts** will be primarily conducted by the Supervision consultants and GoTN/PIU's field units responsible for each project road, and the information will be collated through a standardized reporting system for further monitoring by the GoTN. The reporting system will have built-in flags for highlighting critical issues such as, time and cost overruns, quality problems and disputes.

38. **Third-Party Performance Monitoring and Auditing:** PIU will hire independent multidisciplinary performance auditors to assess project quality and progress. The audit will cover technical aspects, fiduciary and safeguards compliance and quality of outputs. The auditors will review, appraise, and assess performance of the activities accomplished two times a year. The auditors will report to the Project Director, TNRSP and recommend measures to be taken to improve performance. PIU, consultants and contractors will furnish necessary information and data to the auditors to facilitate their task. The auditors' report will be reviewed by the project director and shared with the Empowered Committee and Bank supervision missions.

39. **Impact evaluation:** The project will include evaluation of the socio-economic impact of the project through road user satisfaction surveys using a comparative study of project roads and a 'controlled sample' of similar, non-project roads. Baseline surveys at project start and impact surveys at mid-term of the project and on project completion will be conducted. The results will be reviewed by the Project Steering Committee.

C. Sustainability

40. GoTN places high importance on the road sector, with particular emphasis on maintenance and road safety. For example, there is sustained increase in allocations for the sector (at 11% CAGR over the last decade) and for road maintenance (at 18% CAGR over the last five years) constituting nearly half of the overall allocations for the sector. After pioneering the RADMS, GoTN allocated USD 50 million in 2014-15 budget for undertaking various initiatives. From a project design standpoint, sustainability of the loan-supported investments is being secured through contracting methods that include construction and maintenance, thus making the

government commitment to ensure post-construction maintenance contractually binding. The GoTN is keen to mobilize additional revenues through user charges and is in the process of finalizing a state toll policy. Operationalization of this policy would enhance the state's ability to devote more resources for up-gradation and maintenance, either directly or through securitizing the future revenue streams from additional avenues. IT-based systems developed for improving the management of road assets, as well as project finance and management will be mainstreamed through institutional capacity enhancement, making IT-based systems mandatory for budgetary allocation and payment decisions.

V. Key Risks

41. The political and governance risk is considered low due to the GoTN's commitment to the key elements of the project - programmatic approaches, institutional capacity enhancement and road safety. The risks related to sector strategies & policies, technical design and fiduciary are considered moderate since these are steps in progression initiated in the first project. The risks related to institutional capacity for implementation and sustainability, environmental and social, and stakeholders (opposition) are rated substantial, see explanation below; an extended analysis of all risks and corresponding ratings are in **Annex 5**.

A. Overall Risk Rating and Explanation of Key Risks

42. Institutional Capacity for implementation and sustainability (Substantial Risk): The project has a robust capacity for implementing the network improvement and road safety components. The institutional capacity enhancement component is expected to be a challenging endeavor since it aims to mainstream several best practices across the HD requiring a change management effort, which may face opposition from vested interests or general resistance to change. This risk is rated substantial and the mitigation measure is to incorporate ownership from officers at various levels of the HD. To ensure this, the draft of the Implementation Capacity Enhancement Plan is developed by HD's working group of middle-management professionals and recommended by the Board of (Chief) Engineers to the GoTN.

43. Environment and Social (Substantial Risk): Environmental and Social risk is substantial because of potential adverse impacts due to land acquisition, displacement of people, construction and operational impacts. The environmental impacts include loss of vegetation, impacts on physic-chemical parameters, displacement of cultural and community resources. These risks will be mitigated through developing and implementing robust Environmental Management Plans (EMP) and Resettlement Action Plans (RAP).

44. Stakeholders (Substantial Risk): The project is likely to face opposition from stakeholders in the areas of institutional level change management (from the staff) and mobilization of additional resources through direct and indirect user charges (from the road users and political opposition). The institutional level resistance will be mitigated through encouraging inclusive consultations and implementation. The external opposition for user charges will be alleviated through broader dissemination/demonstration of the rationale for such user charges.

45. Summary of risks and risk-rating is given below:

Sl. No.	Risk Categories	Rating (H, S, M or L)

1	Political and governance	Low
2	Macroeconomic	Moderate
3	Sector strategies and policies	Moderate
4	Technical design of project or program	Moderate
5	Institutional capacity for implementation and sustainability	Substantial
6	Fiduciary	Moderate
7	Environment and social	Substantial
8	Stakeholders	Substantial
9	Other	--
	Overall	Moderate

46. Given the preparation and progress thus far, the project is expected to face low to moderate risks in implementation of the Network Improvement Component. In case of the remaining components – namely, Institutional Capacity Enhancement and Road Safety – the residual risk appears to be strongest in the case of Institutional Capacity Enhancement, particularly with regard to its sustainability in the medium to long run. The overall risk for the project is rated as moderate.

VI. Appraisal Summary

A. Economic and Financial Analysis

47. The economic evaluation of the proposed road investments was conducted for all the upgradation roads using the Highway Development and Management Model (HDM-4), a globally accepted analytical tool for economic analysis for highways with investment alternatives, which simulates life cycle conditions and costs and provides economic decision criteria for multiple road design and maintenance alternatives and computes the Net Present Value (NPV) and the Economic Internal Rate of Return (EIRR). The project's main economic benefits are savings in road user costs resulting from the road improvements which include the vehicle operating costs, travel time costs to both passengers and commercial vehicles, maintenance costs, and accident costs. The evaluation assessed whether upgradation of the proposed project roads is justified based on current traffic volumes and projections, road condition, and the proposed investments.

48. The cost-benefit analysis of the project indicates that the economic benefits are satisfactory. The overall EIRR for the EPC upgradation roads is 30.9%. The NPV of these roads is estimated at USD 420 million, at a 12% discount rate over a 25-year evaluation period. The sensitivity of the EIRR to the changes in costs and benefits show that a 20% increase in project costs would result in the EIRR reducing to 26.9%. If the benefits are reduced by 20%, the EIRR would decrease to 26%. In a more adverse scenario of a simultaneous 20% increase in project cost, 20% decrease in benefits and one year delay in construction, the overall EIRR is estimated to be 22.6%. The switching value analysis shows that the percentage increase in costs for the NPV to become zero is 222% and the percentage decrease in benefits is 69%.

49. The overall EIRR for the PPP upgradation roads is 31.8% and the NPV of these roads is estimated at USD 375 million, at a 12% discount rate over a 20-year evaluation period. The switching value analysis shows that the percentage increase in costs for the NPV to become zero is 144% and the percentage decrease in benefits is 59%. All the upgradation project roads are economically viable individually. Economic analysis is detailed in **Annex 6**.

B. Technical

50. **Proposed Upgradation Works.** The GoTN commissioned international consultants for preparation of designs for 2,079 km of SH using their own funds. Based on economic, environmental and social screening criteria, about 575 km of SH have been selected for upgradation under the project. These existing roads, which are distributed in 7 out of the total 8 Circles in Tamil Nadu, are of intermediate to two-lane configuration (pavement width up to 7 m) with traffic levels ranging from 3,000 to 21,000 Passenger Car Unit (PCU). These roads have poor geometry, distressed pavement, narrow bridges/structures, and insufficient sight distance and currently offer poor level of service. The proposed works will consist of widening to two/four-lane configuration with paved shoulders and include strengthening of existing pavement, junction improvements, drainage facilities, and provision of bus lay-byes and truck lay-byes, widening / reconstruction of structures, bypasses, road safety engineering measures and improvement of the geometry of the alignment of the road. Preparation of designs and drawings for most of these roads has been completed. The respective field divisions of the HD and the staff of PIU including the ones managing the environmental and social aspects were fully involved in the review of designs and drawings and their field verification.

51. **Proposed Maintenance Works.** The roads proposed to be improved through PBMC 5-year maintenance contracts are two lane roads, which were strengthened and widened a few years ago. The proposed works will include initial rectification, bituminous overlay, day-to-day regular maintenance, pothole and crack repairs, and restoration of road safety features, markings and road furniture. These works do not include any widening or geometric improvements.

52. **Design Standards.** As per the industry practice in India, the design standards and specifications of Works, developed by the Indian Roads Congress have been used for the design of the proposed works under this project.

53. **Road Safety Provisions.** Designs were reviewed from the road safety point of view by safety experts in the design team. Safety vulnerabilities were identified and specific road safety engineering counter measures including speed calming measures to reduce accidents especially in populated areas were adequately integrated in the engineering designs to reduce the risks. All the upgradation project roads are subjected to International Road Assessment Program (iRAP) assessments and the final designs will address the findings and improve the safety rating of the road.

C. Financial Management

54. The project will be implemented by the PIU formed by the HD under the previous Bank financed project. The finance wing of the PIU is headed by a Finance Controller who is familiar with Bank's financial management policies and procedures of HD. The funds will flow through GoTN's treasury system. The PIU created an identifiable budget line for the project within the budget of HD. The budget provision (BE/RE) will be made on the basis of annual work plans developed by the PIU. The Finance Department will issue 'Letter of Credit' (LOC) to the respective Drawing and Disbursement Officer (DDO) of PIU and participating field divisions in the HD for making payments. The administrative authority levels established within HD will be used by DDO to authorize such payments. The PIU and the field divisions will maintain financial records as per the accounting norms prescribed in HD manual. The Interim Financial Reports

(IFR) will be submitted by PIU through the office of CAAA to the Bank at the end of each calendar quarter and this IFR will form the basis of disbursement. The internal audit for the project will be carried out by the audit wing of the PIU, headed by the Finance Advisor/Chief Accounts Officer (deputed from the treasury and accounts). The external audit of the project will be carried out by the office of the Comptroller & Auditor General (C&AG) as per the terms of reference agreed with the Bank. The financial management arrangements proposed under this project are considered to be adequate to account for and report on project expenditures. These arrangements will satisfy the fiduciary requirements of OP/BP 10.00. (Refer Annex 3 for details).

D. Procurement

55. All procurements under the project will be carried out in accordance with the World Bank's Guidelines (January 2011 edition as updated in July 2014). Most of the civil works would be procured using International Competitive Bidding (ICB) procedures (for EPC packages) or open competitive bidding procedures acceptable to the Bank (for PPP packages), but a few packages may also involve use of National Competitive Bidding (NCB). The project will pilot the use of e-procurement system (NIC platform) for ICB/NCB procurement. The PIU has adequate capacity to take up the procurement of BoQ based packages but procurement of other models (EPC, PBMC and PPP) may pose some challenges. Contract management may be another challenge as previous project witnessed delays in completion of major contracts and frequent variation orders. The procurement capacity assessment of PIU was done using the Procurement Risk Assessment and Management System (PRAMS) and residual risk rating was found to be Substantial and mitigation measures agreed for implementation by the GoTN. The Project is likely to award major consultancy and EPC and PBMC works contracts by April, 2015.

E. Social (including safeguards)

56. Social Impacts. The proposed project will have positive social impacts owing to benefits due to the improved road network. During the social impact assessments, the local people perceive that the proposed improved road network will result in positive benefits in the form of improved transport facilities, more employment opportunities, and better access to markets, health centers, and schools and reduced travel time and increase in the value of their lands alongside the roads. People expect negative benefits in the form of loss of agricultural lands, assets, increased noise, air pollution and accidents due to increased speed of the vehicles.

57. **Safeguard Policies.** The project involves substantial amount of land acquisition and resettlement impacts which triggered OP/BP "Involuntary Resettlement." The social safeguard policy "Indigenous People" was not triggered, since Tamil Nadu has very few districts inhabited by tribal population (about 0.8 million i.e. less than 1% of population of the state) and the proposed roads do not pass through these areas. The social impact assessment and consultations indicated that the local population in the project area does not fall into the category of Indigenous People as defined in the policy.

58. **Resettlement Policy Framework.** Land acquisition is necessary in the project for widening of roads and structures, curve improvement, geometric corrections and bypasses. Since most of the small towns in Tamil Nadu are congested and the available Right of Way is narrow,

impacts to houses and shops in the built-up areas including non-title holders is also anticipated. The Resettlement Policy Framework (RPF) has been prepared taking into account the provisions of India's new Land Acquisition and Rehabilitation and Resettlement Act, 2013 (RTFCTLARR Act, 2013). Most of the provisions of this act are in line with the Bank's Operational Policy on Involuntary Resettlement, except the cut-off date for eligibility of certain R&R assistance, assistance to non-title holders on Right of Way and public lands and valuation of affected structures. The RPF provides for appropriate mechanism to bridge these gaps. The RPF covers the principles and objectives of resettlement, process for conducting census survey, socio-economic surveys, and preparation of RAPs, entitlements for different types of impacts, process of land acquisition, valuation of affected assets, consultations and disclosure, institutional arrangements, coordination with civil works, grievance redress mechanism and monitoring and evaluation arrangements. The final RPF consistent with Bank operational polices has been approved by GoTN and has been re-disclosed in TNRSP website on January 01, 2015 and at the Bank's Info Shop on January 20, 2015.

59. **Land Acquisition and Resettlement Impacts.** The project includes widening of about 575 km of roads through EPC contracts and PPP concessions. These road improvements will involve acquisition of about 150 hectares of private land, transfer of about 15 hectares of government land and will impact about 9000 households. Among these, the major impacts will be limited to about 1400 households, which will lose their houses or livelihoods. Out of these, about 10% are women-headed families. The remaining people will loss only a small part of their houses/shops or a narrow strip of land. The RAP for the EPC roads has been prepared as part of appraisal of the project and the RAP for PPP roads will be prepared prior to initiation of bidding process for these roads. Land will be acquired in accordance with the provisions of Tamil Nadu Highway Act, 2001 and the compensation will be determined in accordance with the RTFCTLARR Act, 2013. Since the rules pertaining to application of the new land acquisition law is still awaited in the state, the GoTN confirmed that the payment of compensation for land acquisition would be meeting the Bank's requirement for the treatment of land acquisition compensation during this "transition" period, through (a) first, making the "minimum" level of payment stipulated in the new Act; and (b) making second and final payment to cover the difference as and when the rules for the new Act are adopted in the state. Though such a two-tier payment scheme could pose challenges at the time of implementation, but perhaps unavoidable considering the special backdrop of a major legislative transition in India. The replacement value of houses, buildings and other immovable properties will be determined on the basis of Public Works Department's latest Plinth Area Rates as on date without depreciation to reflect the full replacement costs are aligned with the World Bank's operational policy on Involuntary Resettlement. PIU's staff has been delegated powers to carryout land acquisition and resettlement implementation and land acquisition has been already initiated. Census and socio-economic surveys and consultations were carried out among the affected people and draft RAP for EPC roads has been prepared describing the baseline socio-economic characteristics of affected people, implementation arrangements, outcome of consultations, grievance redress mechanism and monitoring and evaluation arrangements. The draft RPF and RAP for EPC roads have been disclosed and three stakeholder workshops were held in December, 2014 at Chennai, Tirunelveli and Namakkal to receive feedback and suggestions on the draft RPF. In these three workshops, about 250 people including 20 women representing PAPs, elected members of local bodies, Transport associations, Government

departments, NGOs, community and press/media attended. The mitigation measures available in the RPF to the concerns raised by the stakeholders were clarified and suggestions were suitably incorporated in the draft RPF.

60. **Socio-economic Surveys and Consultations.** The key baseline characteristics include (a) the average family size is 4.1 and (b) 1.5 persons/family is earners. The average income reported is INR 11,641 (USD 195). While 26 % are indebted and 40% engage in small businesses, a quarter of Project Affected Persons (PAP) is residing in permanent houses, 50% have separate kitchens, and 27% have toilets and 80% houses are electrified. In terms of assets, only 5% use washing machines, 30% have motor cycles, 21% have refrigerators and 80% own a television. 20 consultations were held along the project roads and about 1,500 people participated in these consultations. Participants' views and concerns about the project were discussed in these consultations and the key outcomes were integrated into the design and mitigation plans. Some of the key outcomes of consultations include accidents and safety concerns due to increase in speed, impacts to trees, drinking water pipelines, and graveyards, suggestions for bypasses and realignments, loss of livelihoods due to impacts to business establishments, loss of irrigated lands, and suggestions for avoiding physical displacements, etc. These concerns were incorporated in the designs and in preparation of RAP to the extent possible. Further consultations were held at 11 locations as part of disclosure of the draft RAP among the PAPs in December, 2014. In all 1689 people including 386 women (23%) participated in these consultations. The participants included largely PAPs and the meetings were chaired by local body representatives. The key issues raised in these meetings were timely payment of compensation, alternative resettlement arrangements especially for non-title holders, need for drains in built up areas, ensuring replantation of tamarind trees, safety due to speed after improvement of roads, etc. The women expressed concerns on alternative housing and safety to children and safe crossing of roads for fetching drinking water. These concerns will be adequately addressed during the implementation of the project.

61. **Gender Mainstreaming and Inclusion**. The RPF provides for additional support to women-headed households, disabled members and Dalit families (Scheduled Castes) as part of support to vulnerable groups. There is a special provision in the RPF for reimbursement of costs of registration charges (about 8%) out of compensation amount received both for title and non-title holders for properties (land and houses) purchased in the name of women. In case alternative houses or sites are provided to the displaced families, the titles will be given jointly to wife and husband with woman as the first beneficiary. The civil works contracts have provisions that the contractors give preference to local population for unskilled labor needs during the construction and maintenance stages and female labor participation will be measured. There is also provision for targeted skill training to vulnerable family members including women-headed families. About 14% of 1350 people that participated in the consultations were women and their concerns include safety of children due to increased speeds of vehicles, impact on drinking water facilities in some villages and livelihood support. These concerns will be addressed as much as possible during implementation of the project. All these measures in the project are expected to enhance gender equity and social inclusion.

62. **Implementation.** Social safeguards implementation is underway as first notification for land acquisition for all EPC roads has been completed in September, 2014 and the final

Resettlement Action Plan for EPC roads acceptable to the Bank, has been approved and re-disclosed by TNRSP in their website on February 05, 2015 and at the Bank's Info Shop on the same day. The key staff responsible for land acquisition and resettlement implementations is in place. Procurement of the NGOs/consultants for implementation support, and external consultants for concurrent monitoring and establishment of grievance redress committees to deal with complaints and grievances of PAPs are underway. A budget of INR 6.33 billion (USD 105.5 million) for land acquisition and resettlement has been approved by GoTN and will be met out of counterpart funding.

F. Environment (including safeguards)

63. The nature of potential environmental issues assessed as part of preparation of EPC roads of the project vary among the roads. The typical impacts include: (a) loss of roadside trees on an average, about 44 trees per km of varying girth size; (b) limited impact on reserve forest with diversion of about 0.5 hectares of forest land; (c) impacts on water bodies and natural drainage areas; and (d) impacts on community/common property resources. The project implementation also would lead to temporary environmental impacts during construction stage. Given this, the proposed project triggered: Environmental Assessment (OP/BP 4.01); considering expected impacts on cultural properties, the Physical Cultural Resources (OP/BP 4.11) policy; although there is no impact on Wildlife and Natural Habitats; and in anticipation of possible impacts for PPP roads, Natural Habitats (OP/BP 4.04) policy and Forests (OP/BP 4.36) policy.

64. Considering the multiplicity of road corridors to be improved under the project, and the typical impacts described above, an Environmental Management Framework (EMF) approach has been adopted to address the Environmental Assessment (EA) requirements of the project. The EMF for the project defines the EA process to be followed, complying with the in-country environmental legislations as well as Bank's environmental safeguards policies. The EMF defines the four key process steps to be followed for corridor level EAs with relevant illustrations. These include: (i) Environmental Screening and Scoping; (ii) Environmental Assessment; (iii) Environmental Management Plan; and (iv) Integration of EMPs into actionable mechanisms including road construction contracts. The EMF also defines the public consultations which will form part of the process steps (i) to (iii) above, cumulative impact assessment requirements, and the institutional management framework. Prior to finalizing the draft, the proposed EMF has been tested for EPC roads with necessary changes and subjected to extensive public consultations. Based on the application of EMF, the EA and the EMPs for the EPC road corridors have been completed. Further, generic environmental management measures which would be applicable for all the corridors have been derived. The disclosure of draft EMF and the corridor specific draft EAs and EMPs have been completed by the borrower and the Bank in the InfoShop.

