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INDIA

The State Government of Uttaranchal
Public Works Department

TA-4607 (IND)

UTTARANCHAL STATE ROADS INVESTMENT PROGRAM

FINAL REPORT

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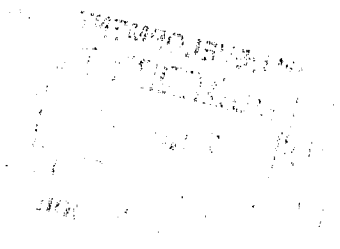

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UTTARANCHAL STATE ROADS INVESTMENT PROGRAM

FINAL REPORT

CONTENTS

MAP

CURRENCY EQUIVALENTS AND ABBREVIATIONS

I. INTRODUCTION **1**
- A. Background to Assignment 1
- B. Features and Output of TA-4607 (IND) 2
- C. Acknowledgements 3

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS AND OPPORTUNITIES **4**
- A. Performance Indicators and Analysis 4
- B. Analysis of Key Problems and Opportunities 5

III. INVESTMENT PROPOSAL **10**
- A. Impacts and Outcome 10
- B. Outputs 10
- C. Infrastructure Improvement Component 10
- D. Infrastructure Management Component 13
- E. Special Features 14
- F. Cost Estimates 15
- G. Financing Plan 16
- H. Implementation Arrangements 17

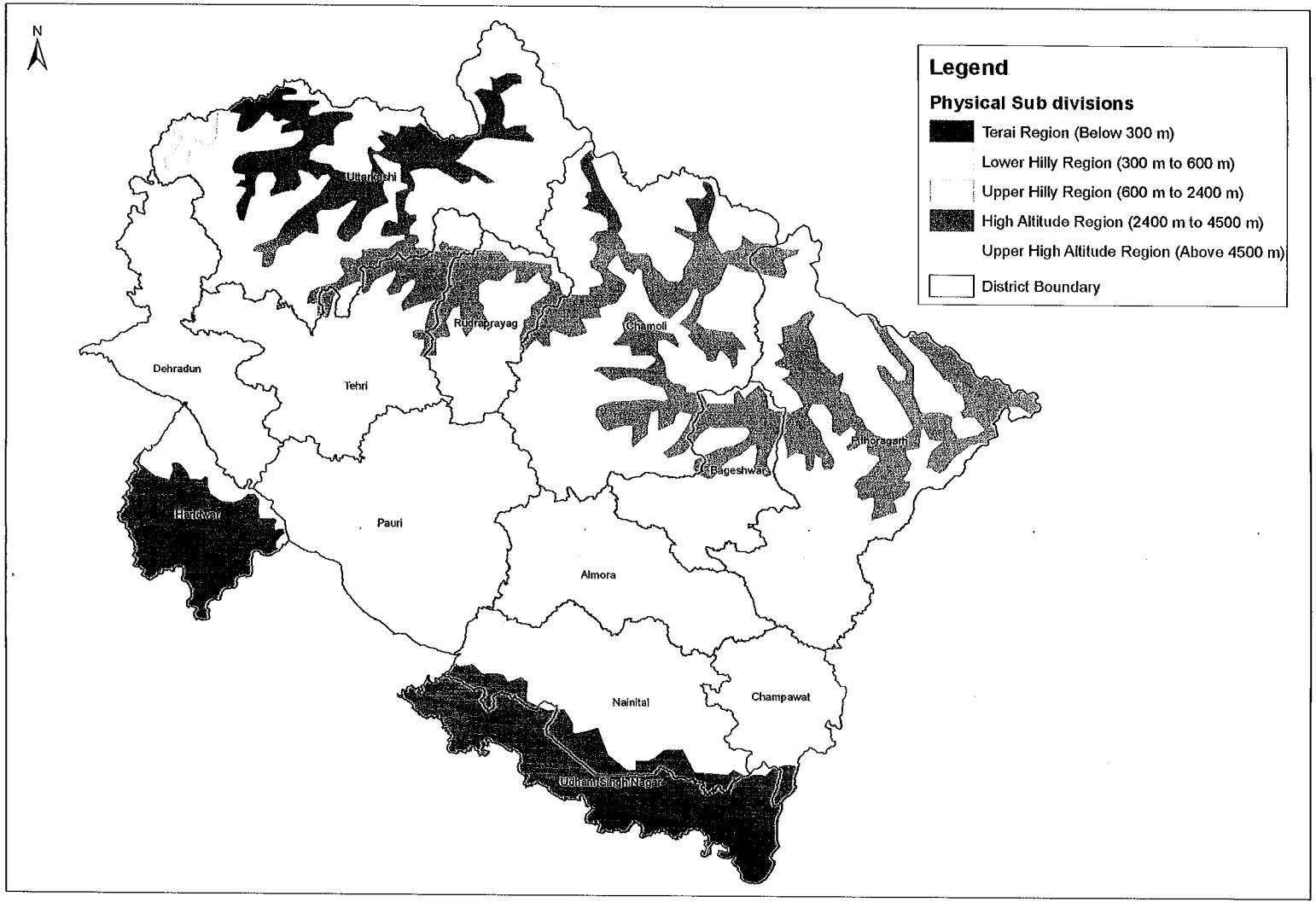
IV. INVESTMENT PROGRAM BENEFITS, IMPACTS AND RISKS **25**
- A. Overall Impacts and Benefits 25
- B. Sustainability of Investment 25
- C. Sustainability of Policy and Institutional Interventions 26
- D. Economic Analysis 26
- E. Social Impact 28
- F. Environmental Impact 31
- G. Risks 32