65. The corridor specific EAs for EPC roads included detailed environmental management measures with necessary implementation arrangements including integration into construction contracts. In addition, the corridor level designs considered alternative options and design optimization measures to minimize impacts. Summary of environmental management measures include: (a) upfront identification of construction stage measures and regulatory requirements which formed part of the bid documents; (b) compensatory afforestation in 1 Ha revenue land contiguous to forest area and afforestation measures; (c) compensatory plantation at 1:10 ratio to

offset the loss of avenue trees; (d) protection of sensitive receptors all along the project corridors with appropriate measures during construction and operational phases; (e) protection, conservation of cultural properties and heritage sites; (f) measures to protect water bodies; and (g) environmental enhancement measures to benefit the communities along the project corridors. In addition, measures to minimize cumulative impacts have also been adequately addressed.

66. The PIU developed relevant institutional capacity for effective implementation of environmental management measures. The PIU has an Environmental Cell (EC) which will implement the environmental safeguards management measures. The EC is currently staffed with one Environment Specialist, deputed from the Pollution Control Board, who will oversee the environmental safeguards management. The EC also comprises of one Assistant Conservator of Forest, two Rangers and few field staff. The Forester will supervise and coordinate compensatory plantation and compensatory afforestation. For effective implementation, the EC will work jointly with the other staff of PIU and filed offices.

G. Other Safeguards Policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[ ]
Natural Habitats (OP/BP 4.04)	[X]	[ ]
Pest Management (OP 4.09)	[]	[X]
Physical Cultural Resources (OP/BP 4.11)	[X]	[ ]
Involuntary Resettlement (OP/BP 4.12)	[X]	[ ]
Indigenous Peoples (OP/BP 4.10)	[]	[X]
Forests (OP/BP 4.36)	[X]	[]
Safety of Dams (OP/BP 4.37)	[ ]	[X]
Projects in Disputed Areas (OP/BP 7.60)	[ ]	[X]
Projects on International Waterways (OP/BP 7.50)	[ ]	[X]

Annex 1: Results Framework and Monitoring and Evaluation

Country: India

Project Name: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

Results Framework

Project Development Objectives

PDO Statement

The project development objective is to increase road capacity, enhance quality of maintenance, improve safety and support institutional development of Tamil Nadu's core road network (CRN).

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Roads in good and fair condition (IRI<4) as a share of total classified roads	☒	Percentage	35.6%			40%		45%	At Baseline, Mid Term and Yr 5 (at close of Project)	Road condition survey	HD, DPR Consultants
Size of the total classified network	☒	Kilometers Sub-type Supplemental	11,594							HD data	
Reduced average travel time per kilometer on project roads	☐	Text	1.25 min					1 min	At Baseline, Mid Term and Yr 5 (at close of Project)	DPRs, Mid-Term Review and Ex-Post Evaluation study	HD, DPR Consultants

Reduced average Vehicle Operating Cost (VOC) on project roads	☐	Text	Cars – 5.8 INR/km Trucks – 24 INR/km					Cars – 5 INR/km Trucks – 22 INR/km	At Baseline, Mid Term and Yr 5 (at close of Project)	DPRs, Mid-Term Review and Ex-Post Evaluation study	HD, DPR Consultants
No increase in number of annual fatalities from road accidents on project roads	☐	Text	452 fatalities in 2014					No increase in fatalities	At Baseline, Mid Term and Yr 5 (at close of Project)	DPRs, Police Records and other road accident statistics collated by GoTN	HD, DPR Consultants

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Component A: Network Improvement											
Road rehabilitated	☒	Kilometers	0					575	Annually	Annual reports/Quarterly Progress Reports	HD
Length of CRN developed using new contracting methods (such as EPC, PPP, and PBMC contracts)	☐	Kilometers	350			1000		2000	At Baseline, Mid Term and Yr 5 (at close of Project)	Signed contracts, Project Progress Reports	HD, GoTN
Increase in number of HD field divisions/circles that have implemented at least a large civil works contract under the new modes of contracting	☐	Number	0			3		5	At Baseline, Mid Term and Yr 5 (at close of Project)	Annual reports/Quarterly Progress Reports	HD
Number of Project Affected Families that received full compensation and all R&R assistance (including % women)			0	2000	5000	7000	8500	9000	Quarterly	Annual/Quarterly Progress Reports (with gender disaggregated data)	HD
Local labor among unskilled employment created under the works contracts(including		%	0			30		50	Quarterly	Annual/Quarterly Progress Reports (with gender disaggregated	HD

women)										data)	
State Road Toll policy formulated	☐	Yes/No	Not in place					State Road Toll policy formulated and accepted.	At Baseline, Mid Term and Yr 5 (at close of Project)	GoTN Circulars / Notifications	HD, GoTN
Component B: Institutional Capacity Enhancement											
Enhanced efficiency of HD to manage its road network	☐	Number of kilometers widened / strengthened annually	800			1000		1200	Annually	Annual Reports	HD
Capacity enhancement of HD staff (both HQ and field staff) undertaken for preparation and implementation of new methods of contracting (including % women trained)	☐	Capacity building actions, percentage	To be initiated			Training needs assessment study carried out and capacity enhancement/training calendar established		Capacity enhancement/training programs held as per calendar and at least 75% of HD (both HQ and field staff) trained in new contracting methods. At least 90% of women staff trained.	At Baseline, Mid Term and Yr 5 (at close of Project)	Annual reports/Quarterly Progress Reports, Consultant reports	HD, Consultants
Increased use of automated systems for strategic planning	☐	Institutional strengthening actions	To be initiated			Annual updation of road collection data PFMS piloted in 3 Circles		Road Management System mainstreamed for rationalizing road investments / maintenance. PFMS mainstreamed in all Circles and used for monitoring and management of civil works	At Baseline, Mid Term and Yr 5 (at close of Project)	Annual reports/Quarterly Progress Reports, Consultant reports	HD, Consultants
Reduced time in preparing, awarding and implementing large size projects	☐	Months	48					36	At Baseline, Mid Term and Yr 5 (at close of Project)	Annual reports/Quarterly Progress Reports	HD
Component C: Road Safety											
CRN (length) on which road safety related improvements carried out	☐	Kilometers	0			1400		1700	At Baseline, Mid Term and Yr 5	Signed contracts, Project Progress Reports	HD

									(at close of Project)		
Key recommendations/actions as per State Road Safety Policy implemented	☐	Policy and Institutional Actions	Partially implemented			Actions w.r.t. safety campaigns, training, enforcement, equipment, etc. initiated. Actions to strengthen institutional mechanism for road safety initiated.		All major State Road Safety Policy actions implemented or initiated.	At Baseline, Mid Term and Yr 5 (at close of Project)	Annual reports/Quarterly Progress Reports, Consultant reports	HD, other stakeholder departments (such as Transport, Police, Health and Education), Consultants

Annex 2: Detailed Project Description

India: Second Tamil Nadu Road Sector Project (P143751)

1. The project has three components as described below.

2. **Component A: Network Improvement (Total Cost: USD 746.45 million; IBRD Loan: USD 274.45 million):** The project would support upgradation and/or maintenance of about 1175 km of CRN through a combination of EPC contracts, PPP concessions and performance-based maintenance contracts (PBMC). The scope of work under upgradation will include widening of formation width, pavement strengthening & widening, rehabilitation of existing structures, construction of new pavement, structures, bypasses and realignments (when required), improvement of junctions, provision of road safety features and maintenance for a specified period after the construction. The proposed performance-based maintenance works will include initial rectification, bituminous overlay, day-to-day regular maintenance, pothole and crack repairs, and restoration of road safety features, markings and road furniture.

3. Upgradation through EPC contracts (Sub-component A1, Phase 1): Under this sub-component, about 430 km of CRN will be upgraded to standard two-lane configuration with paved shoulders, through EPC contracts including the responsibility for maintenance during the 5-year period post-construction. The sub-component will include (a) civil works for construction and maintenance; (b) consulting services for supervision during construction and maintenance periods; and (c) land acquisition, resettlement & rehabilitation, shifting of utilities, implementation of Environmental Management Plan, tree cutting, afforestation and agency charges. The loan would provide 50% of the construction cost of civil works and 80% of cost of construction supervision during the construction period. All the remaining costs will be met through GoTN funds.

4. Upgradation through PPP Concessions (Sub-component A2, Phase 2): Under this sub-component, about 145 km of CRN will be upgraded to four-lane configuration, through PPP concessions. These concessions include construction for a period of two to three years and Operation & Maintenance (O&M) over the balance period. The sub-component will include (a) civil works for construction; (b) consulting services of transaction advisory consultants and Independent Engineers (IEs) during construction and maintenance periods; and (c) land acquisition, resettlement & rehabilitation, shifting of utilities, implementation of Environmental Management Plan, tree cutting, afforestation and agency charges.

5. In each concession, the loan would provide 50% of the estimated cost of construction. This amount would be paid to the concessionaires to be competitively selected by the GoTN, during the construction phase in pre-specified tranches linked to achievement of agreed milestones or levels of construction progress. The concessionaire would raise the required financing to carry out construction works and other expenditure including the O&M expenses, through a combination of equity and debt. The concessionaire will recover the investments through two types of payment by GoTN: (a) lump-sum payment (50 percent of the estimated construction cost) during construction on achievements of agreed milestones; these lump-sum payments will be financed entirely by the proposed IBRD loan; (b) a semi-annual payments

(annuities) during the operating period of the concession. The amount of the annuity payment will be determined through a competitive process during the bidding stage, and will be entirely financed by GoTN during the O&M phase. The concession will span for a period of 10 years with a construction period of two to three years, and O&M phase of seven to eight years. The selected concessionaires will fully bear the design and performance responsibility and risks, for each concession, and a firm will be engaged as an 'Independent Engineer' to monitor the progress and quality of works during the construction phase, as well as to enforce maintenance and safety management on the corridors during the O&M phase of the concession period. The loan would provide 80% of cost of construction supervision during the construction period and also the transaction advisory consultants to assist in the procurement and other relevant handholding during the preparatory phases. .

6. Maintenance under PBMC Contracts (Sub-component A3, Phase 1): The loan will finance maintenance of about 600 km of CRN for a 5-year period through performance-based maintenance contracts and associated consultancies.

7. Road Prioritization and Selection: In line with GoTN's preference to rapidly improve the level and quality of road services over the relatively high-traffic segments, the project roads were drawn mainly from the State's CRN of about 22,000 km comprising of SH and MDR. The HD has identified about 2,800 km of high-traffic roads for a high-level techno-economic feasibility study by the Indian Institute of Technology, Chennai which analyzed these roads mainly using the data available in the Road Management System, traffic surveys and HDM 4, and prepared a list of investments/improvements prioritized broadly on the basis of EIRR/NPV, which formed the basis for the roads finally selected for upgradation. The selection was further subjected to the test of economic viability and care has been taken to achieve an even spread of project packages across the state, mainly to involve many operational units of the HD and familiarize them with these new contracting approaches.

8. Choice of contracting methods: For upgradation of roads, the choice of contracting methods was primarily driven by the strategic imperative of substantially reducing time and cost overrun risks and ensure due emphasis on maintenance, by providing strong incentives for the contractors to optimize capex and O&M costs over project life cycle. Furthermore, the roads with very heavy traffic which require upgradation to four-lane standard and have the potential for mobilization of additional revenues after the construction – that is, through direct user charges such as tolls – have been earmarked for development on a PPP basis. The choice and size of maintenance contracting, on the other hand, was driven by the need to reduce the administrative cost of handling numerous small contracts on annual basis.

9. The roads proposed for improvement and/or maintenance have traffic plying on non-standard two lane roads. Most sections of these roads have poor horizontal and vertical geometrics, distressed or weak pavements, inadequate capacity, narrow or weak cross-drainage structures, and poor riding quality and black spots prone to accidents. The base traffic volumes (in the year 2013) on sections of these roads vary from 3,000 to 21,000 PCU. The designs for road improvements – to standard two-lane or four-lane configuration with paved shoulders – are being done as per the codes of the Indian Roads Congress, with 15- and 10-year traffic levels as the basis for pavements up to base layers and for surfacing layers, respectively. The final

Detailed Project Reports (DPRs) have been prepared for most of the roads identified for upgradation and the DPRs for the balance is also progressing apace. The engineering details of these roads are presented in **Annex 7**.

10. In order to avoid a variety of slippages that have been routinely affecting similar projects, the implementation of civil works – the award of the contract in particular – would be done only on completion of the following preparatory activities: (i) completion of all land acquisition notifications and key R&R implementation actions; (ii) obtaining all requisite environmental clearances and government permits; and (iii) completing the process of engaging the consultants for independent supervision/monitoring of works.

11. Road Safety: The project preparation and detailed designs of the roads and structures including road safety features have been carried out through DPR consultants who in their team consisted of a road safety specialist. Safety vulnerabilities were identified and specific road safety engineering counter measures including speed calming measures to reduce accidents especially in populated areas were adequately integrated in the engineering designs to reduce the risks. All the upgradation project roads are subjected to International Road Assessment Program (iRAP) assessments and the final designs will address the findings and improve the safety rating of the road.

12. The findings of the DPRs led to the inclusion of the following road safety measures in the bidding documents of the works contracts:

- Improvement of all intersections whether major or minor;
- Provision of footpaths at urban locations;
- Widening of all narrow culverts so that entire roadway width is carried on the structures and blackspots are removed;
- Replacing railings / parapets of existing bridges with crash barriers;
- Provision of pedestrian guardrails at urban locations;
- Provision of crash barriers at hazardous locations such as high embankments, horizontal curves, locations of ponds, canals etc.;
- Transverse rumble strips at junctions, approaches to villages, speed change locations etc.;
- Pedestrian crossings;
- Safety barriers and retaining walls at hazardous locations;
- Street lighting at major built-up areas;
- Road signs and markings;
- Improvement of both horizontal and vertical geometrics of the road alignment;
- Improvement of sight distance;
- Paved shoulders; and
- Four-lane cross-section with paved shoulders and median for high traffic roads ensuring physical separation of traffic in opposite direction

13. To ensure these provisions are implemented, each is duly embedded in the contract documents, ensuring obligatory implementation as a payable item. Additionally, each contract stipulates:

- Road Safety Audit of all the design details that have bearing on safety of users as well as pedestrians and animals by an independent Safety Consultant. If the safety audit requires any additional work, Change in Scope will be instructed by the Authority Engineer;
- Deployment of a Qualified Safety Officer and a Safety Supervisor available in the Contractor's working team for the entire construction period;
- Preparation and submission of a traffic management and safety plan covering safety of users and workers during construction within 30 days of the Appointed Date, to the Authority Engineer;
- Fulfillment of all required safety measures as per MORTH Specifications during construction;
- Monthly submission of the filled-in Construction Safety Checklist which is included in the Specifications;
- Ensure safe conditions for the users and in the event of unsafe conditions, lane closures, diversions, vehicle breakdowns and accidents, follow relevant operating procedures;
- Maintain and operate a round-the-clock vehicle rescue post to remove damaged vehicles and debris from the Project Highway;
- Report all accidents to the Police and to the Authority; and
- Effect and maintain during the Agreement insurances to insure (a) the Contractor's personnel and (b) any person against any damage, death or bodily injury;

14. Furthermore, the contracts includes the following additional provisions for ensuring effective implementation of the road safety measures:

- If the construction work threatens the safety of users and pedestrians, the Authority Engineer can recommend suspension of whole or part of works. Until necessary rectifications are made, works will remain suspended;
- Safety and traffic management is a paid item under the contract;
- Time limits have been set for attending to and repair of damaged safety features such as road signs, road markings, railing, parapets, crash barriers, pedestrian facilities, retaining walls, road lighting, removal of obstructions to sight, removal of fallen trees and bushes etc. Noncompliance to these timelines will result in reduction of payments. Authority Engineer will undertake regular site inspections to evaluate compliance with the maintenance requirements; and
- Provisional Certificate which is to be issued to the contractor upon substantial completion of works will not be issued if the Project Highway or any part thereof cannot be safely and reliably placed in operation.

15. Consultancy Services: The Network Improvement Component will also include support for engaging expert assistance for project level supervision and program level audit in the following manner. For each contracting/concession package, consulting firms will be engaged to serve as either Engineer (for EPC contracts) or Independent Engineer (for PPP concessions), to ensure that the works and O&M are executed as per the technical specifications and commercial conditions stipulated under the contract/concessions. In addition, consultants/non-governmental organizations will assist the PIU and the HD in the implementation of the RAPs. In addition to the consultants engaged to provide support in the day-to-day activities, third-party consultants will be engaged to conduct a bi-annual audit of implementation of all components of the project

including the civil works. Specifically, such audits will cover the technical, financial, environmental, social, institutional, and road safety aspects. For PBMC maintenance contracts, monitoring consultants will be engaged to support the TNRSP in ensuring desired Service Levels are maintained during the period of maintenance.

16. Costs: The list of project roads proposed to upgraded and/or maintained under each of the aforementioned mode of contracting are summarized in Table A2-1 below, along with the estimated cost of various sub-activities and the extent to which they will be financed through the Bank loan.

Table A2-1: Estimated Cost of Network Improvement Component (USD million @ 1 USD = INR 60)

Description		Base Cost	Physical contingencies	Price contingencies	Cost including physical and price contingencies	Bank Financing	GoTN/Private Operator Financing
A1) Civil Works through EPC contracts (length 430 km) (Phase 1)		**263.2**	**12.7**	**25.5**	**301.4**	**150.7**	**150.7**
1 (a)	Kancheepuram - Vandavasi Road (SH 116 km 14/500 - km 36/900)	12.5	0.6	1.2	14.4	7.2	7.2
1 (b)	Sadras - Chengalpattu Road (SH 58 km 0/000 to km 26/800)	14.6	0.7	1.5	16.8	8.4	8.4
2	Arcot - Villupuram Road (SH 4 km 29/800 to km 110/200 and km 113/200 to km 114/600)	47.6	2.4	4.8	54.8	27.4	27.4
3	Madapattu - Tirukoillur Road (SH 9 km 41/700 to km 44/000 and km 45/000 to km 66+190 and construction of a new link road between SH 9 and SH 137 (km 66+190 to km 71+147)	16.1	0.8	1.6	18.5	9.2	9.2
4	Vridhachalam - Parangipettai Road (SH 70 km 0/000 to km 35/800)	24.3	1.2	2.4	27.9	13.9	13.9
5	Thiruchengode - Paramathy Road (SH 86 km 54/800 to km 81/000)	15.4	0.8	1.5	17.7	8.8	8.8
6	Malliyakarai - Rasipuram - Trichengode Road (SH 79 km 0/000 to km 30/600 and km 51/400 to km 71/300)	32.4	1.6	3.2	37.3	18.6	18.6
7	Mohanur – Namakkal Road (SH 95 km 0/000 to km 13/100)	9.3	0.5	0.9	10.7	5.3	5.3
8	Naduvapatti - Ettayapuram Road (SH 44 km 22/500 to km 38/750 and km 41/300 to km 56/700)	22.9	1.1	2.3	26.3	13.2	13.2
9	Nanguneri - Ovari Road (SH 89 km 0/000 to km 35/200)	16.8	0.8	1.7	19.3	9.6	9.6
10	Rajapalayam - Tirunelveli Road (SH 41 km 1/800 to km 28/000 and km 33/800 to km 82/800)	43.0	2.1	4.3	49.4	24.7	24.7
11	Allowance for any cost increases	8.5	0.0	0.0	8.5	4.3	4.3
A2) Civil Works through Annuity contracts (length 145 km) (Phase 2)		**191.2**	**0.0**	**9.6**	**200.8**	**100.4**	**100.4**
1	Gobi - Erode Road (SH15 km 123/000 to km 153/600)	41.7	0.0	2.1	43.8	21.9	21.9
2	Oddanchatram - Avinashipalayam Road (SH37 km 37/400 to km 106/300)	87	0.0	4.4	91.4	45.7	45.7

3	Tirunelveli – Thenkasi Road (SH39 km 5/000 to km 50/600)	62.5	0.0	3.1	65.7	32.8	32.8
A3) Civil Works through PBMC contracts (length 600 km) (Phase 1)		**33.8**	**2.5**	**2.5**	**38.9**	**7.8**	**31.1**
1	Nagapattinam - Tuticorin Corridor	19.5	1.5	1.5	22.5	4.5	18.0
2	Arcot - Tiruvarur Corridor	14.3	1.1	1.1	16.4	3.3	13.1
A4) Supervision during construction period		**19.5**	**1.2**	**1.2**	**21.9**	**15.5**	**6.4**
1	Authority Engineer for EPC contracts	7.9	0.6	0.6	9.1	7.3	1.8
2	Independent Engineer for Annuity contracts	5.7	0.4	0.4	6.6	5.3	1.3
3	RAP Implementation Agencies	1.0	0.0	0.0	1.0	0.0	1.0
4	Third-party Audit consultancy	0.7	0.0	0.0	0.7	0.5	0.1
5	Monitoring consultancy for OPRC maintenance works	0.7	0.1	0.1	0.8	0.6	0.2
6	RAP Monitoring Consultancy etc.	1.5	0.0	0.0	1.5	0.0	1.5
7	Other Consultancies	2.0	0.2	0.2	2.3	1.8	0.5
A5) Maintenance of project roads (EPC) for 5 years		**8.4**	**0.0**	**0.0**	**8.4**	**0.0**	**8.4**
A6) Maintenance of project roads (Annuity)		**51.0**	**0**	**0**	**51.0**	**0.0**	**51.0**
A7) Supervision during 5-year maintenance period		**1.8**	**0**	**0**	**1.8**	**0**	**1.8**
A8) Other costs		**122.3**	**0.0**	**0.0**	**122.3**	**0.0**	**122.3**
1	Land acquisition and Resettlement and Rehabilitation	85.9	0.0	0.0	85.9	0.0	85.9
2	Shifting of utilities	27.4	0.0	0.0	27.4	0.0	27.4
3	Other Charges (LWF, QC contingencies etc.)	8.9	0.0	0.0	8.9	0.0	8.9
Total		**691.1**	**16.5**	**38.8**	**746.4**	**274.4**	**472.0**

17. **Component B: Institutional Capacity Enhancement (Total Cost: USD 11 million; IBRD Loan: USD 8.8 million):** This component will support fine-tuning and implementation of the Institutional Capacity Enhancement Plan (ICEP) developed by the HD and approved by GoTN. The Plan – containing policy-level actions and commitments (to improve mobilization and allocation of resources in the road sector) and operational-level initiatives (to enhance enterprise-level efficiency of the HD) – is placed in **Annex 8**. Specifically, the project would support technical assistance, advisory services and goods covering the following areas (see Table A2-2 below for cost estimates and the extent of loan financing support from the Bank).

a) Development and operation of **an information system for monitoring the implementation of ICEP** w.r.t. policy commitments as well as overall results in terms of enterprise-level performance improvements, e.g., extent of mobilization of additional revenues through new sources, the percentage of capital and operational expenditures made through better contracting structures and efficiency in program/project delivery (reductions achieved in time and cost overruns, number of kilometers of roads built and/or maintained in a year, level of quality, etc.)
b) **Improving Organizational Processes and Structure of the HD:** In keeping with the change in scale, scope and nature of its operations (e.g., through the increasing reliance on contracting arrangements that are larger as well as more complex), the project will support

engagement of expert assistance to identify (and bridge) gaps in the areas of organizational processes and structure, with particular focus on streamlining of workflows and standardization of bid documents to acquisition skills in specialized functions such as, for example, Planning, Design, Contract Management, Quality Assurance, PPP, Environmental and Social safeguards, Legal and Road Safety.

c) **Enhance and mainstream utilization of the key IT-based systems** developed under TNRSP I – that is, RMS, PFMS, RADMS and GIS – through provision of adequate IT-infrastructure/investments, allocation of manpower and mainstreaming their use through integrating (and making their use mandatory) in relevant decision-making processes, viz., planning and budgeting decisions (RMS), expediting payments to contractors (PFMS) and design and prioritization of road safety interventions (RADMS) with appropriate GIS interface.

d) Develop and implement a **Human Resources Development Strategy** with particular focus on (i) **training** both the time of induction of new recruits and through refresher courses for other levels, with due focus on new functional skillsets such as PPP and IT; and (ii) **knowledge management** through establishing and operationalizing a virtual library for easy access of manuals, reference books, reports and project files.

Table A2-2: Estimated Cost of Institutional Capacity Enhancement Component (USD million @ 1 USD = INR 60)

Description	Total Cost incl. Contingencies	Bank Financing		GOTN Financing	
		Amount	%	Amount	%
B1) M&E Information System RUSS, Feedback systems, etc.	2.0	1.6	80%	0.4	20%
B2) Process Improvements and Organizational Restructuring Updating of manuals and codes, standardization of documents, workflow optimization, formulation of IT Policy etc.	1.0	0.8	80%	0.2	20%
B3) IT-ICT based systems Updating of key software and making it more versatile for use via mobile devices, augmentation of hardware, software, disaster recovery systems, Data Center etc.	5.0	4.0	80%	1.0	20%
B4) Human Resources Development Knowledge Transfer and Capacity Building including through training and exposure visits	3.0	2.4	80%	0.6	20%
TOTAL	**11.0**	**8.8**	**80%**	**2.2**	**20%**

18. **Component C: Road Safety (Total Cost: USD 20 million; IBRD Loan: USD 16 million):** This component will finance strategic and operational level initiatives, aimed at bridging of some of the strategic and operational levels gaps identified during a recent review of

the state's road safety management capacity. The review was conducted by the World Bank experts in consultation with the government agencies responsible for road safety in the state. Salient features of the review's analysis and recommendations are placed in **Annex 9**.

19. At the strategic level, the component would support the Road Safety Executive Leadership Group (RSELG), an inter-disciplinary institutional arrangement with participation from the key line ministries/agencies engaged in road safety agenda, viz., Transport, Police, Health, Education and HD. The RSELG headed by the Principal Secretary (Home) will comprise of Secretaries of the HD, Health, and Education departments, the Director General of Police, Transport Commissioner, and the Chief General Manager, National Highways Authority of India. The RSELG will be supported by a Road Safety Management Cell (RSMC) led by the Transport Commissioner, with representation from HD, Police, Health, Education and Municipal Administration departments. Specifically, the project support will be channeled for (a) developing and implementing a comprehensive program for road safety management and knowledge transfer (through consulting assistance); and (b) augmenting key systems such as data collection, enforcement, compliance, post-crash care and awareness (through investments). The comprehensive program would include suitable sub-modules in line with the requirements of the participating stakeholder departments, e.g., Risk-targeted Patrol Plan for Police Department, Audit and Control Review for the Transport Department, and also quite a few other activities that come under the direct remit of RSELG, viz., Road Safety Promotion Plan, M&E and Research, Capacity Building and Knowledge Transfer. The support for investment, on the other hand, would include augmentation of enforcement systems target key behaviors (Police), compliance systems targeting unsafe drivers and operators (Transport), Administration sanctions regime and strengthening the implementation of RADMS including its integration with the road management system and health system.

20. At the operational level, for the district level initiatives, the project will support the Road Safety Implementation Unit (RSIU) led by the Regional Transport Officer and supported by competent staff with requisite experience and qualifications, to carry out the day-to-day implementation of the envisaged activities. Specifically, the project will support design and implementation of two initiatives to demonstrate how multiple stakeholder departments engaged in road safety could achieve better outcomes through coordinated efforts and investments, respectively at district and corridor levels. The project would support initiatives in two districts. For this, Kancheepuram district has been selected as one of the districts, keeping in view the following broad criteria, viz., (i) Population and decennial growth rate; (ii) Traffic volumes and vehicle density; (iii) Number of fatalities, fatality rate and district share of state-wide fatalities; (iv) Vicinity to the state capital of Chennai (to ensure effective support and oversight); (v) Industrialization and/or presence of major industrial clusters in the district (to facilitate third party engagement); (vi) Mix of different types of roads and traffic (to reflect wider State patterns)and (vii) Visibility of the district (to lift the profile of road safety). See Box below for further details.

21. In addition, corridors with significant road safety challenges will be selected. For the corridor level initiatives, the project will support the Road Safety Corridor Implementation Unit (RSCIU) led by the Transport Commissioner and supported by competent staff with requisite

experience and qualifications, to carry out the day-to-day implementation of the envisaged activities.

Box 1: Kancheepuram Disrict: Salient Features from Road Safety Perspective

Kancheepuram has the second-highest population in Tamil Nadu (after Chennai) and it recorded the highest growth of 38.69% between 2001 and 2011. The district comprises 2700 km of the state's road network. Traffic volume in the district has been growing and the mix of traffic also largely represents the state's traffic. Kancheepuram is adjacent to Chennai and has high visibility as it is one of the major centers of religion, attracting tourists from all over the state and country regularly. It is also highly industrialized – according to a recent Government of India report, the electronic software industry grows by around 50%, the auto and auto ancillary industries by about 15-20% and the leather industry by about 10% annually.[16] The Kancheepuram District is home to an industrial park (SIPCOT in Sriperumbudur) and several major auto manufacturing companies (such as Hyundai, Ford, Nissan).

The city of Kancheepuram (which is the administrative centre) has three state highways – SH58 (connecting Chengalpet/Sadras in the southeast to Thiruthani in the north), SH118A (connecting it to SH118) and SH116 (connecting it to Vandavasi in the southwest) – which intersect at the city centre. Two of these roads (SH58 and SH116) are part of the roads that will be upgraded under the Network Improvement Component of the project. The Kancheepuram District also has two major national highways running east-west across the north of the District (NH4, linking Chennai to Bengaluru, and on to Mumbai) and north-south through the length of the District (NH45, the principal route south from Chennai).

22. The project will assist the district as well corridor level safety initiatives through consulting support services, goods and investments aimed at enhancing the road safety in the areas of (a) civil works (HD working in collaboration with the Municipalities and Panchayats); (b) Policing, regulation, licensing and enforcement (in collaboration with Police and Transport Departments); (c) improving post-accident response and trauma care systems and infrastructure (in collaboration with the Health Department); (d) Road safety awareness, training and campaigns; and (e) advisory and administrative support to the respective District Administration and other entities involved, including in project M&E at periodic intervals.

23. Implementation of both the district and corridor level initiatives will be reviewed in 2017 and, depending on the results, support will be provided for planning and preparation for suitable recalibration, scaling-up and/or replication of these initiatives in other districts and corridors by the government in due course.

24. This component will thus finance: (i) technical advisory and consulting services, training costs and fees, logistics, consumables and publications; and (ii) software, goods and equipment. (see Table A2-3 below for cost estimates and the extent of loan financing support from the Bank).

[16] *Brief industrial profile of Kancheepuram District*, MSME Development Institute, Government of India, 2012-13

Table A2-3: Estimated Cost of Road Safety Component
(USD million @ 1 USD = INR 60)

Description	Total Cost incl. Contingencies	Bank Financing		GOTN Financing	
		Amount	%	Amount	%
C1) State Level – Strategic Advisory Assistance	**2.5**	**2.0**	**80%**	**0.5**	**20%**
(i) Road Safety Results Framework	0.5	0.4	80%	0.1	20%
(ii) Road Safety Promotion Plan	0.5	0.4	80%	0.1	20%
(iii) M&E and Research	0.5	0.4	80%	0.1	20%
(iv) Knowledge support and Capacity Building	0.5	0.4	80%	0.1	20%
(v) Knowledge Transfer and Exchange	0.5	0.4	80%	0.1	20%
C2) State Level – Operational Assistance	**2.5**	**2.0**	**80%**	**0.5**	**20%**
(i) Augmenting enforcement systems targeting key behaviors (Police)	0.5	0.4	80%	0.1	20%
(ii) Compliance systems targeting unsafe drivers and operators (Transport)	0.5	0.4	80%	0.1	20%
(iii) Administrative sanctions regime	0.5	0.4	80%	0.1	20%
(iv) RADMS implementation	1.0	0.8	80%	0.2	20%
C3) District Level Initiative - Kancheepuram	**4.0**	**3.2**	**80%**	**0.8**	**20%**
i) Complement TNRSPII infrastructure safety investment by working with municipalities and panchayats to effectively manage roadside safety issues	0.5	0.4	80%	0.1	20%
ii) Establish good practice speed management program including promotion, speed limit setting, signposting, enforcement and evaluation	0.5	0.4	80%	0.1	20%
iii) Establish risk targeted patrol plans for Kancheepuram Police sub-Districts, and support additional equipment for key offences on highways in the District	0.5	0.4	80%	0.1	20%
iv) Establish and implement safety focussed administrative procedures targeting unsafe drivers and transport operators, including appeal and audit processes	0.5	0.4	80%	0.1	20%
v) Establish community health promotion campaign to support interventions, including a specific two wheeler helmet wearing promotion	0.5	0.4	80%	0.1	20%
vi) Support quicker trauma response services and better treatment services	0.5	0.4	80%	0.1	20%
vii) Project management support to KRSDP project leader and interagency team	0.5	0.4	80%	0.1	20%
viii) Establish and undertake monitoring and evaluation program for KRSDP	0.5	0.4	80%	0.1	20%
C4) Second District Level Initiative	**3.0**	**2.4**	**80%**	**0.6**	**20%**
C5) Corridor Level Interventions	**8.0**	**6.4**	**80%**	**1.6**	**20%**

i) Planning and Preparation	0.5	0.4	80%	0.1	20%
ii) Implementation	7.5	6.0	80%	1.5	20%
TOTAL	**20.0**	**16**	**80%**	**4.0**	**20%**

Annex 3: Implementation Arrangements

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

1. The sections below summarize the implementation arrangements for the project.

2. Network Improvement Component: The PIU, headed by a Project Director, will have the primary responsibility for implementation of all aspects of this component including preparatory activities (e.g., land acquisition, utility shifting), management of environmental and social safeguards, procurement and contract management. In order to ensure operational flexibility and faster decision-making, the PIU shall have dedicated field units, each headed by a Divisional Engineer; already, for Phase I works, filed units have been established at seven locations: Tiruvannamalai, Salem, Tiruppur, Trichi, Vridhachalam, Tuticorin and Tirunelveli. At the HQ as well field level, PIU shall fulfill its responsibilities in due collaboration with the HD at the HQ as well as field levels. For example, at HQ level, PIU will steer preparatory activities such as planning, scrutiny of alignments and designs in consultation with the centralized technical wings of the HD. In a similar vein, the filed units of PIU shall assume direct responsibility for making available encumbrance-free land for construction through coordinating with the state-level agencies responsible for forestry, land acquisition, and public utilities, and will be drawing upon the convening and coordination capabilities of the Highway Department's Divisional Offices as may be necessary.

3. Each upgradation contract/concession will be monitored by an "Independent Engineer." In case of the PBMC maintenance contracts, the Divisional Engineer of the concerned PIU field division will also function as the "Engineer," with support from a Technical Monitoring Consultant (TMC) for ensuring *inter alia* quality control and compliance with Environmental Management Plans (EMPs). GoTN will ensure that appropriate and timely action is taken by the PIU on the findings of the TMC report.

4. As regards contract management, the Project Director of PIU will be the "Employer" for all contracts and the Divisional Engineer of the concerned PIU field division will act as the "Employer's Representative" for the execution of the respective contracts. The field units of the PIUs will thus guide and oversee the Contractor, Consultants/NGOs implementing the RAPs, and the Construction Supervision Consultant (CSC) or Engineer to ensure compliance with contractual agreements and safeguard requirements.

5. The PIU staff is already familiar with the challenges and processes involved in undertaking large civil works contracts and also the Bank's safeguards' requirements. With some guidance and assistance, they should be able to accustom themselves to new types of contracting structures and safeguards implementation issues.

6. Institutional Capacity Enhancement Component: In line with the objective of this activity to improve the overall institutional capacity of the State to better plan and manage the State's road network, the HD will lead and provide strategic guidance for this component. The sub-activities will be implemented by the respective user departments/agencies (e.g., IT, Training, etc.) under the ambit of the HD. The procurement related to all the activities will be undertaken by the HD in consultation with the respective user departments/agencies.

7. Road Safety Component: At the State level, this component will be led by the RSELG and implemented in collaboration with the key stakeholder departments including Police, Health, Highways and Education. Here, too, while HD would be taking responsibility for procurement, the responsibility for all other aspects including planning, defining the specifications and implementation of sub-activities will vest with the respective stakeholder departments. In order to ensure effective coordination, each department would be required designate a nodal person as well as depute sufficient number of staff to be a part of the RSMC. In case of the District Road Safety demonstration project, a similar arrangement will be replicated under the aegis of the District Collector. The project will also support engagement of Road Safety consultants to provide expert assistance across the entire array of road safety initiatives ranging from providing inputs for policy to implementation of the demonstration project at the district and corridor levels.

8. An Institutional Capacity Enhancement and Road Safety Cell (the "ICERS Cell") will be established within the HD to carry out (a) day-to-day implementation of the activities under Institutional Capacity Enhancement component, including inter-institutional coordination, procurement, and financial management and monitoring; and (b) all procurement and financial management activities for the Road Safety Component in close coordination with the respective stakeholder agencies. This ICERS Cell, headed by a Superintending Engineer will be assisted by competent staff, including, a Divisional Engineer empowered to serve as Drawing and Disbursement Officer.

A. Procurement Management

9. The proposed loan will finance three components. Under the Network Improvement component, procurement of civil works (EPC, PPP Concessions, and PBMC) and consultancies (transaction advisory, construction supervision, quality control etc.) are involved. Under the other two components, some consultancies and goods may be procured.

10. Procurement for the project will be carried out in accordance with the World Bank's "Guidelines: Procurement of goods, works and non-consulting services under IBRD loans and IDA credits & grants by World Bank borrowers" dated January 2011 as updated in July 2014 ("Procurement Guidelines") and "Guidelines: Selection and employment of consultants under IBRD loans and IDA credits & grants by World Bank borrowers" dated January 2011 as updated in July 2014 "(Consultant Guidelines)" and the additional provisions mentioned in legal agreement.

11. Procurement capacity: All the procurement will be handled by the PIU. Many of the officials of PIU were also involved in last phase of the Project and they are well conversant with World Bank procurement procedure. However, as current Project involves newer form of contracts (EPC, PPP Concessions, and PBMC), this will be more challenging than the last Project which mostly involved BOQ based contracts. Apart from delays in procurement process, contract management delays and disputes are potential problem areas. Detailed Procurement Capacity Assessment is available in P-RAMS.

12. Procurement arrangements: All the works will use NIC e-procurement platform, which is already assessed and accepted by the Bank. This is likely to increase efficiency and transparency of procurement. All EPC procurements are likely to use ICB, while PBMC packages are likely to use NCB. PPP Concessions will be procured using open competitive bidding procedures acceptable to the Bank.

13. Procurement Planning: For each contract to be financed by the Loan, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame will be reflected in the Procurement Plan to be agreed between the Borrower and the Bank project team. The capacity building plan will also be reflected in the procurement plan. The procurement plan is provided in **Annex 10**.

14. Advanced Contracting: Bids for Works Contracts worth USD 300 million have been received and evaluated. Proposals for critical consultancies worth USD 9 million are also received and are under evaluation. All these contracts are likely to be awarded by April 2015.

15. Procurement risk assessment: The table below describes major procurement-related risks and the mitigation plan. The risk ratings have been decided based on both the probability of occurrence of various events as well as their likely impact. Based on the risk factors and mitigation measures, the overall residual procurement risk rating for the project is determined as "Substantial." The residual rating on procurement will be reviewed and updated periodically by the World Bank.

Assessed Procurement Risks and Mitigation Measures (to be updated after PRAMS is completed)

Risk Factor	*Initial Risk*	*Mitigation Measure*	*Completion Date*	*Residual Risk*
Limited capacity and inefficiencies resulting in delays in procurement and contract management processes	High	- Use of skilled procurement staff for handling procurement of services - Monitoring through procurement plan and quarterly reports - Use of e-Procurement and contract management tools (including PFMS)	Continuous from year 1	Substantial
Non-compliance with agreed procurement arrangements	High	- Training and hand-holding provided by the Bank - Prior and post reviews by the World Bank - Internal and external audits	Continuous from year 1	Substantial
Overall Risk	**Substantial**			**Substantial**

16. Procurement methods: The table below describes the various procurement methods to be used for activities financed by the proposed loan. These along with agreed thresholds will be reproduced in the procurement plan. The thresholds indicated in the following table apply to the initial 18 month implementation period and are based on the procurement performance of the project; these thresholds will be modified as required. Domestic preference will be applicable for International Competitive Bidding (ICB) procurement of goods as per Appendix 2 of the Procurement Guidelines.