V. CONCLUSIONS **34**

LIST OF APPENDICES

APPENDIX A	DESIGN AND MONITORING FRAMEWORK
APPENDIX B	SUBSECTOR ANALYSIS
APPENDIX C	EXTERNAL ASSISTANCE TO THE ROAD SECTOR
APPENDIX D	SELECTION CRITERIA AND APPROVAL PROCESS FOR SUB-PROJECTS
APPENDIX E	DESIGN STANDARDS AND TECHNICAL FEATURES OF SUB-PROJECTS
APPENDIX F	SCHEDULES AND ESTIMATED COSTS FOR INDIVIDUAL SUB-PROJECTS IN PROJECTS 1, 2, 3 AND 4
APPENDIX G	CAPACITY DEVELOPMENT PLAN FOR UTTARANCHAL PWD
APPENDIX H	COST ESTIMATES
APPENDIX I	ORGANIZATION STRUCTURE FOR PROJECT IMPLEMENTATION
APPENDIX J	INDICATIVE IMPLEMENTATION SCHEDULE
APPENDIX K	PROCUREMENT PLAN
APPENDIX L	OUTLINE OF PROJECT PERFORMANCE MONITORING SYSTEM
APPENDIX M	REVIEW OF ECONOMIC APPRAISAL
APPENDIX N	SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY (SPRSS)
APPENDIX O	INDIGENOUS PEOPLE DEVELOPMENT FRAMEWORK
APPENDIX P	RESETTLEMENT FRAMEWORK
APPENDIX Q	SUMMARY RESETTLEMENT PLAN
APPENDIX R	SUMMARY INITIAL ENVIRONMENTAL EXAMINATION AND ENVIRONMENTAL IMPACT ASSESSMENT
APPENDIX S	OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES FOR DETAILED DESIGN AND CONSTRUCTION SUPERVISION
APPENDIX T	OUTLINE TERMS OF REFERENCE FOR PROGRAM SUPPORT CONSULTING SERVICES
APPENDIX U	OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES FOR INFRASTRUCTURE MANAGEMENT COMPONENT

MAP


N
Legend
Physical Sub divisions
Terai Region (Below 300 m)
Lower Hilly Region (300 m to 600 m)
Upper Hilly Region (600 m to 2400 m)
High Altitude Region (2400 m to 4500 m)
Upper High Altitude Region (Above 4500 m)
District Boundary
Uttarkashi
Rudraprayag
Chamoli
Dehradun
Tehri
Pithoragarh
Bageshwar
Haridwar
Pauri
Almora
Nainital
Champawat
Udham Singh Nagar

CURRENCY EQUIVALENTS
(as of 1 April 2006)

Currency Unit	-	Indian Rupee / Rupees (Re / Rs)
Re1.0	=	$0.0228
$1.0	=	Rs43.80

ABBREVIATIONS

AADT	annual average daily traffic
ADB	Asian Development Bank
AP	affected person (by resettlement)
BC	bituminous concrete
BM	bituminous macadam
BME	benefit monitoring and evaluation
BSR	Basic Schedule of Rates
BWS	Binsar Wildlife Sanctuary
CRRI	Central Road Research Institute (of India)
DC	District Collector
DoF	Department of Forests
DoGM	Department of Geology and Mines
DPR	Detailed Project Report
EA	executing agency
EARF	environmental assessment and review framework
EIA	environmental impact assessment
EIRR	economic internal rate of return
EMP	environmental management plan
FFA	Framework Financing Agreement
GDP	gross domestic product
GIS	geographic information system
GoI	Government of India
GRC	Grievance Redress Committee
HDM-4	Highway Development and Management –4 (computer model)
HRS	human resource strategy
IEE	initial environmental examination
IMEC	Independent Monitoring and Evaluation Consultant
INRM	(ADB) India Resident Mission
IP	Indigenous People
IPDF	Indigenous People's Development Framework
IPDP	Indigenous People's Development Plan
IRI	international roughness index