Procurement Methods

Category	*Method of Procurement*	*Threshold (US$ Equivalent)*
Works	International Competitive Bidding (ICB)	> 40,000,000
	National Competitive Bidding (NCB)	Up to 40,000,000 (with NCB conditions)
	Shopping	Up to 100,000
	Direct Contracting (DC)	As per paragraph 3.7 of Guidelines
	Public-Private Partnership (PPP) for Works	As per paragraph 3.14 of Guidelines
	Force Account	As per paragraph 3.9 of Guidelines
	Framework Agreement (FA)	As per paragraph 3.6 of Guidelines
Goods and non-consultant services (NCS)	International Competitive Bidding (ICB)	> 3,000,000
	Limited International Bidding (LIB)	wherever agreed by Bank
	National Competitive Bidding (NCB)	Up to 3,000,000 (with NCB conditions)
	Shopping	Up to 100,000
	Direct Contracting (DC)	As per paragraph 3.7 of Guidelines
	Public-Private Partnership (PPP) Services	As per paragraph 3.14 of Guidelines
	Force Account (only for NCS)	As per paragraph 3.9 of Guidelines
	Framework Agreement (FA)[17]	As per paragraph 3.6 of Guidelines
	Procurement from United Nations (UN) Agencies	As per paragraph 3.10 of Guidelines
Consultants' Services	Selection Based on Consultants' Qualifications (CQS)/Least-Cost Selection (LCS)	Up to 300,000
	Single-Source Selection (SSS)	As per paragraphs 3.9-3.11 of Guidelines
	Individuals	As per Section V of Guidelines
	Particular Types of Consultants	As per paragraphs 3.15-3.21 of Guidelines
	Quality- and Cost-Based Selection (QCBS)/ Quality-Based Selection (QBS)/ Selection under a Fixed Budget (FBS)	for all other cases
	(i) International shortlist (ii) Shortlist may comprise national consultants only	> 800,000 Up to 800,000

17. World Bank review of procurement: The World Bank will prior review the following contracts:

a) Works: All contracts more than US$ 10 million equivalent

b) Goods: All contracts more than US$ 1 million equivalent

c) Services (other than consultancies) and IT systems: All contracts more than US$ 1 million equivalent;

d) Consultancy services: > US$ 500,000 equivalent for firms and > US$ 200,000 equivalent for individuals.

[17] DGS&D rate contracts may be used as framework agreement (FA) provided:

- Use of DGS&D rate contracts as FA must be reflected on the procurement plan agreed by the Bank for particular goods.
- Before issuing the purchasing order, the implementing agency will carry out a price analysis on the specific good that is intended to be purchased. If after this due diligence the implementing agency concludes (and Bank agrees) that the DGS&D rate contracts are more advantageous, DGS&D rate contracts may be used as FA.
- To meet the Bank's requirements for right to audit and F&C, these clauses may be included in the Purchase Orders (in case the purchasers are directly placing the purchase orders to DGS&D rate contract holders). On the other hand, if indent is placed through DGS&D, the Purchaser has the option to sign a separate undertaking with DGS&D rate contract holder, where Bank's right to audit and F&C clauses could be mentioned.

18. In addition, the justifications for all contracts to be issued on the basis of LIB, single-source or direct contracting (except for contracts less than US$ 50,000 in value) will be subject to prior review. The above thresholds are for the initial 18 month implementation period; based on the procurement performance of the project these thresholds may be subsequently modified. The prior review thresholds will also be indicated in the procurement plan. The procurement plan will be subsequently updated annually (or at any other time if required) and will reflect any change in prior review thresholds. The World Bank will carry out an annual ex-post procurement review of the procurement falling below the prior review thresholds provided above.

19. Implementation support: The World Bank will normally carry out implementation support missions, including review and support on procurement, on a semi-annual basis. Mission frequency may be increased or decreased based on the procurement performance of the project. Training on procurement and contract management has already been provided by the Bank in February 2015. Refresher training will be arranged in future, as and when needed.

20. Use of government institutions and enterprises: Government-owned enterprises or institutions in India may be hired for activities of a unique and exceptional nature if their participation is considered critical to achievement of project objectives. In such cases the conditions provided in clause 1.13 of the Consultant Guidelines will be satisfied and each case will be subject to prior review by the World Bank.

B. Financial Management and Disbursements

21. Financial Management: The project will be implemented by the PIU formed by the HD under previous Bank-financed project. The finance wing of the PIU is headed by Finance Controller and is familiar with Bank's financial management policies and procedures of HD. The audit wing is headed by Finance Advisor/Chief Accounts Officer, deputed from treasury and accounts for carrying out internal audit of the Project. The divisional accountants at the participating divisions/circles will be deployed by GoTN prior to project effectiveness and sufficient training will be provided to the staff. The PIU will have the overall accountability of maintaining the financial management system and ensuring that these are carried out in accordance with the Project's legal agreements. These activities would include: (a) adequate annual budgetary provision and effective utilization; (b) sufficient and timely flow of funds for project activities; (c) maintenance of adequate and competent financial management staff; (d) appropriate accounting of project expenditures; (e) preparation and timely submission of IFRs; and (f) timely submission of audit reports and project financial statements to the Bank.

22. Budgeting: At GoTN level, the Project's funding requirement will be provided within the budget of the HD under Externally-Aided Project. The PIU has opened a separate budget head and object heads[18] for this project and adequate budget provision was made to finance project expenditures. The yearly budgets (BE/RE) will be approved by the finance department of GoTN based on the Annual Work Plans (AWP) developed by the PIU.

23. Funds Flow (GoTN to PIU and Field Divisions): The funds for this project will flow through the existing GoTN's treasury system. Based on the approved budget, physical progress

[18] Civil works, and Land Acquisition

and funding requirements, the Finance Department will issue monthly 'Letter of Credit' (LOC) to the drawing and disbursement officer (DDO) of the PIU and the field/circle divisions in HD. The PIU is in the process of obtaining a special status Government Order from the GoTN which would facilitate timely approval of LOCs by the Finance Department. The payment function for civil works, land acquisition and R&R activities will be de-centralized through sub-treasuries at the respective field divisions. For goods and consulting services, the payments will be centralized at Pay and Accounts Office (PAO) in Chennai. For executing civil work payments, the DDO's will use established administrative authority levels of the HD, in addition to obtaining pre-certification from supervision consultant/independent engineer. A firm will be engaged as an independent engineer to monitor the quality and progress of work. For EPC contracts, the payments will be linked to achievement of construction milestones and these will be specified in contract document. The Bank loan will finance 50% of the cost and remaining 50% will be financed by GoTN. For PPP concessions, the GoTN will select a concessionaire through a competitive bidding process. The concessionaire would mobilize the required financing to carry out construction works and other expenditure including O&M expenses, through a combination of equity and/or debt. During the construction phase, the Bank loan will finance 50% of the estimated construction cost of civil works and payments will be linked to achievement of agreed milestones/levels of construction progress. During O&M phase, the semi-annual payments (annuities) will be entirely financed by GoTN. For PBMC contracts, the Bank loan will finance 20% of the costs and 80% will be financed by GoTN. The field divisions will provide necessary documents to TNRSP and obtain their approval before cheques are drawn by respective DDOs' and issued to the contractors.

24. Accounting and Financial Reporting (IFR): The PIU will use GoTN extant systems for project budgeting, accounting and payments. The accounting function for civil works, Land Acquisition, utility shifting and R&R activities will be de-centralized at various field divisions/circles. The accounting function for procurement of goods and consulting services will be centralized at PIU. The PIU and the field divisions will maintain subsidiary/memoranda records as per the accounting norms prescribed in HD manual. These policies and procedures are comprehensive and lay down adequate internal control procedures for accounting and contract management functions. The expenditure statements will be submitted by project to the office of AG (A&E) for recording project expenditures against the approved budget. The PIU will obtain monthly reconciliation certificate from AG (A&E). The Interim Financial Reports and annual financial statements will be prepared after the reconciliation is completed with AG (A&E).

25. The Interim Financial Reports will report actual expenditures incurred by Project. The IFR will be prepared by PIU from its underlying accounting records and expenditure statements obtained from field divisions. The IFR will provide information on the sources and uses of funds as per disbursement categories and project components. The IFR will be submitted to the Bank within 45 days from the end of each calendar quarter. The IFR will form the basis of disbursement. Any ineligible expenditure that is either identified by the Bank or in the audit reports or otherwise would be adjusted by the Bank in subsequent disbursements.

26. Disbursement Arrangements: The applicable disbursement method will be "reimbursement'. The Government will use its budgetary resources to finance the project expenditures. The project will submit Interim Financial Reports to the office of CAAA, GoI.

These financial reports will be submitted by CAAA to the World Bank for seeking timely reimbursement.

27. Information system (PFMS): The HD under the previous Bank financed Project have developed a PFMS to integrate accounting, procurement, human resource and contract management functions. The technical and finance staff of the HD have been adequately trained on this system. The functionality of the PFMS system is presently been tested at certain field divisions/circles. This system needs to be customized further to accommodate the modern contracting techniques (i.e. EPC and PPP) as it is currently been designed for traditional item-rate BOQ model. On successful roll out/implementation of PFMS across the HD, the system will be used for contracts executed under the project.

28. Finance Staffing and Training: The finance wing of PIU, TNRSP is adequately staffed with finance personnel. It is headed by financial controller (qualified professional) who reports to the Project Director. He has rich experience in government accounting/financial management matters and has supervised the previous Bank financed Road project. The PIU staff are familiar with Bank's financial management policies/procedures and are adequately trained in PFMS system. The financial controller will provide regular oversight and ensure that agreed financial management arrangements are carried out seamlessly. At field divisions/circles, the project has identified vacant finance positions and divisional accountants will be deployed prior to project effectiveness. The divisional accountants will be provided sufficient training on departmental procedures and PFMS system. The staffing needs of the project will be regularly assessed by PIU and swift action will be taken to appoint vacant positions.

29. Internal Audit: The internal audit wing of the PIU, TNRSP is headed by finance advisor/chief accounts officer deputed from treasury and accounts department of GoTN. The internal audit will be carried out by the audit wing of TNRSP. The audit will focus on review of internal control processes adopted by field divisions of HD; assess functioning of PFMS, procurement and contract management functions. The audits will provide feedback to management on control weaknesses and issues that require management attention. The internal audit reports along with the corrective actions taken by the project to address the control weaknesses (if any) will be shared with the Bank.

30. External Audit: The Comptroller and Auditor General of India (CAG) will be the external auditor for the project. The CAG's office will conduct an annual audit of the project financial statements covering sources and uses of funds (entire Project cost of USD 778.2 million). The audit will be conducted as per the terms of reference agreed with the Bank and the audit report will be submitted within nine months from the close of each financial year. The audit report for the expenditures incurred under Retroactive financing will be combined with the first year audit report. The annual audit report would consist of (i) audit opinion; (ii) project financial statements; and (iii) management letter highlighting weaknesses, if any. The following audit reports will be monitored:

Implementing Agency	Audit Report	Auditor	Due Date
PIU, TNRSP – GoTN	Audit report and project financial statements	C&AG of India	December 31 of each year

31. Supervision Plan: The financial management risk of the project is assessed as Moderate. The PIU has successfully implemented the previous Bank-financed project and has adequate fiduciary capacity in carrying out financial management functions. The staffs are familiar with Bank's financial management policies and procedures of HD. The GoTN treasury systems and HD procedures are robust and these systems are used for project budgeting, accounting and payments. The Project is using modern contracting methods (i.e. EPC and/ or PPP) wherein major risks related to design; time and cost overruns are transferred to the contractors thereby improving operational efficiency and cost optimization. In the first year of implementation, the team would carry out six monthly supervision missions to ensure that laid down processes and procedures are appropriately followed and as implementation progresses; it will involve review of IFRs and audit reports.

32. Retroactive Financing: The project has requested for a financing of USD 30 million. The payments made by PIU on or after June 1, 2014 to the loan signing date (period less than one year) for the contracts awarded following World Bank procurement procedures or other acceptable operating costs shall be eligible for retroactive financing. The PIU will submit a separate IFR to claim such expenditures.

33. Public Disclosure: The annual audit reports and project financial statements will be disclosed by PIU, TNRSP at Highway's Department website.

34. Disbursement Schedule: IBRD funds will be disbursed against eligible expenditures under the following categories subject to the allocated amount and the disbursement percentage as indicated in the table below:

Disbursement Category	**Amount of the Loan Allocated (expressed in USD)**	**percent of expenditures to be Financed (inclusive of taxes)**
(1) Works under Sub-Component A1 of the Project	150,750,000	50%
(2) Works under Sub-Component A2 of the Project	100,400,000	100%
(3) Works under Sub-Component A3 of the Project	7,800,000	20%
(4) Works under Component C of the Project, goods, non-consulting services, consultants' services, Training and Incremental Operating Costs	40,300,000	80%
(5) Front-end Fee	750,000	Amount payable pursuant to Section 2.03 of the Loan Agreement in accordance with Section 2.07 (b) of the General Conditions
(6) Premia for Interest Rate Cap and Interest Rate Collar	0	Amount payable pursuant to Section 2.08 (c) of the Loan Agreement
Total Amount	300,000,000	

C. Environmental and Social (including safeguards)

35. Institutional arrangements – Social: To expedite land acquisition and implementation of RAPs, three regional-level Land Acquisition Rehabilitation and Resettlement Units (LARRU) have been constituted. These units, headed by Special District Revenue Officers (Special DRO), are supported by Resettlement Officers (RO) for RAP implementation support and Tahsildar(s) for support in land acquisition. A separate Government Order has been issued nominating Special DROs as Competent Authority under TNH Act for land acquisition and award pronouncement. A Chief Engineer, supported by domain experts in land acquisition and resettlement, will be the overall in-charge of land acquisition and R&R implementation and will coordinate with the three Special DROs in RAP implementation and Land acquisition. These units will be entrusted with responsibilities of implementation of the RAP involving: (i) acquisition of land and assets; (ii) payment of compensation for land and assets; (iii) disbursement of resettlement assistances including development of resettlement sites wherever required and disbursement of R&R assistance and reconstruction of affected common facilities. The LARRU in each region will be supported with support staff including clerical staff and seven field units headed by Tehsildars. The implementation of the R&R provisions will be supported by NGOs/consultants with experience in similar development projects. There will be concurrent monitoring consultants who will be providing PAPs feedback on land acquisition compensation, payment of R&R assistance and implementation progress on quarterly basis through field visits and consultation with NGOs and officials as well as affected people.

36. Budget Provision: The budget estimates for the RAP implementation including the compensation for land and assets and R&R assistances is INR 2.21 billion (approximately USD 36.8 million) for 11 road stretches proposed under EPC and additional budget for subsequent phases will be provided by GoTN as needed. The preliminary budget estimate for 3 PPP roads will be INR 4.12 billion (approximately USD 68.67 million). This amount will be met out of counterpart funding. The Government will provide adequate budget for all land acquisition compensation, R&R assistances and RAP implementation costs from the counterpart funding in accordance with the eligibility and entitlement. The compensation and R&R assistance will be paid to the affected people prior to taking over of their land and assets.

37. India's new LARR Act, 2013: This new Act which replaced the previous anarchic Land Acquisition Act of 1894, seeks to balance out the interests of the land owners, project affected people and the acquirers and links land acquisition and the obligations of resettlement and rehabilitation. This law also provides that no one shall dispossess their land and assets until the payments are made and alternative resettlement sites have been prepared. This Act significantly reduces the differences between India's national standards for land acquisition and R&R and the World Bank's operational policy requirements in relation to compensation, transitional support, resettlement sites, and support to vulnerable people, grievance mechanisms, consultations, disclosure, etc. The Project specific RPF has appropriately incorporated the provisions of the new Act and Bank's OP on Involuntary Resettlement, which will be adopted for this project.

38. Social Safeguard Risks: The likely risks from social safeguards point of view are: (i) difficulty in timely handing-over of encumbrance-free road stretches to the contractors due to

delays in payment of compensation and R&R assistance, (ii) impact on poor, marginal land owners and vulnerable people requiring careful handling, (iii) inadequate capacity to meet the Bank's requirements and India's new LARR Act provisions in implementation, (iv) resistance from the land owners for impact to their wetlands and built-up structures, (v) availability of budget from counterpart funding due large requirement (about USD 105.5 million), (vi) inter-departmental coordination on certain land acquisition and resettlement implementation, and (vii) effective grievance mechanism for handling the grievances and complaints from the land owners. The PIU is taking appropriate measures to deal with the above risks though delegation of powers for land acquisition, establishing grievance mechanisms, availing services of local NGOs/consultants for implementation support, adequate R&R support to all section of affected people, coordination with civil works and procurement timetable, ensuring adequate budget support from the GoTN. On the other hand, the Bank is factoring the readiness and implementation progress in land acquisition and resettlement implementation at different stage of procurement of civil work contracts and obtaining certification on payment of compensation and resettlement assistance at the time of handing over of road stretches to the contractors. Land acquisition and resettlement actions for PPP concessions are spelled out in the RPF that are required to be completed prior to procurement and handing over of site to the contractors. This is to ensure that the affected people receive compensation and assistance prior to their handing over of affected land and assets. The works contract agreements have suitable clauses for joint verification of site at the time of executing the agreement. Contractor and employer will need to identify encumbrances before the land is handed over by the employer and agree on a time frame for mitigation of encumbrances.

39. Grievance redress process: There is a provision in the RPF and RAPs for establishment of two-level grievance redress committee. The local-level committee will consist of a retired Government Official, a local person of repute, the Revenue Divisional Officer and the Divisional Engineer of HD. In addition to this, LARR Authority will serve as appellate authority. Also, communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

40. Consultations: As part of census and socio-economic surveys, consultations were held with the displaced households and other stakeholders in 23 locations along the EPC roads. As many as about 1350 people including 14% women participated in these consultation meetings. Similar consultations are being held separately for PPP roads also. The consultations were initiated by presenting an overview of the project features to the participants, justification for undertaking the project, and its benefits and likely impacts. Participants' views and concerns

about the project were discussed and key outcomes were integrated in the design and mitigation plans. The key outcomes of consultations include safety concerns due to increased speed and accidents, impacts to trees and drinking water pipelines, impacts to graveyards, suggestion for bypasses and realignments, loss of livelihoods due to impacts to business establishments, loss of irrigated lands, suggestion for reduction in width of corridor of impact to avoid physical displacements, etc. These concerns are incorporated in the designs and the RAP to the extent possible. The key concerns among women include safety to school-going children due to increase in speed of vehicles, support for livelihood impacts, disturbances to drinking water pipelines and loss of certain trees. Suitable measures to these concerns will be taken up during the project implementation.

41. Monitoring and Evaluation: Management Information System (MIS) will be developed using appropriate software to track the implementation progress and generate progress reports and support queries. Consultants having experience in resettlement and land acquisition will be engaged to undertake concurrent monitoring and provide feedback from the affected people on the compensation, assistance and support received by them. Grievance Redressal Committee (GRC) will be established at two-levels to receive, evaluate and facilitate the resolution of displaced persons' concerns, complaints and grievances. Mid and end-term impact evaluations will be undertaken to assess how the compensation and R&R assistance has helped the people to improve or regain their pre-impacted living standards over the baseline socio-economic data gathered during the initial socio-economic surveys. As part of RAP implementation, social inclusion and gender mainstreaming will be tracked through (i) number of poor/ vulnerable/disabled members received R&R assistance; (ii) number of Dalit families (SC population) received compensation and R&R assistance; (iii) proportion of local people received employment under contractors including female labor participation.

42. Institutional Arrangement – Environmental: During the implementation of TNRSP I, the PIU has developed relevant institutional capacity for effective implementation of environmental management measures. The PIU currently has an Environmental Cell which will continue to implement environmental safeguards management measures for TNRSP-II. The EC is currently staffed with one Environment Specialist, deputed from the Pollution Control Board, who will oversee the environmental safeguards management. The EC has an Assistant Conservator of Forests, two Rangers and field staff. The forester will supervise and coordinate compensatory plantation, successful coordination for compensatory afforestation. For implementation effectiveness, under the leadership of the Project Director (PD), the EC will work jointly with a Superintending Engineer, an Assistant Divisional Engineer, 2 Assistant Engineers (HO) and 6 Assistant Engineers (Field Offices – 1 in each of the six field divisions).

43. Environmental Monitoring and Post-Audit: Construction monitoring, including field inspection and survey requirements have been adequately identified. These activities will be coordinated by the Environmental Specialist to ensure that environmental protection requirements are being met. The monitoring and reporting protocols are pre-defined, budgeted and will be integrated into contracts and supervision consultancies. This is in line with the reporting system developed for the project. The application and implementation of EMPs will be closely monitored (using parameters that are prescribed in the EMPs) by qualified and experienced specialists (including those from the Construction Supervision Consultant) who will

report on a regular basis. A comprehensive assessment report on environmental performance will be prepared by the PIU at mid-term and at the close of Project. In order to ensure that the proposed mitigation measures have the intended results and comply with GoI/State and World Bank requirements, environmental performance monitoring program will be developed by the project.

D. Monitoring and Evaluation

44. Results Indicators: Baseline values and project-related targets will be agreed during negotiations.

45. Monitoring: Routine monitoring will focus on physical and financial progress of civil works contracts and consultancies and the road safety and institutional capacity enhancement activities under the project. The PFMS will be extensively used in M&E and will feed routine monitoring reports. Road user satisfaction surveys will be carried out to assess the socio-economic impact of newly improved highways, safety of road users etc. The results of the Third-party Audits covering project implementation will complement monitoring and evaluation. Independent consultants will undertake detailed audits of all the works contracts on semi-annual basis. The audit will include technical, procurement, financial, social and environmental aspects, contract management, and engineering supervision. At semi-annual intervals, the auditors will also review the implementation status and results of the Institutional Capacity Enhancement Component and Road Safety Component, and provide a report to the Project Empowered Committee. The objective of the audits is to collect feedback on project implementation and evolve recommendations to further enhance performance of project activities. The Third-party Audit Consultants will hold consultations and discussions with various stakeholders while making their assessments and evolving recommendations.

46. Reporting: The PIU will prepare project progress reports on a quarterly basis and submit to the World Bank within 45 days after the end of each quarter. These reports will include status of project implementation by component, updated project performance indicators, and IFR.

Annex 4: Implementation Support Plan

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

Strategy and Approach for Implementation Support

1. The strategy for the implementation support has been developed based on the nature of activities involved in the project and their commensurate risk profile. The Implementation Support Plan (ISP), as described below, will be a live document, will be reviewed and revised regularly as and when required during the implementation, at least on a half yearly basis.

2. **Technical Support.** The Bank will provide required technical support through sector specialists and institutional, road safety and governance specialists to the GoTN in technical aspects and formulating medium and long term strategy related to improved planning, financing, asset management, safety and governance aspects. The implementation support will be provided through at least two implementation support missions in a year and through continuous exchange of correspondence and regular communication.

3. **Procurement.** Implementation support will include: (a) reviewing procurement documents and providing timely no-objection; (b) providing detailed guidance on the Bank's Procurement Guidelines; (c) monitoring procurement progress against the detailed Procurement Plan; (d) review of contract management activities; and (e) identifying the capacity building/training need on procurement processing and providing training if required. The support will be provided through regular interactions, half-yearly implementation support missions, and thematic implementation support missions, if required.

4. **Financial management.** Implementation Support will review the project's financial management system, including but not limited to, accounting, reporting, and internal controls. The broader integrity risks as regards to the financial management aspects will be also addressed. The support will be provided through regular interactions, half-yearly implementation support missions, and thematic implementation support missions, if required.

5. **Environmental and Social Safeguards.** The Bank safeguards specialists in the team will supervise various activities to ensure full compliance with the Bank's operational policies / procedures and the agreed actions related to environment and social safeguards aspects. The implementation support will be provided through regular interactions, half-yearly implementation support missions, and thematic review missions, if required.

Implementation Support Plan:

6. Most of the Bank team members will be based in the India country office, including Task Team Leader, technical, procurement, financial management, and safeguards specialists, which would facilitate timely, efficient, and effective implementation support to the client. Detailed inputs from the Bank team are outlined below:

(a) **Transport Sector Specialist**, Procurement Specialist and Lawyer, will provide inputs to finalize the bidding documents and facilitate smooth implementation of the EPC

contracts and PPP concessions throughout the project life. The technical specialist will also collaborate with the safety expert in providing implementation support for the road safety component (particularly engineering aspects).

(b) **Institutional Strengthening Inputs**. The institutional specialist will provide implementation support in finalizing the institutional capacity enhancement component, provide assistance to GoTN in completing the procurement process for this component, and then review along with the PIU the quality of various studies/outputs prepared by the consultants. The specialist would also provide specific implementation support in ensuring the adoption/rolling out of various institutional study recommendations.

(c) **Road safety inputs.** The road safety specialist in collaboration with the institutional specialist and the technical/sector specialist would provide implementation support to the client in developing and implementation of the road safety program under the project.

(d) **Fiduciary Compliance and Management.** The Bank's financial management and procurement specialist will help GoTN identify capacity building needs to strengthen its procurement and financial management capacity and improve procurement management efficiency including identification of red flags (for fraud and corruption). Both the specialists will provide timely support in procurement processing and compliance with financial management requirement including timely submission of audit statements and financial reports.

(e) **Safeguards Compliance and Management**. The Bank's social and environmental specialists will provide implementation support in review of various safeguards documentation and ensuring compliance with the Bank's operational policies and procedures on social and environmental safeguards. The specialists will visit project sites during implementation support missions, take detail notes, and follow up with the client to help improve safeguards implementation.

(f) **Governance**. In order to support effective implementation and good governance under the project, the task team will undertake enhanced supervision in the areas of implementation of institutional strengthening activities and closely monitor the procurement process and contract management under the project. This support will be primarily provided by the Governance specialist with adequate assistance from Financial Management Specialist, Procurement Specialist and other team members.

7. The main focus of implementation support is summarized below.

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Network Improvement Component	Technical / Transport Sector Specialist	8 SW	
	Institutional Capacity Enhancement and Road Safety Components	Transport Sector Specialist Institutional Development Specialist Governance Specialist Road Safety Specialist	4 SW 4 SW 2 SW 6 SW	
	Fiduciary and Safeguards, Procurement	Procurement specialist Environment Specialist	8 SW 6 SW	

Time	Focus	Skills Needed	Resource Estimate	Partner Role
		Social Development Specialist FM Specialist Lawyer Governance Specialist	6 SW 3 SW 2 SW 2 SW	
	Team leadership	Task Team Leader	12 SW	
12-60 months	Implementation of Network Improvement Component	Transport Sector Specialist	8 SW/ year	
	Implementation of Institutional Capacity Enhancement and Road Safety Components	Transport Sector Specialist Institutional Development Specialist Road Safety Specialist Governance Specialist	4 SW / year 4 SW / year 4 SW/ year 2 SW / year	
	Fiduciary and Safeguards	Procurement Specialist Environment Specialist Social Development Specialist FM Specialist Governance Specialist	3 SW/ year 6 SW/ year 6 SW / year 3 SW / year 2 SW / year	
	Task leadership	TTL	12 SW / Year	

8. Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips per year
Technical Specialist	12 SWs every year	2
Institutional Development Specialist	4 SWs every year	2
Road Safety Specialist	6 SWs first year, then 4 SWs annually	2
Procurement Specialist	8 SWs first year, then 3 SW annually	2
Environment specialist	6 SWs every year	2
Social specialist	6 SWs every year	2
FM Specialist	3 SWs annually	2
Governance Specialist	4 SW every year	2
Task Team Leader	12 SW annually	2

Annex 5: Risk Analysis and Rating

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

1. The key risks for this project are essentially with respect to change management, especially in terms of ensuring sustainability of the institutional capacity and likely opposition from stakeholders, viz., staff (for change management), political opposition and users (for direct or indirect user charges).

2. Political & Governance (Low Risk): The Political and Governance risk is low. The state is politically stable, the government that has full majority has been in office for 3 years, and the upcoming elections are about one year away. The emphasis on development priorities is generally being sustained despite changes in the ruling party. The proposed project is a follow-on project building on some of the successful features of the earlier project, with full support from the incumbent government. As regards governance, there are adequate avenues available for effective legal recourses against the state and legitimate cases are generally successful. The Right to Information Act (2005) has increased public and media scrutiny in the country; in parallel, the GOI has also stepped up its governance agenda – new legislation on an effective anti-corruption body[19], whistleblower protection[20] and land acquisition and resettlement[21] have recently been enacted by Parliament to promote transparency and good governance. Independent constitutional bodies such as the CAG and the CVC are increasingly using their constitutional powers to identify and bring to light systemic corruption. Significant reforms are being initiated at the state level (e.g. the enactment of a Right to Service) as well.

3. Macroeconomic (Moderate Risk): The risk of emerging or continuing external and/or domestic imbalances is moderate, and consequent macroeconomic effects would only moderately affect the achievement of the PDO if they materialize. The macroeconomic framework is adequate and appropriate with latest projections of 5.6 percent in FY2014-15, accelerating to 6.4 percent in 2015-16 and 7 percent in 2016-17 owing to gradual pickup of domestic investment and rising global demand. The forecasts assume that reforms are undertaken to ease supply-side constraints (particularly in energy and infrastructure) and to improve labor productivity, fiscal consolidation continues, and a credible monetary policy stance is maintained. The longer term growth potential remains high due to favourable demographics, relatively high savings, recent policies and efforts to improve skills and education, and domestic market integration. Monetary, exchange rate and fiscal policies are generally consistent with macroeconomic stability and growth objectives.

4. Sector strategies and policies (Moderate Risk): The sector strategies and policies have been consistent and progressively evolving in the desirable direction of achieving greater efficiencies in building and maintaining the state's road network. In line with the evolving best practices, the state is gradually moving towards (a) large contracts with better risk-sharing arrangements (e.g., EPC, BOT) and due emphasis on maintenance; (b) ensuring adequate

[19] The Lokpal & Lokayuktas Act, 2013
[20] The Whistleblower's Protection Act, 2011.
[21] The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013

funding from the exchequer; and (c) mobilizing additional resources through direct and indirect user charges, thereby ensuring predictably funding support for the project as well as the sector. Yet, some of the anticipated elements such as, for example, mobilization of additional finances through user charges may face political resistance or get delayed. Keeping these in view, the risk pertaining to sector strategies is rated moderate.

5. Technical design of the project (Moderate Risk): A key area of concern here is emanating from the roads that are proposed to be developed outside the purview of the proposed project, using direct user charges under BOT-Toll mode. In case of any disruption in developing these high traffic segments – say, due to delay in putting place the toll policy or the prevailing lack of investor interest in toll-based PPPs – deployment of the Bank loan support for the development of stretches in the next lower rungs of the CRN could be seen as a case of "misread" priorities. Excepting this "outside" risk element, the project is unlikely to have other major downsides as the design has been kept relatively simple. The three components of the project and most of their sub-activities have been tried in other projects and, to a large extent, familiar to the implementation agency (e.g., large contracts, PBMC and IT-based systems for management of projects, finances and road assets and road accident data) and/or the Bank (EPC, PPP, road safety and other institutional strengthening activities). Accordingly, this risk on account of technical design is expected to be moderate.

6. Institutional Capacity for implementation and sustainability (Substantial Risk): The implementation agency is staffed with skills sets for implementing the activities and will be aided by professional experts and consultants as needed, e.g., network improvement and road safety. The availability of adequate counterpart resources is unlikely to be constraint considering the track record of substantial increase in allocations to the sector from the exchequer over the years. Yet, achieving the key purpose of the institutional capacity enhancement component – that is, to ensure that the skills developed and learnings from the project would go beyond the small contingent of dedicated project implementation wing and permeate the entire HD – is likely to pose a notable challenge. This transformation would require a change from practices, and, is likely to face opposition from vested interests or general resistance to change. In order to mitigate this downside, the institutional capacity enhancement effort is being reasonably paced over the project period and is being implemented with involvement of officers from various levels of the HD.

7. Fiduciary (Moderate Risk): The project will be implemented by the PIU-TNRSP formed by the HD for the previous Bank financed project. The finance wing of the PIU is headed by a Finance Controller and is familiar with Bank's financial management policies and procedures. Divisional Accountants will be deployed by project effectiveness and necessary training will be provided to them. The treasury systems and procedures of the GoTN are robust and these systems will be used for project budgeting and payments. The integrated PFMS developed under the previous project will be used extensively for project accounting and contract management functions after it is customized further on modern contracting techniques (i.e. EPC and PPP). Internal audit will be carried out by the audit wing of the PIU, headed by the Finance Advisor/Chief Accounts Officer (deputed from the treasury and accounts). The external audit of the project will be carried out by the office of the C&AG as per the terms of reference agreed with the Bank. The PIU has adequate capacity to take up the procurement of BOQ based

packages but procurement of other models (EPC, PPP and PBMC) may pose some challenges. On contract management front, previous project witnessed delays in completion of major contracts and frequent variation orders, which is an area of concern. The project will use e-procurement for works packages, which will improve the efficiency of procurement process. Based on these the fiduciary risk is rated moderate.

8. Environment and Social (Substantial Risk): Environmental and Social risk is substantial because of potential adverse impacts due to land acquisition and displacement of people and construction and operational stage environmental impacts including loss of vegetation, impacts on physic-chemical parameters and cultural and community resources. The land acquisition and displacement will affect the small landowners, petty shopkeepers and squatter families belonging to poor and low-income population. The magnitude of land acquisition and displacement impacts in the project are considered high in relation to similar Bank assisted projects in India and delays in land acquisition and resettlement process is anticipated. The magnitude of impact includes acquisition of about 150 hectares of private land and transfer of about 15 hectares of Government land. This acquisition process will impact about 1400 families who will experience major impacts in the form of loss of house or livelihood and minor impacts to about another 7600 families. In addition, there may be difficulties in timely handing over of encumbrance-free milestone stretches to the contractors due to resistance from the landowners especially wet landowners. Limited implementation capacity and inter-departmental coordination may also adversely impact the management of land acquisition and resettlement impacts. Close coordination between the implementation of land acquisition, R&R and procurement and handing over of site will be maintained to ensure that the affected people receive compensations before their assets are taken over for the project. The nature of potential environmental impacts varies across different stretches proposed for widening and strengthening. These impacts, although amenable for mitigation, are significant and comparable to similar projects with significant impacts in India portfolio. The nature of impacts for EPC roads include: (a) loss of roadside trees; on an average, about 44 trees per kilometer with varying girth size; (b) limited impact on reserve forest; diversion of 0.5 Ha. forest land; (c) impacts on water bodies and natural drainage areas; (d) disturbance and/or loss of community/common property resources; and (e) impact on sensitive receptors along all the project corridors. The project implementation would also lead to temporary environmental impacts during construction stage. In order to mitigate these risks, the project design includes appropriate measures including development and implementation of robust EMPs and RAPs.

9. Stakeholders (Substantial Risk): As explained in the sections related to sector strategies and policies and institutional capacity enhancement sustainability, the project is likely to face opposition from stakeholders in the areas of institutional level change management (from the staff) and mobilization of additional resources through direct and indirect user charges (from the road users and political opposition). While the opposition to change at the institution level would be addressed through a more gradual pacing of the change management and inclusive consultations and implementation, the external opposition (for user charges) would be overcome through explaining the underpinning imperative, that is, to achieve rapid improvement in the capacity and quality of road services.

Annex 6: Economic Analysis

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

1. The Network Improvement Component comprises three programs designed to upgrade and maintain the road network in Tamil Nadu: (i) upgrading 430 km of priority SH to standard two-lane configuration with paved shoulders through public sector financing (EPC roads); (ii) upgrading about 145 km of priority SH to standard four-lane configuration through PPP mode; and (iii) maintenance of about 600 km of priority SH through public sector financing (PBMC roads). Economic evaluation has been carried out for the upgrading roads (EPC roads and PPP roads). The economic analysis was done using the Highway Development and Management Model (HDM-4), a globally accepted key analytical tool for economic analysis of highways investment alternatives, which simulates life cycle conditions and costs and provides economic decision criteria for multiple road design and maintenance alternatives. The main project economic benefits are savings in vehicle operating costs, travel time costs, savings in accident costa, distance savings and maintenance costs arising from the road works.

2. The cost-benefit analysis of the project indicates that the project economic benefits are satisfactory. The overall Net Present Value (NPV) of net benefits of upgrading the priority SH under EPC is USD 420 million, at a 12% discount rate over a twenty five year operation period. The Economic Internal Rate of Return (EIRR) is 30.94%. NPV of net benefits for the three PPP roads is USD 375 with an overall EIRR of 31.85%. **Table 1 and Table 2** show the results of economic analysis of EPC roads and PPP roads respectively.

Table 1: Economic Analysis Summary – EPC Roads

Sl. No.	Details	PPC 01	PPC 02	PPC 03	PPC 05	Total
1	Benefits (USD million)	255.54	19.67	87.43	247.05	609.68
2	Costs (USD million)	58.69	16.78	46.86	66.78	189.12
3	Net Benefits (USD million)	196.85	2.89	40.56	180.26	420.56
4	Economic Internal Rate of Return (%)	39.70	13.81	17.77	38.96	30.94

Note: Figures are NPV @12% discount rate

Table 2: Economic Analysis Summary – PPP Roads

Sl. No.	Details	PPC 04 SH 15	PPC 04 SH 37	PPC 05 (SH 39)	Total
1	Benefits (USD million)	145.26	116.31	263.32	524.89
2	Costs (USD million)	32.65	69.27	48.12	150.04
3	Net Benefits (USD million)	159.65	180.26	215.21	374.86
4	Economic Internal Rate of Return (%)	37.16	17.57	49.09	31.85

A. Main Assumptions

3. For the economic analysis, fast moving motorized traffic including two wheelers and non-motorized vehicles have been considered. The cost of vehicles and tires were collected from manufacturers and dealers located in Tamil Nadu. All the transfer payments such as sales tax and excise duty were deducted from financial costs to arrive at economic costs. **Table 3** presents the vehicle fleet characteristics and economic unit costs for motorized vehicles.

Table 3: Motorized Vehicle Fleet Characteristics

Item	Car	Two Wheel	Three Wheel	Bus	2-Axle Truck	3-Axle Truck	Multi Axle Truck	LCV	Tractor
Vehicle Price INR	399,591	50,629	1,32,483	1,031,967	1,068,820	1,205,536	1,386,804	610,979	585,707
No. of Wheels	4	2	3	6	6	10	12	4	7
No. of Axles	2	2	2	2	2	3	4	2	3
Passengers	4	1	3	25					
Tyre Price INR	2,762	930	930	9,339	8,759	8,759	8,759	4,322	4,322
Fuel Per/Lt. INR	30	30	30	28	28	28	28	28	28
Lubricating Oil (INR)	78	78	78	78	78	78	78	78	78
Maint. Labor (per hr.) INR	59	26	85	121	132	129	129	110	110
Crew Wages (INR/ hr)	30	-	21	83	132	132	132	34	34
Annual Overhead (INR)	22,088	1,165	3,417	148,756	31,063	57,688	57,688	12,656	12,656
Interest Rate (%)	12	12	12	12	12	12	12	12	12
PCSE	1	1	1	2	2	2	2	2	
Working Hours	1,950	1,300	3,600	2,200	2,100	2,100	2,100	1,500	350
Annual km	32,000	16,000	21,900	1,00,000	75,000	75,000	75,000	60,000	4,000
Avg. life (Years)	10	10	8	8	8	8	8	8	10

Source: Updated from IRC : SP30 (2009) from 2009 to 2014 using the WPI and values adopted from other similar studies in India

4. Based on the above assumptions, **Tables 4 and 5** present typical economic road user costs, in USD/vehicle-km, for (i) an upgrading project of two lane road to 7.0 m carriageway with paved shoulder and (ii) an widening project of two lane road to four lane carriageway with paved shoulder.