LA	land acquisition
LCB	local competitive bidding
LIBOR	London interbank offered rate
LVR	Light Vehicle Road
MDR	Major District Road
MIPMS	management information and project management system
MFF	multi-tranche financing facility
MoEF	Ministry of Environment and Forests
MoRD	Ministry of Rural Development
NACO	National AIDS Control Organization
NGO	non-governmental organization
NH	National Highway
NHAI	National Highway Authority of India
NHDP	National Highway Development Program
NPV	net present value
OCR	ordinary capital resource (of ADB)
ODR	Other District Road
PAF	project affected family
PFS	Pre-feasibility Study
PIR	poverty impact ratio
PIU	Project Implementation Unit
PMGSY	Pradhan Mantri Gram Sadak Yojana (Prime Minister's Rural Roads Program)
PMU	Project Management Unit
PPMS	project performance monitoring system
PSA	poverty and social analysis
PWD	Public Works Department (of the State Government of Uttaranchal)
RC	Resettlement Cell
RDA	Rural Development Agency
RF	Resettlement Framework
RO	Resettlement Officer
RoW	right-of-way
RP	Resettlement Plan
R&R	resettlement and rehabilitation
RRP	reports and recommendation of the President
RSB	Road Stakeholder Board
SACS	State AIDS Control Society
SC	scheduled caste
SEIA	Summary Environmental Impact Assessment
SGOU	State Government of Uttaranchal
SH	State Highway
SIA	Social Impact Assessment
SIEE	Summary Initial Environmental Examination
SOS	Strategic Options Study
SPRSS	Summary Poverty Reduction and Social Strategy (Report)
SRP	Short Resettlement Plan
SRTC	State Road Transport Corporation

ST	scheduled tribe
TA	technical assistance
ToR	terms of reference
USRIP	Uttaranchal State Roads Improvement Programme
VOC	vehicle operating cost
VR	Village Road
WBM	water bound macadam

NUMERICAL UNITS

1 lakh 100,000 (one hundred thousand)

1 crore 10,000,000 (ten million)

NOTES

(i) In this report, "$" refers to US dollars

I. INTRODUCTION

A. Background to Assignment

1. Uttaranchal is India's 27th State and it was formed in November 2000 by the bifurcation of the State of Uttar Pradesh. The new State of Uttaranchal has an area of 53,500 square kilometres and a population of 8.5 million, and it is bounded by China to the north and Nepal to the east. Population density is relatively low in Uttaranchal, on account of the hilly and mountainous terrain that covers approximately 93% of the overall land area. The hilly and mountainous nature of Uttaranchal gives rise to a number of development challenges, which differ significantly from those in the majority of India's States.

2. Uttaranchal's road network mostly serves the regions lying below an altitude of 3,000 metres. Between altitudes of 3,000 and 4,500 metres, the region is above the snow line and the roads are narrow with steep gradients and sharp curves, carrying mostly light vehicles. Above 4,500 metres, the terrain is mountainous and snow covered, with deep gorges and steep barren rock slopes. Here, transport is generally confined to foot tracks. The hilly terrain has resulted in a poorly developed road network, particularly for the lower category roads that provide access to villages and settlements.

3. In Uttaranchal, the primary economic activities are agricultural and tourism, which together contribute 37% to the State's gross domestic product (GDP), and are both heavily dependent on road access. Road transport is the predominant mode of transport in the State and presently, it accounts for 80% of Uttaranchal's passenger and freight traffic market. Rail access is only provided in the lower plain area where there are 4 railheads that connect to the national railway network.

4. Uttaranchal's road network is in a relatively poor condition, and this is hampering the achievement of the general development targets that the State Government of Uttaranchal (SGOU) has set itself. These targets include doubling of per capita income and reducing the proportion of the population below the poverty line by 50%. The SGOU places a high priority on improving the road network, to support its general development targets and it has now embarked on the ambitious Uttaranchal State Road Improvement Program (USRIP). It is envisaged that the USRIP will be implemented in three stages over a 10 year period, and that it will cover improvement of the existing network as well as provision of new road links to improve village connectivity. The initial Stage I is planned to be implemented over a 4 year period commencing in 2006 and it will focus on the rehabilitation and reconstruction of existing roads. Stage II will continue this theme and extend over a further 3 years.

5. Uttaranchal's Public Works Department (PWD) will be the executing agency for the USRIP.

6. The Asian Development Bank (ADB) has been requested to provide loan finance to support Stages I and II of the USRIP. It is envisaged that this loan finance might be provided in the form of a multi-tranche financing facility (MFF) with a maximum ceiling of US$550 million that will cover a rolling implementation program with seven individual projects.