Table 4: Road User Costs– upgrading to a Two Lane Road

Vehicle Category	Without Project (USD/Veh-km)			With Project (USD/Veh-km)		
	VOC per Vehicle km	Travel time Cost per Vehicle km	Total RUC / Vehicle km	VOC per Vehicle km	Travel time Cost per Vehicle km	Total RUC / Vehicle km
Autorickshaw	0.063	0.053	0.116	0.060	0.053	0.113
Bus	0.269	0.354	0.623	0.243	0.355	0.598
LCV	0.149	0.004	0.153	0.131	0.004	0.135
Medium Truck (2 Axle)	0.279	0.013	0.292	0.248	0.013	0.260
Mini Bus	0.129	0.229	0.358	0.119	0.229	0.348
Multi Axle Truck	0.556	0.024	0.579	0.492	0.024	0.516
New Tech. Car	0.090	0.116	0.206	0.083	0.116	0.199
Trucks - Heavy (3 Axle)	0.401	0.013	0.414	0.363	0.013	0.375
TW	0.018	0.016	0.035	0.017	0.016	0.033

Table 5: Road User Costs – Strengthening and Widening to a Four Lane Road

Vehicle Category	Without Project (USD/Veh-km)			With Project (USD/Veh-km)		
	VOC per Vehicle km	Travel time Cost per Vehicle km	Total RUC / Vehicle km	VOC per Vehicle km	Travel time Cost per Vehicle km	Total RUC / Vehicle km
Autorickshaw	0.066	0.054	0.120	0.055	0.042	0.096
Bus	0.291	0.363	0.654	0.222	0.279	0.501
LCV	0.164	0.004	0.168	0.123	0.003	0.126
Medium Truck (2 Axle)	0.305	0.013	0.318	0.231	0.010	0.241
Mini Bus	0.138	0.237	0.375	0.110	0.181	0.291
Multi Axle Truck	0.607	0.024	0.632	0.465	0.019	0.483
New Tech. Car	0.097	0.119	0.216	0.079	0.091	0.170
Old Tecch. Car	0.000	0.000	0.000	0.000	0.000	0.000
Trucks - Heavy (3 Axle)	0.433	0.013	0.446	0.339	0.010	0.349
TW	0.019	0.017	0.036	0.017	0.013	0.030

5. The economic evaluation has been done for an analysis period of 28 years (25 years operation period) with a discount rate of 12 percent. The capital costs (financial) of the project road works have been converted into economic costs by using a standard conversion factor of 0.9. Cost of land acquisition (LA) is not considered for the analysis. **Table 6** presents the average financial unit costs of different road works.

Table 6: Average Financial Unit Road Works Costs

Road Work	Cost (USD/km)
Routine Maintenance 2-lane	2,833
Periodic Maintenance 2-lane (30 mm BC)	50,300
Periodic Maintenance 2-lane (50 mm DBM + 40mm BC)	139,858
Periodic Maintenance 4-lane (30 mm BC)	85,510
Periodic Maintenance 4-lane (50 mm DBM + 40mm BC)	237,759
Widening to 2-lane 7.0 m CW with Paved Shoulder	688,125
Widening to 4-lane with Paved Shoulder	1,333,333

DBM = Dense Bituminous Macadam, BM = Bituminous Macadam, CW = Carriageway Width

B. Upgrading Program

6. The GoTN embarked on a program for upgrading, rehabilitation, strengthening and capacity augmentation of SH to improve the connectivity and upgrade the transport infrastructure to provide impetus to developmental activities. The HD through TNRSP identified a core network of state roads. Subsequently, TNRSP appointed consultants to carry out a pre-feasibility and Strategic Option Study (SOS) that recommended rehabilitation and upgrading of about 2,867 km. A sequel study to the SOS was undertaken with the following objectives: (i) comprehensive feasibility, preliminary design and initial safeguard scoping study of about 2,867 km of the state roads identified in the pre-feasibility study, and (ii) economic analysis, detailed engineering, design and project preparation for the identified about 2079 km high priority roads. The 575 km to be upgraded under the project represent the TNRSP II.

7. Classified traffic volume counts were carried out for seven days for each traffic homogenous segments during the period of January – March 2014. One day (24-hour continuous, both directions) axle load surveys were also carried out at all project corridors. The growth rates for different vehicles types and the different horizon periods have been estimated for five regions covering one package each. On an average, the adopted annual traffic growth rate for cars, motorcycles, and three wheelers is around 6 - 8 % from 2014 to 2017, around 6 - 7 % from 2018 to 22, around 4 – 6 % from 2023 to 2032, and around 3 - 5 percent from 2033 onwards. For trucks, the annual traffic growth rate adopted is around 5 - 6 % from 2014 to 2017, around 6 - 7 % from 2018 to 22, around 5- 6 % from 2023 to 2032, and around 4 - 5 % from 2033 onwards. For buses, the annual traffic growth rate adopted is around 4 - 8 % from 2014 to 2017, around 4 - 6 % from 2018 to 22, around 3- 5 % from 2023 to 2032, and around 4 - 5 % from 2033 onwards. Two percent traffic growth has been adopted for non-motorized vehicles. On sample basis, growth rates adopted for two packages are given in **Tables 7 and 8**.

Table 7: Growth Rates under Most Likely Scenario – TNRSP Package No: PPC03 SH-79

Vehicle Type	Period (2014-17)	Period (2018-22)	Period (2023-27)	Period (2028-32)	Period beyond 2033
Bus	4.5%	5.2%	4.4%	3.6%	3.0%
Mini Bus	4.5%	5.2%	4.4%	3.6%	3.0%
MAV	5.8%	6.8%	5.7%	4.7%	3.9%
3 Axle Truck	5.8%	6.8%	5.7%	4.7%	3.9%
2 Axle Truck	5.0%	5.0%	5.0%	4.7%	3.9%
LCV	4.3%	5.0%	4.2%	3.5%	2.9%
Two Wheeler	5.8%	6.8%	5.7%	4.7%	3.9%
Car	5.8%	6.8%	5.7%	4.7%	3.9%
Auto rickshaw	5.8%	6.8%	5.7%	4.7%	3.9%
Tractor & Tractor Trailor	3.0%	3.0%	3.0%	3.0%	3.0%
Slow moving vehicles	2.0%	2.0%	2.0%	2.0%	2.0%

Table 8: Growth Rates under Most Likely Scenario – TNRSP Package No: PPC04 SH-15 & SH-37

Vehicle Type	Period (2014- 17)	Period (2018- 22)	Period (2023-27)	Period (2028- 32)	Period beyond 2033
Bus	8.05%	7.25%	6.52%	5.87%	5.28%
Mini Bus	8.05%	7.25%	6.52%	5.87%	5.28%
MAV	4.90%	6.23%	5.79%	5.34%	4.90%
3 Axle Truck	4.90%	6.23%	5.79%	5.34%	4.90%
2 Axle Truck	2.45%	3.12%	2.89%	2.67%	2.45%
LCV	4.02%	5.11%	4.75%	4.38%	4.02%
Two Wheeler	8.13%	7.31%	6.58%	5.92%	5.33%
Car	8.13%	7.31%	6.58%	5.92%	5.33%
Auto rickshaw	8.28%	7.45%	6.70%	6.03%	5.43%
Tractor & Tractor Trailor	5.89%	7.49%	6.96%	6.42%	5.89%
Slow moving vehicles	2.00%	1.90%	1.80%	1.70%	1.50%

8. A road inventory, pavement investigations and analysis, bridge and cross –drainage inventory, cross-drainage condition and interpretation, and determination of available road land (right of way) of data have been done for each project road. The type and extent of surface distress were evaluated using the detailed visual inspection (DVI) method. A calibrated "Car mounted Bump Integrator" was used for the determination of pavement roughness along the entire length of all project roads. The pavement strength was evaluated using the Benkelman Beam deflection method on a sample basis.

9. The eleven project EPC roads have been subdivided into appropriate homogeneous sections representing similar traffic, pavement width and condition. The average roughness of these project roads is around 4.4 IRI, m/km and the average deflection is 0.95 mm. **Table 9** presents the current daily traffic of each road. The average total motorized traffic for all EPC roads is 6284 AADT, (3435 AADT excluding motorcycles) and the average non-motorized traffic is 159 AADT. For roads under PPP program, the AADT of motorized traffic is 10007 vehicles (6119 vehicles excluding motor cycles). Motorcycles account for about 45% of the motorized traffic and bicycles account for around 97% of non-motorized traffic.

Table 9: Average Annual Daily Traffic (AADT) for EPC & PPP Roads

Package / Corridor	Section Details	Length (km)	No. of Vehicles (AADT)											
			Bus	Mini Bus	MAV	3-Axle Trucks	2-Axle Trucks	LCV	Two Wheelers	Car / Van / Jeep	Auto-rickshaw	Total Motorised	Total Non-Motorised	AADT
TNRSP - Package 01 – PPC 01														
SH 58	Sadras – Chengalpattu – Kancheepuram – Arakonam – Thiruthani Road (SH 58) km 0/000 to km 26/800	26.8	226	63	8	73	104	218	3769	645	444	5550	78	5628
SH116	Kanchipuram – Vandavasi Road (SH 116) km 14/500 – km 36/900	22.4	494	153	35	122	195	264	2420	1106	103	4893	161	5054
SH4	Arcot – Villupuram Road (SH 4) km 29/800 to km 110/200 and km 113/200 to km 114/600	81.8	322	141	38	131	193	339	2406	867	358	4796	223	5019
TNRSP - Package 02 – PPC 02														
SH 9	Cuddalore – Chittoor Road (SH 9) km 41/700 to km 44/000 and km 45/0 00 to km 66/190 and construction of a new link road between SH9 and SH137 (km 66/190 to km 71/147)	28.5	234	63	19	88	86	342	2784	432	41	4162	708	4870
SH70	Vridhachalam – Parangipettai road (SH 70) km 0/000 to km 35/800	35.8	275	64	17	63	110	364	2500	681	53	4128	236	4364
TNRSP - Package 03 – PPC 03														
SH 86	Omalur – Sankari – Thiruchengode – Paramathy Road (SH 86) km 54/800 to km 81/000	26.2	278	76	157	390	433	450	2531	1334	11	5660	49	5709
SH79	Malliyakarai – Rasipuram – Thiruchengode – Erode Road (SH79) km 0/000 to km 30/600 and km 51/400 to km 71/300	50.5	335	97	58	231	347	582	3158	1487	21	6317	115	6432
SH 95	Mohanur – Namakkal – Senthamangalam _ Rasipuram Road (SH 95) km 0/000 to km 13/100	13.1	252	125	54	416	522	534	3468	1594	7	6972	36	7008
TNRSP - Package 04 – PPC 04														

Package / Corridor	Section Details	Length (km)	No. of Vehicles (AADT)											
			Bus	Mini Bus	MAV	3-Axle Trucks	2-Axle Trucks	LCV	Two Wheelers	Car / Van / Jeep	Auto-rickshaw	Total Motorised	Total Non-Motorised	AADT
SH-15	Gobi Km 123.000 to Erode Km 153.600	30.6	735	177	26	172	430	759	5459	2334	183	10275	387	10662
SH-37	Oddanchatram (Km 37.400) to Avinashipalayam (km 106.300)	68.9	1040	152	132	327	829	965	3164	3253	63	9924	74	9998
TNRSP - Package 05 – PPC 05														
SH 89	Nanguneri – BharatavaramOvari Road (SH 89) up to ECR junction Km 0/000 to Km 35/200	35.2	173	52	12	27	74	330	1573	829	118	3185	245	3430
SH 44	Paruvakudi – Kovilpatti – Ettayapuram – Vilathikulam – Vembar Road (SH 44) Km 22/500 to Km 38/750 and Km 41/300 to Km 56/700	31.7	431	37	98	264	430	588	2394	919	172	5333	221	5553
SH 41	Rajapalayam – Sankarankoil – Tirunelveli Road (SH 41) km 1/800 to km 28/00 and km 33/800 to km 82/800	75.2	442	112	52	133	270	523	3053	1706	361	6651	177	6827
SH 39	Tirunelveli – Thenkasi Road (km 5.000 to km 50.600)	45.6	684	289	325	425	393	1582	3043	2538	545	9823	69	9892

Source: Traffic Survey by DPR Consultants, 2014

Note: AADT is the weighted average of homogenized section-wise traffic

C. Project Cost

10. **Table 10** presents the estimated costs of proposed road works. The economic evaluation considered "without project" alternative that includes routine maintenance, patching and periodic maintenance every six years. "With Project" alternative includes the proposed upgrading works followed by routine maintenance, patching and periodic maintenance every seven years.

Table 10: Details of Project Cost – EPC Roads

Pack-age	Name of the Road	Length (km)	Road Work	Shoulder Type	Cost (USD million)	Cost (USD / km)
PPC01	Kanchipuram – Vandavasi Road (SH 116) km 14/500 – km 36/900	22.4	Strengthening and widening to Two Lane	Paved Shoulder	13.10	586,340
	Sadras – Chengalpattu – Kancheepuram – Arakonam – Thiruthani Road (SH 58) km 0/000 to km 26/800	26.8	Strengthening and widening to Two Lane	Paved Shoulder	15.30	583,310
	Arcot – Villupuram Road (SH 4) km 29/800 to km 110/200 and km 113/200 to km 114/600	81.8	Strengthening and widening to Two Lane	Paved Shoulder	50.00	601,866
	Sub Total – PPC 01	**131.0**			**78.40**	**595,939**
PPC02	Cuddalore – Chittoor Road (SH 9) km 41/700 to km 44/000 and km 45/000 to km 66/190 and construction of a new link road between SH9 and SH137 (km 66/190 to km 71/147)	28.5	Strengthening and widening to Two Lane	Paved Shoulder	16.90	594,025
	Vridhachalam – Parangipettai road (SH 70) km 0/000 to km 35/800	35.8	Strengthening and widening to Two Lane	Paved Shoulder	25.50	712,291
	Sub Total – PPC 02	**64.3**			**42.40**	**659,922**
PPC03	Omalur – Sankari – Thiruchengode – Paramathy Road (SH 86) km 54/800 to km 81/000	26.2	Strengthening and widening to Two Lane	Paved Shoulder	16.20	618,321
	Malliyakarai – Rasipuram – Thiruchengode – Erode Road (SH79) km 0/000 to km 30/600 and km 51/400 to km 71/300	50.5	Strengthening and widening to Two Lane	Paved Shoulder	34.00	673,267
	Mohanur – Namakkal – Senthamangalam _ Rasipuram Road (SH 95) km 0/000 to km 13/100	13.1	Strengthening and widening to Two Lane	Paved Shoulder	9.80	748,092
	Sub Total – PPC 03	**89.8**			**60.00**	**668,151**

Pack-age	Name of the Road	Length (km)	Road Work	Shoulder Type	Cost (USD million)	Cost (USD / km)
PPC05	Nanguneri – BharatavaramOvari Road (SH 89) up to ECR junction Km 0/000 to Km 35/200	35.2	Strengthening and widening to Two Lane	Paved Shoulder	17.60	500,000
	Paruvakudi – Kovilpatti – Ettayapuram – Vilathikulam – Vembar Road (SH 44) Km 22/500 to Km 38/750 and Km 41/300 to Km 56/700	31.7	Strengthening and widening to Two Lane	Paved Shoulder	24.00	758,294
	Rajapalayam – Sankarankoil – Tirunelveli Road (SH 41) km 1/800 to km 28/00 and km 33/800 to km 82/800	75.2	Strengthening and widening to Two Lane	Paved Shoulder	45.10	599,734
	Sub Total – PPC 05	**142.1**			**86.70**	**610,348**
	Total	**427.2**			**267.5**	**625,501**

D. Economic Analysis, Sensitivity Analysis and Switching Values

11. **Table 11** presents the economic evaluation results and sensitivity analysis carried out by (i) increasing costs by 20%; (ii) decreasing benefits by 20%; (iii) construction delay by one year; and (iv) increasing costs by 20% plus decreasing benefits by 20% plus construction delay by one year. The NPV of net benefits for the road upgrading program through EPC is USD 420 million and the EIRR is 30.94%. Under a worst case scenario of increasing costs by 20% plus decreasing benefits by 20% plus one year delay in construction, the EIRR would decrease to 22.6%. The switching value analysis shows that the percentage increase in costs for the NPV to become zero is 222% and the percentage decrease in benefits is 69%.

Table 11: Upgrading Program (EPC roads) Economic Evaluation Results

Contract	Name of the Road	Length (km)	Benefit (NPV in USD million)	Cost (NPV in USD million)	Benefit / Cost	EIRR	Sensitivity Analysis			
							A: Cost + 20%	B: Benefits - 20%	C: One Year Delay in Construction	A +B+C
PPC01	Sadras – Chengalpattu – Kancheepuram – Arakonam – Thiruthani Road (SH 58) km 0/000 to km 26/800	26.8	39.42	10.56	3.7	35.58%	31.02%	30.08%	35.58%	26.16%
	Kanchipuram – Vandavasi Road (SH 116) km 14/500 – km 36/900	22.4	48.41	9.07	5.3	50.50%	43.84%	42.50%	50.30%	36.95%
	Arcot – Villupuram Road (SH 4) km 29/800 to km 110/200 and km 113/200 to km 114/600	81.8	167.72	39.06	4.3	38.22%	33.47%	32.49%	38.22%	28.41%
	Sub Total	**131.0**	**255.54**	**58.69**	**4.4**	**39.70%**	**34.69%**	**33.65%**	**39.70%**	**29.35%**
PPC02	Cuddalore – Chittoor Road (SH 9) km 41/700 to km 44/000 and km 45/000 to km 66/190 and construction of a new link road between SH9 and SH137 (km 66/190 to km 71/147)	28.5	14.56	13.86	1.1	12.53%	10.62%	10.21%	12.53%	8.44%
	Vridhachalam – Parangipettai road (SH 70) km 0/000 to km 35/800	35.8	5.10	2.92	1.7	20.12%	17.31%	16.70%	20.12%	14.10%
	Sub Total	**63.8**	**19.67**	**16.78**	**1.2**	**13.81%**	**11.74%**	**11.30%**	**13.81%**	**9.39%**
PPC03	Omalur – Sankari – Thiruchengode – Paramathy Road (SH 86) km 54/800 to km 81/000	26.2	28.60	12.78	2.2	20.11%	18.07%	18.07%	17.63%	15.53%
	Malliyakarai – Rasipuram – Thiruchengode – Erode Road (SH79) km 0/000 to km 30/600 and km 51/400 to km 71/300	50.5	44.67	26.74	1.7	16.54%	14.85%	14.48%	16.33%	12.6%
	Mohanur – Namakkal – Senthamangalam _ Rasipuram Road (SH 95) km 0/000 to km 13/100	13.1	14.15	7.63	1.9	17.67%	15.87%	15.49%	17.47%	13.52%
	Sub Total	**89.8**	**87.43**	**46.86**	**1.9**	**17.77%**	**15.97%**	**15.58%**	**17.59%**	**13.62%**

Contract	Name of the Road	Length (km)	Benefit (NPV in USD million)	Cost (NPV in USD million)	Benefit / Cost	EIRR	Sensitivity Analysis			
							A: Cost + 20%	B: Benefits - 20%	C: One Year Delay in Construction	A +B+C
PPC05	Nanguneri – Bharatavaram -Ovari Road (SH 89) up to ECR junction Km 0/000 to Km 35/200	35.2	42.37	13.61	3.1	32.69%	28.06%	27.11%	32.67%	23.15%
	Paruvakudi – Kovilpatti – Ettayapuram – Vilathikulam – Vembar Road (SH 44) Km 22/500 to Km 38/750 and Km 41/300 to Km 56/700	31.7	51.21	18.43	2.8	28.48%	24.49%	23.68%	28.44%	20.26%
	Rajapalayam – Sankarankoil – Tirunelveli Road (SH 41) km 1/800 to km 28/00 and km 33/800 to km 82/800	75.2	153.48	34.75	4.4	47.84%	40.22%	38.69%	47.84%	32.53%
	Sub Total	**142.1**	**247.05**	**66.78**	**3.7**	**38.96%**	**33.05%**	**31.86%**	**38.95%**	**27.01%**
	Total	**427.2**	**609.68**	**189.12**	**3.2**	**30.94%**	**26.91%**	**26.08%**	**30.92%**	**22.60%**

E. Public Private Partnerships (PPP) roads

12. The three proposed roads to be widened to four lanes under public private partnership program have been subjected to economic analysis adopting the same methodology and assumptions applied to the economic analysis of the upgrading EPC roads. **Table 12** presents the roads characteristics of PPP roads.

Table 12: Existing Road Characteristics – PPP roads

Contract	Name of the Road	Length (km)	Number of lanes	Existing Width (m)	Average Roughness (IRI, m/km)	Cracking + Raveling (%)	Deflection (mm)
PPC04	SH 15: Gobi km 123.000 to Erode km 153.600	30.6	2L	7	3.1	17.3	Max 92 Min 42
	SH 37: Oddanchatram (km 37.400) to Avinashipalayam (km 106.300)	68.9	2L	7	4.1	11.7	Max 85 Min 32
PPC05	SH 39:Tirunelveli-Tenkasi (km 5.000 to km 50.600)	45.6	2L	7	3.6	16.0	Max 92 Min 42

13. **Table 13** presents the average daily traffic of each road. The average total motorized traffic is 10,007 vehicles (AADT), (6,119 AADT excluding motorcycles) and the average non-motorized traffic is 178 AADT. Motorcycles account for about 39% of the motorized traffic.

Table 13: AADT - PPP roads

Package / Corridor	Length (km)	No. of Vehicles (AADT)											
		Bus	Mini Bus	MAV	3 - Axle Truck	2-Axle Truck	LCV	Two Wheelers	Car / Van / Jeep	Auto-rickshaw	Total Motorised	Total Non-Motorised	AADT
SH-15	30.6	735	177	26	172	430	759	5459	2334	183	10275	387	10662
SH-37	68.9	1040	152	132	327	829	965	3164	3253	63	9924	74	9998
SH 39	45.6	684	289	325	425	393	1582	3043	2538	545	9823	69	9892

14. **Table 14** presents the estimated costs of the proposed road works. The average estimated cost of widening to four lanes with paved shoulders is US$ 1.320 million per km.

Table 14: Estimated Costs – PPP roads

Contract	Name of the Road	Length (km)	Road Work	Shoulder Type	Cost (USD million)	Cost (USD / km)
PPC04	SH 15-Gobi Km 123.000 to Erode Km 153.600	30.6	Widening to 4 Lane	Paved Shoulder	41.70	1,371,711

	Oddanchatram (Km 37.400) to Avinashipalayam (km 106.300)	88.8	Widening to 4 Lane	Paved Shoulder	87.00	1,264,535
	Sub Total	**99.5**			**128.70**	**1,297,379**
PPC05	Tirunelveli to Tenkasi (km 5 to km 50.6)	**45.6**	Widening to 4 Lane	Paved Shoulder	62.50	1,370,614
	Total	**145.1**			**191.20**	**1,320,442**

15. **Table 15** presents the typical cost composition of a road work.

Table 15: Typical Road Work Cost Composition

Item	%
Utility Shifting & Relocation	5.5%
Earthwork & Subgrade	5.3%
Sub-base and Base	17.0%
Bituminous Course	33.0%
Mayor Bridges	2.8%
Cross Drainage Works	1.5%
Drainage & Protective Works	23.5%
Line Marking & Signs	5.2%
Other	6.2%
Total	100.0%

16. **Table 16** presents the economic evaluation results and sensitivity analysis carried out by (i) increasing costs by 20 percent, (ii) decreasing benefits by 20 percent (iii) construction delay by one year and (iv) increasing costs by 20 percent plus decreasing benefits by 20 percent plus construction delay by one year. The NPV of project net benefits for PPP roads is US$375 million and the EIRR is 32 percent. Under a worst case scenario of increasing costs by 20 percent plus decreasing benefits by 20 percent plus one year construction delay, the EIRR would decrease to 23.2 percent.

Table 16: Economic Evaluation Results – PPP roads

Contract	Road	Length (km)	Benefit (NPV in USD million)	Cost (NPV in USD million)	Benefit / Cost	EIRR	Sensitivity Analysis			
							A: Cost + 20%	B: Benefits - 20%	C: One Year Delay in Construction	A + B + C
PPC04	SH 15	30.6	145.26	32.65	4.4	37.16%	32.32%	31.34%	37.14%	27.26%
	SH 37	68.9	116.31	69.27	1.7	17.57%	15.44%	14.99%	17.25%	12.57%
PPC05	SH 39	45.6	263.32	48.12	5.5	49.09%	41.93%	40.49%	49.08%	34.66%
	Total	**145.1**	**524.89**	**150.04**	**3.5**	**31.85%**	**27.64%**	**26.79%**	**31.81%**	**23.19%**

F. Financial Analysis of PPP Roads

17. Financial analysis has been conducted to assess the potential for PPP. The assessment has been conducted for three scenarios as given in **Table 17** and the results are given in **Table 18.**

Table 17: Scenarios for Financial Analysis

Scenario	**Concession Period (Years)**	**VGF**	**Minimum Equity IRR**	**Toll**
Base Case	10	0%	16%	As per ITEL toll rates
Modified Annuity	10	50%	15%*	Not Applicable
Toll + Annuity	10	50%	16%	As per ITEL toll rates

* As the annuity is an assured income and the risk is less to the concessionaire, the expected rate of return for equity is considered as 15% which is 1% less than other scenarios.

Table 18: Key Financial Indicators for PPP Roads

		Base Case	**Modified Annuity**	**Toll + Annuity**
SH 37				
Concession Period (Years)		10	25	10
Base Cost (INR million)		5220	5220	5220
Landed Project Cost (INR million)		6422	6069	6069
Equity IRR		negative	15.0%	16.1%
Average DSCR		0.51	1.41	1.51
VGF	INR million	Nil	2688	2688
	% of TPC	Nil	50%	50%
Annuity	INR million / Annum	Nil	988	411
First Year toll income (INR million)		471	Nil	471
SH 15				
Concession Period (Years)		10	10	10
Base Cost (INR million)		2502	2502	2502
Landed Project Cost (INR million)		3078	2909	2909
Equity IRR		negative	15.2%	16.1%
Average DSCR		0.22	1.41	1.48
VGF	INR million	Nil	1288	1288
	% of TPC	Nil	50%	50%
Annuity	INR million / Annum	Nil	487	328
First Year toll income (INR million)		131	Nil	131
SH 39				
Concession Period (Years)		10	10	10
Base Cost (INR million)		3750	3750	3750
Landed Project Cost (INR million)		4613	4360	4360
Equity IRR		negative	15.1%	16.1%
Average DSCR		0.45	1.42	1.51
VGF	INR million	Nil	1931	1931
	% of TPC	Nil	50%	50%
Annuity	INR million / Annum	Nil	714	335
First Year toll income (INR million)		309	Nil	309

18. ***Oddanchatram to Avinashipalayam (68.9 km):*** For the given toll rates and traffic flow, the project is unviable in the base case.. In modified annuity scenario, the project generates equity IRR of 15.0% with annuity of INR 988 million per annum for the concession period of 10 years with 50% of the construction cost as grant. In the third scenario (toll + annuity) the project generates equity IRR of 16.1% with 50% of construction cost as grant and with annuity of INR 411 million per annum for the concession period of 10 years along with the toll revenue. This section is amenable for PPP with modified annuity and also for toll + annuity mode.

19. ***Gobi to Erode (30.6 km):*** For the given toll rates and the traffic flow, the project is financially unviable in the base case. In the modified annuity scenario, the project generates equity IRR of 15.2% with annuity of INR 487 million per annum for the concession period of 10 years with 50% of the construction cost as grant. In the third scenario (toll + annuity) the project generates equity IRR of 16.1% with 50% of the construction cost as grant and with annuity of INR 328 million per annum for the concession period of 10 years along with the toll revenue. This section is amenable for PPP through modified annuity mode or through toll + annuity mode.

20. ***Tirunelveli to Tenkasi (45.6 km):*** For the given toll rates and traffic flow, the project is financially unviable in the base case. In modified annuity scenario, the project generates equity IRR of 15.1% with annuity of INR 714 million per annum for the concession period of 10 years with 50% of the construction cost as grant. In the third scenario (toll + annuity) the project generates equity IRR of 16.0% with 50% of the construction cost as grant and with annuity of INR 335 million per annum for the concession period of 10 years along with the toll revenue. This section is amenable for PPP with modified annuity and also for toll + annuity mode.

Annex 7: Engineering Details

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

Table 7-1: Road-wise Details of Traffic and Pavement

SH No.	Length (km)	Traffic Homogeneous Section		Traffic Volume (PCU)		Traffic in MSA		Width of existing carriageway (m)	IRI (m/km) of existing road (Min, Max and Average)	Proposed Cross-section details		
		From (km) - To (km)	Length (km)	Base Year (2013-14)	Projected Year (2023-24)	for 10 years design life (for surfacing layers)	for 15 years design life (for base and sub-base layers)			2-lane with ES (km)	2-lane with PS (km)	4-lane (km)
SH 58	26.14	0.00 - 26.14	26.14	4692	10502	4.41	6.96	5.5 to 7	5.9 - 12.2 (7.7)	0	26.14	0
SH 116	22.34	14.50 - 24.60	10.1	5829	12528	11.65	18.11	7	5.7 - 12.2 (7.7)	0	22.34	0
		24.60 - 36.90	12.3	5929	12970	9.65	15.08					
SH 4	83.08	24.6 - 51.83	27.2	7270	15421	6.15	9.68	7	4.8 - 15.3 (7.3)	0	83.08	0
		51.83 - 77.90	26	4433	10096	3.74	5.88					
		77.90 - 110 & 113 - 114.6	32.5	5217	12055	4.52	7.12					
SH 9	28.45	41.70 - 71.15	28.45	4756	8596	6.23	10.71	7	2.3 - 4.7 (3.2)	0	27.45	1
SH 70	35.8	0.00 - 25.30	25.3	4349	8218	4.41	7.57	7	2.3 - 4.6 (3.3)	0	33.8	2
		25.30 - 35.80	10.5	3797	7457	2.64	4.7					
SH 86	26.2	54.80 - 81.00	26.2	7196	13171		55	7	3.1 - 6.3 (4.4)	7.14	19.05	0
SH 79	50.6	0.00 - 30.6	30.6	6838	11835		30	7	3.0 - 5.3 (4.0)	15.9	14.8	0
		51.1 - 71.20	20	7157	12456		20			4.1	15.7	0
SH 95	13.4	0.00 - 13.40	13.4	4920	12871		20	7	3.4 - 4.6 (3.9)	4.44	8.8	0
SH 89	35.2	0.00 - 16.00	16	3336	6729		4.13	6 to 7	3.6 - 12.4 (3.3)	0	35.2	0
		16.00 - 35.20	19.2	3765	7458		7.18					
SH 44	31.65	22.00 - 38.75	16.25	3534	6820		10.62	7	3.5 - 15 (3.9)	0	28.6	2.85
		41.30 - 56.70	15.4	9871	18133		38.03					

SH No.	Length (km)	Traffic Homogeneous Section		Traffic Volume (PCU)		Traffic in MSA		Width of existing carriageway (m)	IRI (m/km) of existing road (Min, Max and Average)	Proposed Cross-section details		
		From (km) - To (km)	Length (km)	Base Year (2013-14)	Projected Year (2023-24)	for 10 years design life (for surfacing layers)	for 15 years design life (for base and sub-base layers)			2-lane with ES (km)	2-lane with PS (km)	4-lane (km)
SH 41	75.2	1.80 - 15.00; 27.50 - 28.00; 33.80 - 82.80	62.7	7475	15099		17.76	7	2.7 - 13.6 (2.9)	0	75.2	0
		15.00 - 27.50	12.5	7164	13206							
SH 15	30.6	123.00 - 140.80	17.8	13520	27140		40	7	2.5 - 3.5 (3.0)	0	0	30.4
		140.80 - 153.40	12.6	7987	17766		30					
SH 37	68.9	37.40 - 72.20	34.8	14926	27709		30	7	2.5 - 5.1 (4.0)	0	0	88.8
		72.20 - 84.55	12.35	21437	40302		40					
		84.55 - 91.40	6.85	18256	34260		35					
		91.40 - 108.20	16.8	8280	16620		15					
		108.20 - 126.20	18	10808	21004		15					
SH 39	45.6	5.00 - 28.20	23.2	17125	32343		34.03	7	3.0 – 10.8 (4.5)	0	0	45.6
		28.20 - 50.60	22.4	12895	25511		19.75					

Table 7-2: Road-wise Details of Proposed Interventions

SH No.	Length (km)	CBR (%) of proposed subgrade	Length of full reconstruction sections (km)	Length of widening / overlay sections (km)	Proposed Pavement Details (thicknesses in mm)	Proposed Structures							Proposed bypasses or realignments
						RoB / Flyover	Major Bridges		Minor Bridges		Culverts		
							New/ Widening/ Reconstruction	Rehab-ilitation	New/ Widening/ Reconstruction	Rehab-ilitation	New/ Widening/ Reconstruction	Rehab-ilitation	
SH 58	26.14	5	1.64	24.5	BC 40, DBM 50, WMM 250, GSB 300, Subgrade 500	0	0	0	5	0	68	0	One realignment km 21 to km 21.525
SH 116	22.34	5	1.5	20.84	BC 40, DBM 80, WMM 250, GSB 300, Subgrade 500	0	0	1	5	0	43	9	One realignment km 19.74 to km 20.40
SH 4	83.08	4 and 6	11.34	71.74	BC 40, DBM 50 - 55, WMM 250, GSB 260 - 330, Subgrade 500	0	0	3	15	2	143	22	Two realignments (i) km 38.65 to km 39.32; (ii) km 67.8 to km 68.2
SH 9	28.45	10	23.49	5.5	BC 40, DBM 50, WMM 250, GSB 200, Subgrade 500	0	0	0	0	1	42	16	One realignment km 66.263 to km 71.147
SH 70	35.8	9	35.8	0	BC 30 - 40, DBM 50 - 55, WMM 250, GSB 150 - 200, Subgrade 500	0	0	0	3	2	113	8	Two realignments (i) km 20.6 to km 21; (ii) km 27.3 to km 33.2
SH 86	26.2	10	12.2	14	BC 40, DBM 90, WMM 250, GSB 200, Subgrade 500	0	0	0	0	1	25	6	One realignment
SH 79	50.6	10	37	13.6	BC 40, DBM 75 - 85, WMM 250, GSB 200, Subgrade 500	0	1	0	6	1	44	16	Seven realignments
SH 95	13.4	10	13.4	0	BC 40, DBM 75, WMM 250, GSB 200, Subgrade 500	0	0	0	1	0	12	7	Two realignments
SH 89	35.2	8	2.18	29.82	BC 40, DBM 55, WMM 250, GSB 230,	0	0	0	4	0	36	0	Two realignments and a bypass km 26.8 to km 30

SH No.	Length (km)	CBR (%) of proposed subgrade	Length of full reconstruction sections (km)	Length of widening / overlay sections (km)	Proposed Pavement Details (thicknesses in mm) Subgrade 500	Proposed Structures							Proposed bypasses or realignments
						RoB / Flyover	Major Bridges		Minor Bridges		Culverts		
							New/ Widening/ Reconstruction	Rehab-ilitation	New/ Widening/ Reconstruction	Rehab-ilitation	New/ Widening/ Reconstruction	Rehab-ilitation	
SH 44	31.65	8	0.8	31	BC 40, DBM 85 - 135, WMM 250, GSB 330, sand blanket 225, Subgrade 500	0	0	0	6	0	49	0	Two realignments
SH 41	75.2	8	3.61	71.39	BC 40, DBM 90 - 95, WMM 250, GSB 300, sand blanket 225, Subgrade 500	0	0	2	15	12	91	22	Seven realignments
SH 15	30.4	8			BC 40, DBM 85 - 90, WMM 250, GSB 200, Subgrade 500	0	0	0	5	0	68	0	Nil
SH 37	88.8	7			BC 40, DBM 60 - 90, WMM 250, GSB 200, Subgrade 500	1 (flyover)	3	0	8	0	100	0	Five realignments (i) km 42.2 to km 43.2; (ii) km 47.2 to km 47.8, (iii) km 61.7 - km 62.2, (iv) km 84.8 - km 85.6, (v) km 119.7 - km 120.3
SH 39	45.6	8	45.6	0	BC 40, DBM 40 - 95, WMM 200, GSB 160 - 260, Subgrade 500	1 (RoB)	0	0	7	2	71	0	Twelve realignments

Annex 8: Institutional Capacity Enhancement Plan

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

This annexure provides (a) the background note on the institutional capacity enhancement prepared by the Bank team in consultation with the HD, (b) endorsement of the Board of Engineers for the action points of the Institutional Capacity Enhancement Plan, and (c) the GoTN's approval for the component.

(a) Note on Institutional Capacity Enhancement (ICE) for HD

1. **In Tamil Nadu, the HD[22]is responsible for managing about 62,000 km**[23,24] of the state's road network, which comprises of National Highways (NH, 4,974 km, 8%), State Highways (SH, 11,594 km, 19%), Major District Roads (MDR, 11,289 km, 18%) and Other District Roads & Sugarcane Roads (ODR, 34,160 km, 55%). Of these, NH, SH and MDR broadly serve as arterial networks carrying sizeable share of freight and passenger traffic, whereas ODR mainly serves the purpose of providing connectivity and access to rural areas.[25]

2. **GoTN recognizes the criticality of the road sector as an instrument for facilitating economic growth as well as providing access to basic amenities.** Accordingly, it has been progressively making higher levels of allocations to the sector. During 2009-14, expenditure on the sector has increased from Rs.3,695 crore in 2009-10 to Rs.5,476 crore in 2013-14, with a CAGR of 11%. Two other noteworthy features of these expenditures are: (a) the importance being given to otherwise oft-neglected area of maintenance; and (b) enhancing the network capacity especially at MDR and ODR levels. For instance, over the last five years, the expenditure towards maintenance increased at a CAGR of 18% and, at around 48% of the total expenditure, it equaled the amount spent on asset creation and maintenance (47%). In a similar vein, during 2009-14, the expenditure towards asset creation has increased, albeit at a much lower pace of 5% per annum and nearly 60% of this allocation (Rs.6,140 crore) was directed towards widening/strengthening road stretches[26] mainly in the MDR and ODR segments.

3. **However, much of the expenditure is making little or no impact as it is being made through very small contracts.** For instance, in 2011-12, US$310 million towards capital expenditure was spent for widening/strengthening of 5,342 km through 2,675 contracts, implying an average contract size of about US$0.1 million, covering just about 2 to 3 km; the broad pattern of maintenance expenditure also conforms to similar small contracts. This might have been necessitated by competing demands from different geographical areas and might have even

[22] Two other corporations – Tamil Nadu Road Infrastructure Development Corporation (TNRIDC) and Tamil Nadu Road Development Company (TNRDC) - are also engaged in road sector projects, albeit in a limited role, as mandated by the state government from time to time; TNRIDC focuses on the development of road and bridge infrastructure in industrial areas (TNRIDC), whereas TNRDC focuses on a few PPP projects.

[23] Of these, the National Highways are mostly funded and managed in coordination with the central government.

[24] Since its establishment in 1946, the HD has nearly doubled the network and the recent capital expenditure trend suggests that the institution has been able to widen/strengthen about 800 km per year.

[25] In tune with this, while the NH comprises only double-lane (56%) and multi-lane (44%) roads, the SH includes mostly double-lane (84%) roads, whereas the majority of MDR are intermediate lane (64%) and that of ODR are single lane (89%).

[26] The balance was spent on structures such as flyovers, bridges and Road/Rail-Over-Bridges.

encouraged participation of small contractors. Yet, from an efficacy perspective, this approach has been not only increasing the workload of staff in terms of procuring and monitoring numerous contracts, but also leaving little scope for harnessing either economies of scale or technology on the part of the contractors. It also makes little or no impact because it involves tackling a needy corridor only through small stretches over several years; by the time the last stretches are completed, the initial stretches would have transitioned into a state of disrepair. An effective way out of this could be a shift to mobilize a larger quantum of resources, say, through securitizing the future allocations from the exchequer, and then use it for entering into larger size contracts and thereby deliver a more impactful program, in a quicker time.

4. **More importantly, the increased emphasis on capacity expansion at the network rungs with low-traffic contributed to improved access but resulted in underinvestment in the network rungs with high-traffic, that is, SH and MDR,** which formed the State's CRN. Such underinvestment, however, is not very apparent because most of the high-traffic roads in the CRN are being provided with strengthening coats at 1-3 year intervals, instead of the more appropriate intervention of structural strengthening of the road in the first place. Continuing with such an approach would set-in a vicious cycle of underinvestment of capital expenditure, leading to higher maintenance costs over the life cycle. It would also result in inefficient 'gouging' of maintenance funds that are needed and could be better utilized in other parts of the network. The need for substantive capex to enhance the capacity and quality of the high-traffic stretches of the CRN is also borne by a recent study conducted by the Indian Institute of Technology, Madras, which had estimated that nearly 2,900 km (about 13%) of the CRN would require capacity augmentation in terms widening and/or strengthening, at an estimated cost of about Rs.12,000 crore. Clearly, meeting such huge investment needs requires significant stepping up of resource allocation to the sector. For example, if one assumes that the government allocates nearly 50% of the allocations for widening/strengthening over the past five years (about Rs.6,140 crore or Rs.1,200 crore per annum), it would take nearly 20 years to meet this investment requirements of the top 13% of the high-traffic segments of the CRN. Such a "Business-as-Usual" scenario, however, would be untenable as it adds to the hardships of the road users in terms of travel time, cost, congestion, pollution and safety and thereby severely constricts the state's economic growth potential.

5. **GoTN is now keen to address the issue of underinvestment in high-traffic stretches,** by giving more focused attention to the formation, quality maintenance and management of high-traffic stretches of its network, as per global standards. Toward this end, they have even announced the establishment of a dedicated agency, entitled Tamil Nadu State Highways Authority[27]. More importantly, they are targeting to strengthen/widen nearly 4,000-5,000 km of high-traffic segments of the CRN during the next 3-4 years, under a new initiative, entitled the Tamil Nadu State Highway Development Program. To achieve this, the HD would need significant enhancement of its capacity in two main areas, i.e., resource mobilization and implementation capabilities. For instance, to implement a program of this scale, the HD may have to nearly double its capacity for undertake widening/strengthening of highways to about 1,500 km per year (as compared its current level of about 800 km per annum) and resources to the tune of about Rs.4,000 crore per year (as compared to the average capex of about Rs.1,200 crore towards widening/strengthening of roads over the last five years). Although this seems rather ambitious, the experience of TNRSP I – wherein a fraction of the staff of HD had

[27] Budget Speech of Honorable Finance Minister of GoTN for Year 2013-14, March 21, 2013

implemented a program of about Rs.3,250 core to upgrade 700 km and maintain 1300 km in just about 5-6 years – suggests that it is eminently achievable as long as the institution is provided with adequate resources and willing to adopt more efficient contracting methods and good practices.

6. **In light of the above, HD constituted a working group to comprehensively analyze the aforementioned challenges and develop appropriate solutions.** Following several rounds of consultations among themselves and in consultation with the Bank, the team had concluded that addressing this issue would require various policy, institutional, program and operational level interventions, all driven together by the following broad vision and objectives, as outlined in Box 1 below. Such an ICEP should also include a resource requirement estimate as well as a clear responsibility-assignment and timeline for each sub-activity and be accompanies by a results monitoring framework with 4-5 core indicators that tangibly capture the performance of the institution over the next 5-10 years. Also, it needs to be endorsed/approved by the highest levels within the government to ensure continued support and sustainability especially w.r.t. policy measures related resource mobilization/allocation. Once such an ICEP is finalized, GoTN and HD could indicate the specific areas of the plan and/or its monitoring that could be supported by the Bank through provision of expert assistance (e.g., Training, Monitoring and Evaluation, etc) and/or procurement of equipment (e.g., IT hardware and/or software).

Box 1: An Indicative Outline of the Vision and Objectives Underpinning the ICEP

Vision: Comprehensively address the capacity augmentation, maintenance and safety needs of users of the CRN, specifically through (a) widening/strengthening of about [x,000 km] of high priority corridors; (b) output based maintenance of [x,000 km]; and (c) reducing the accidents and fatalities over CRN, respectively, by [xx%] and [yy%], during the project period of TNRSP II, that is from 2014-15 to 2019-20.[28]

Objective 1: Allocate/mobilize resources of about Rs.[yyyy] crores, to be achieved through

- Stepping up overall allocations for the sector, by about [15%] p.a. over the next five years, and continue with the current trend of spending about [48%] each toward capex and maintenance;
- Earmarking at least [60%] of the sector-level capex and maintenance allocations for expenditure on the selected high-traffic segments of the CRN, in conformity with the outputs of RMS;
- Developing toll policy and award ___ km of roads with more than _____ PCU on PPP basis, with or without viability gap funding support (equivalent mobilization of resources: _____ crore);
- Levying a cess of [xx] on fuel and ring-fence it through a non-lapsable State Road Fund and use [70%] of the proceeds thereof for meeting the capex and maintenance requirements of CRN (say, with [75:25] split between capex and maintenance); the remainder could be used for ODR.

[28] Admittedly, the focus of this institutional strengthening is mostly geared towards achieving measurable outcomes over the CRN and mostly the high-traffic segments within it. This has been done consciously keeping in view the urgent attention required for this critical element(s) of the network and that the best practices induced here would percolate down for the improved management of the remainder of the network.

- Allow the use/commitment of the likely future allocations for the selected high-traffic segments of the CRN, to raise more funds through securitization and/or enter into contracts with multi-year payment commitments, e.g., annuity, Performance-based maintenance contracts;

Objective 2: Improve efficiency of allocation of resources through

- An objective, evidence/need-based allocation of resources
- Adopting efficient contracting structures that (a) transfer time and cost overrun risks and incentivize optimization of costs over the project life cycle; (b) encourage use of better technology and resources; and (c) would be less onerous for HD and staff, e.g., large contracts that club construction and/or maintenance over multiple years, viz., EPC, Annuity, PBMC, etc.

Objective 3: Enhance enterprise-level efficiency improvements through

(a) Process re-engineering

- Synchronize the RMS data collection and planning cycles with the government's budget cycle
- Harness modern technologies (such as PFMS) for e-billing, e-payment
- Use of hand held devices and mobile applications (for electronic measurement of quantities at site) for better contract management
- Update manuals/departmental codes for streamlining workflow and better compliance with government directives

(b) Minor Organizational Restructuring

- Assess gaps in HD in terms of skills in the specialized areas of Planning, Contract Management, PPP, IT, EIA, SIA, legal aspects and dispute resolution
- Create a Road Safety Cell (RSC) within HD for addressing road safety issues, systematic analysis of RADMS data and for proactive research and development
- Strengthen and integrate Planning Wing to enable it to collect data and to monitor program implementation; bring IT cell and RSC under this wing
- Strengthen Design unit to improve the quality and timeliness of designs
- Standardize bid documents for works
- Explore establishment of independent quality assurance system
- Strengthen the HRS to enable it to take up R&D that can be integrated into the department's working

(c) IT-ICT Infrastructure Sustainability

- Integrate existing IT infrastructure/applications for effective working
- Update and conduct security audit of RMS, PFMS, GIS, RADMS software and ROMDAS equipment, and integrate these into the department's working
- Develop mobile version of some of the above applications for ease of use and data entry
- Augment storage and bandwidth capacity for running these applications
- Introduction of automated traffic census procedures

(d) Training and Knowledge Management

- Training and acquisition of new skillsets commensurate with the new ways of doing business, e.g., more resources for Planning, R&D, IT, PPP etc.

- Prepare an annual and/or multi-year training plan and ensuring that all engineers are trained periodically;
- Introduce orientation and induction training for all new recruits at the lower levels every year;
- Initiate job rotation and secondment to public and private sector undertakings
- Create a physical and a virtual library using the document management system for manuals, reference books/material, reports, and all project files, including support to a statistical cell

Note: All the numbers including those in the parenthesis to be filled or firmed-up after further rounds of deliberation.

(b) Endorsement of the Board of Engineers of HD for the action points of the Institutional Capacity Enhancement Plan

7. The Board of Engineers of the HD in their meeting on September 26, 2014 have endorsed and recommended to the GoTN the following salient features of the Institutional Capacity Enhancement Plan.

- Dedicated Road Fund by levying cess on fuel, issuing infra-bond and exploring toll on PPP mode;
- Adopting of Annuity mode for upgradation works and PBMC mode for maintenance works when toll-based models are not feasible;
- 15% increase in budget allotment for the HD every year for next 5 years;
- e-tendering;
- Awarding large-size contracts under EPC mode for ensuring quality of works;
- Adopting Road Management System for selection of roads for providing budget funds;
- Introducing e-billing and e-payment and use of PFMS for financial management;
- Updating and integrating the IT-ICT infrastructure such as RMS, PFMS, RADMS, and GIS; and
- Augmentation of IT data storage systems and deployment in field offices

(c) GoTN's approval for the component: The GoTN has accorded its approval for the Institutional Capacity Enhancement Plan vide G.O. (D) No.3 dated January 5, 2015.

Annex 9: Road Safety Management Capacity Review Executive Summary

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

1.1 Background

1. The global crisis in road traffic injury declared by the World Health Organization (WHO) 2004 World Report on Road Traffic Injury Prevention continues largely unabated. The crisis is playing out most vividly in middle-income countries where it is a major development issue. In India, road traffic is the number one killer of all males aged 15-29, and the estimated socio-economic cost of road trauma in the country is over $US50 billion per annum. Tamil Nadu is at the frontline of the crisis, and recorded fatalities on the State's roads increased by almost 60% over the last decade – from 9,570 in 2005 to 15,545 in 2013. The State has India's highest rate of fatality[29] and double that of India as a whole.

2. The prognosis is poor. At the core of the road trauma problem is that a rapid increase in wealth, population, vehicles, and traffic is occurring within a legacy road transport system that has not been designed and is not being managed to facilitate safe travel. Simple analyses of fatalities by vehicle type and road type show that motorcycle fatalities quadrupled between 2001 and 2012 which, along with high concentrations of trauma on the National and State Highway networks, must be an urgent priority.

3. The World Bank and the GoTN agreed to review the road safety situation in Tamil Nadu and an executive road safety management capacity review (RSMCR) involving World Bank experts and the senior management of the responsible governmental agencies for road safety in Tamil Nadu was conducted during June and August 2014. The purpose of the review was to reach agreement on an operational framework for the road safety component of the TNRSPII, which would help to establish a robust road safety management system aimed at bringing the state's challenging road safety outcomes under control.

4. The objectives of this road safety management capacity review were to:

- Diagnose the current road safety management capacity in the State of Tamil Nadu
- Develop a road safety investment strategy for GoTN in consensus with stakeholders
- Identify/design elements of the strategy that could be supported through TNRSP II.

Key findings and recommendations

5. A key factor in tackling the growing road traffic injury burden worldwide is the creation of institutional capacity across a range of interlinking sectors, backed by both strong political commitment and adequate and sustainable resources. Tamil Nadu has developed a road safety policy, established a Road Safety Council, nominated the Transport Department as the lead agency, and established the function of a Road Safety Commissioner. But much more needs to be done, as summarized below, and as depicted in the accompanying snapshot of road safety management capacity in Tamil Nadu.

[29] In 2012, there were an estimated 22 fatalities per 100,000 population in Tamil Nadu, and an estimated 11 fatalities per 100,000 population in India.

1.1.1 Strengthening the Lead Agency

6. Lead agencies are central to orchestrating and aligning specific road safety interventions and management functions to support achievement of intermediate and final safety outcomes, and the Transport Department's road safety management capacity needs strengthening. A Road Safety Management Cell (RSMC) needs to be urgently established within the Transport Department to perform or coordinate a series of critical road safety management functions, and support the Road Safety Commissioner to effectively lead and coordinate the various road safety management functions within the State.

1.1.2 Results Focus

7. Road safety in Tamil Nadu is currently analyzed only in terms of final results such as fatalities and grievous injuries, or the disaggregation of these results by (for example) gender, age, districts, and road users. Considerable effort is required to go deeper to identify the key drivers of this trauma which can be effectively managed (see Annex 3). It is proposed that a comprehensive road safety results framework (incorporating final/intermediate outcomes and institutional outputs) is developed on a collaborative basis across the key government agencies and become a focus of management and leadership attention to drive road safety improvement over the remainder of the decade.

1.1.3 Coordination

8. Road safety requires a determinedly multi-sectoral approach, where partner agencies first come together to agree on strategy and then take responsibility for delivering their own outputs in concert with their partners. It is proposed that a small group of very senior executives is established as a Road Safety Executive Leadership Group (RSELG). It is also proposed that a Road Safety Reference Group is established to engage business and community interests in improving Tamil Nadu's road safety performance. The RSELG and the RSMC would have an overriding focus on road safety results, and lead the implementation of this road safety management capacity review, and provide leadership and governance to the safe systems demonstration project which is proposed.

1.1.4 Legislation and Compliance Systems

9. Road safety progress in Tamil Nadu is in part at least dependent upon decisions and systems established by the Government of India. Within Tamil Nadu, there is evidence of increases in enforcement activity, but all stakeholders agree that much more needs to be done. A concerted and coordinated additional effort is proposed from both Police (primarily to increase detection activity) and Transport (primarily to tighten the issue of licences and permits and increase suspension/revocation actions). It is proposed that to support and define future investments a strategic program of road traffic compliance and enforcement capacity building in Police and the Transport Department is undertaken involving international experts in traffic safety enforcement and in road transport safety regulation. It is envisaged this program would have a State-wide management perspective, but also focus on the initial delivery needs for the demonstration project.

1.1.5 Funding and Resource Allocation

10. While the GOTN has made a significant initial allocation to initiate an infrastructure safety program, and significantly increased the size of its Road Safety Fund in recent years, significant additional funding is still required. Notwithstanding the need for further investment, it is proposed that in collaboration with the Finance Department the Road Safety Commissioner lead an expenditure review to establish necessary expenditure over the next five years (concurrent with the project period of 2015-20), and the basis upon which this investment is made – that is, where the investment should be made, into what activities, and for what purpose.

1.1.6 Promotion and Awareness

11. A more deliberate and systematic response is needed to the framing of road safety issues within the state. It is proposed that a road safety promotion plan is prepared, which identifies how:

- The profile of road safety as a community health issue will be raised
- Influential leaders and organizations will be encouraged to make decisions that can significantly affect the safety experienced by the community, and
- The community itself will be engaged to demand higher levels of safety and support effective safety interventions.

12. It is envisaged that the plan would take a State-wide perspective and focus any broader promotional activity within the community through the safe system demonstration project.

1.1.7 Monitoring and Evaluation

13. The most important aspects of road crashes which require monitoring and evaluation are those which are aligned with the overall results that are the subject of management attention and agency delivery. It is proposed that a quarterly reporting system is established in Tamil Nadu, based on an agreed monitoring and evaluation framework, to ensure that the executive leadership group is capable of providing the necessary governance to the road safety effort.

14. The reporting system should draw heavily in the first instance on the RADMS which was pioneered in Tamil Nadu and has been recommended for use in other States by the national Ministry of Road Transport and Highways. The management systems being applied to the gathering and analysis of the data need specific attention to ensure that the system stays at the forefront of such systems in India and to provide direction on any future investment. It is proposed that a management review of the RADMS is commissioned, focusing on data collection/entry and analysis matters discussed in this report, with proposals firstly to strengthen the operations of the current system and secondly to consider additional functionality and strengthening of the RADMS itself, and possible integration with the State's health management information system.

1.1.8 Research and Development and Knowledge Transfer

15. The most notable research and development initiative within Tamil Nadu is the initial iRAP surveys being conducted on the 2000 km of SH that comprise the TNRSP II project roads. It is proposed that funding is allocated from the road safety component of TNRSPII to continue the iRAP survey of highways in Tamil Nadu, using the results to target GOTN investment in highway safety, and evaluate the results of such investment based on iRAP safety star ratings.

16. Aside from knowledge transfer activity within individual agencies, it is important that knowledge transfer investments are made in critical cross-agency contexts. It is proposed that a specific road safety management knowledge transfer component is developed which focuses on the professional development in road safety of the Road Safety Commissioner, the Road Safety Executive Leadership Group, and the Road Safety Management Cell, including peer to peer exchange within India, and access to international expertise and training as appropriate.

A snapshot of Road Safety Management Capacity in Tamil Nadu

Function	Capacity	Status, and Snapshot of Proposals
Strengthening Lead Agency Strategic/State Level Operational/District Level	○	**Considerable effort is required to strengthen the road safety management capacity of the Transport Department** Road Safety Management Cell (RSMC) established within the Transport Department to lead State's road safety effort District Collector appoints project leader for KRSDP and establishes interagency team to coordinate delivery
Results Focus Strategic/State Level Operational/District Level	○	**A 60% jump in fatalities over the last decade, and the worst fatality rate in India, the prognosis for Tamil Nadu is poor** Develop a comprehensive results framework to drive road safety improvement to 2020 Establish critical intermediate and output performance measures with KRSDP to demonstrate potential for success
Coordination Strategic/State Level Operational/District Level	○	**State Road Safety Council meets only occasionally and has too many members to be effective** Establish a small Road Safety Executive Leadership Group (RSELG) to coordinate agency efforts Create leadership and coordination links between RSELG, RSMC and KRSDP to ensure learning by doing
Legislation and Compliance Strategic/State Level Operational/District Level	○	**Primary road safety policy dependent on national action, and stronger compliance effort required within the State** Support a strategic program of capacity building in traffic safety enforcement and road transport safety regulation Support for equipment, and a risk-targeted highway patrol plan to ensure better compliance to existing legislation
Funding & Resource Allocation Strategic/State Level	□	**GOTN increasing Road Safety Fund and infrastructure expenditure needs to continue, and allocation rules revised** An expenditure review to establish necessary expenditure over the project period of 2015-20, and allocation rules

Function	Capacity	Status, and Snapshot of Proposals
Operational/District Level		KRSDP provided with significant resourcing to demonstrate value of intensive investment
Promotion Strategic/State Level Operational/District Level	○	**Awareness week dominates promotional activity which needs to focus on more strategic communications** Support for preparation of a holistic state-wide, targeted promotion plan KRSDP promotion support for interventions including two wheeler helmet wearing in concert with Police enforcement
Monitoring & Evaluation Strategic/State Level Operational/District Level	□	**RADMS well established and recommended for use in other states, now needs attention to stay at the forefront** Commission a management review of RADMS, and establish quarterly reporting system Support the Highway Research Station (HRS) to coordinate M&E program both State-wide and for KRSDP
Research & Development/ Knowledge Transfer Strategic/State Level Operational/District Level	○	**R&D program needed to support results focus, and investment in professional knowledge transfer** Leverage greater value out of iRAP activity, and invest in peer to peer exchange and access to expertise for RSELG Support to the HRS to lead R&D program and support for professional development within KRSDP
Note: ○ inadequate, □ partially adequate, □ substantially adequate.		

Annex 10: Procurement Plan

India: Second Tamil Nadu Road Sector Project (TNRSP II) (P143751)

(For first 18 months)

Table 1: Schedule for Works Packages (first 18 months)

Works Package	Estimated Cost (US$)	Contract Signing Date	Completion Date
OPRC 01 (Arcot-Tiruvarur Road)	14,250,000	11-Apr-15	10-Apr-22
OPRC 02 (Nagapattinam - Thoothukudi Road)	19,530,000	11-Apr-15	10-Apr-22
EPC Contract for SH116 & SH58	30,829,333	11-Apr-15	10-Apr-22
EPC Contract for SH-4	53,336,667	11-Apr-15	10-Apr-22
EPC Contract for SH-9 & SH-137 (re-bid)	16,090,000	11-Augu-15	10-Aug-22
EPC Contract for SH-70	27,068,500	11-Apr-15	10-Apr-22
EPC Contract for SH-86	17,301,667	11-Apr-15	10-Apr-22
EPC Contract for SH-79	37,343,333	11-Apr-15	10-Apr-22
EPC Contract for SH-95	10,658,333	11-Apr-15	10-Apr-22
EPC Contract for SH-89	18,498,275	11-Apr-15	10-Apr-22
EPC Contract for SH-44	25,495,000	11-Apr-15	10-Apr-22
EPC Contract for SH-41	47,749,900	11-Apr-15	10-Apr-22
Sub-Total (Works)	**318,151,008**		

Table 2: Schedule for Consultancy Packages (first 18 months)

Consultancy Package	Estimated Cost (US$)	Contract Signing Date	Completion Date
Supervision Consultancy for EPC contracts (SC-01)	3,000,000	10-Apr-15	30-Apr-22
Supervision Consultancy for EPC contracts (SC-02)	3,000,000	10-Apr-15	30-Apr-22
Supervision Consultancy for EPC contracts (SC-03)	3,000,000	10-Apr-15	30-Apr-22
Third Party Monitoring for OPRC-1 and OPRC-2	800,000	10-Apr-15	30-Apr-22
Other post review consultancies	1,000,000	Misc.	Misc.
Sub-Total (Consultancies)	**10,800,000**		