B. Features and Output of TA-4607 (IND)

7. The objectives of TA-4607 are:

(i) to assist the Uttaranchal PWD to finalize the Master Plan and Financing Plan for the USRIP;

(ii) to review the individual road schemes selected by PWD for implementation in Project 1 of ADB's proposed Investment Program to ensure technical, environmental and socioeconomic feasibility, as well as compliance with safeguards set by the Government and ADB;

(iii) to prepare a plan to enhance PWD's capacity and provide intermediate training to PWD staff;

(iv) to cover ADB's project preparation activities for the Uttaranchal State Road Investment Program.

8. ADB engaged the following team of consultants to carry out the TA:

(i) international transportation engineer / economist / project administration specialist / team leader (M Hoddinott) – start date 17 November 2005;

(ii) international institutional development specialist (R Fergerstrom) – start date 20 March 2006;

(iii) national highway engineer (M Ahmad) – start date 27 January 2006;

(iv) national environmental specialist (S.K. Choukiker) – start date 28 January 2006;

(v) national social development / resettlement specialist (M.K. Mohanty) – start date 28 January 2006.

All consultants were engaged directly by ADB under individual contracts.

9. Details of the activities to be carried out by the consultants and initial findings were contained in the Inception Report dated December 2005. This Inception Report was submitted to ADB and PWD on 19 December 2005.

10. A draft final report for TA-4607 (IND) dated May 2006 was prepared in a format similar to ADB's Report and Recommendations of the President (RRP). Soft copy of this draft final report was submitted to ADB on 24 May 2005. Hard copy of the report was then submitted to ADB, PWD and the Indian Department of Economic Affairs on 2 June 2006. The following separate reports had also been prepared that supported the draft final report:

(i) Initial Environmental Examination dated April 2006 and Environmental Impact Assessment dated April 2006 covering two of the Project 1 sub-project roads that pass through a protected wildlife sanctuary, prepared by the national environmental specialist;

(ii) Sample Short Resettlement Plans (4 no.) dated April 2006, prepared by the national social development / resettlement specialist;

(iii) Institutional Capacity Development Plan dated May 2006, prepared by the international institutional development specialist.

11. Comments on the draft final report have been received from ADB and PWD. This final report incorporates these comments, where appropriate. Other revisions to the cost estimates and economic analysis made during the ADB Pre-Appraisal Mission to India, between 19 June and 29 June 2006, are also incorporated in this final report.

C. Acknowledgements

12. The Consultants would like to express thanks to all officials and individuals met for the kind support and valuable information that they have received.

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS AND OPPORTUNITIES

A. Performance Indicators and Analysis

1. The Road Sector

13. The predominant mode of passenger and freight transport into and out of the State is road transport on the National Highway network and this transport carries around 80% of the total passenger and freight transport market. Rail services offer freight and passenger connections to the neighboring State of Uttar Pradesh and New Delhi through four rail heads located in the Uttaranchal's southern low lying plain region[1]. There are no rail services operating for inter-state transport and the hilly and mountainous terrain that exists over most of the State's land area would preclude the development of railway infrastructure catering for such services. Although there is an air service that presently operates between the State capital Dehradun and New Delhi, this service has a low capacity and poor reliability.

14. Within Uttaranchal, the primary mode of inter-district freight and passenger transport is road transport and this will continue to be the case, due to the State's hilly and mountainous terrain.

15. Uttaranchal inherited an under-performing road sector when the new State was formed in 2000, largely due to under-investment, outdated construction and maintenance practices, and a general low level of economic activity. This under performance was particularly marked in the hill and mountain areas which account for 93% of the State's land area. Of the 17,000 km of rural roads in the State that are managed by PWD[2], around 38% (6,500 km) are un-surfaced and 43% (7,300 km) are in a poor condition. Roads in the hill and mountain areas total approximately 12,500 km, and these roads account for 75% of the the PWD network.

16. Since 2000, the number of registered vehicles in Uttaranchal has shown consistent annual growth of between 12% and 14%, public transport usage has increased significantly[3], and annual tourist arrivals have also shown a steady increase[4]. Although these indicators demonstrate a steady increase in transport demand, this demand is not spread evenly across the State and much of the demand is in the lower, more heavily populated, plain areas. The poor condition of the road infrastructure in the hill areas is suppressing transport demand, hampering the development of the agricultural and tourism sectors, and thereby restricting opportunities for stimulating the economic growth that is needed to make meaningful improvements in the earning potential of the rural poor.

17. Improvement and upgrading of the national highway network within Uttaranchal is in progress, under the central government funded National Highway Development Program (NHDP). Phase III of the NHDP includes the upgrading of a 120 km section of the NH-72,

[1] Rail heads are located in the State capital, Dehradun, as well as Kotdwar, Ramnagar, and Kathgodam.
[2] PWD is responsible for the development and maintenance of 437 km of State Highways (SHs), 1,369 km of Major District Roads (MDRs), 6,910 km of Other District Roads, 5,631 km of Village Roads (VRs) and 2,633 km of Light Vehicle Roads (LVRs).
[3] In 2005, the monthly income of the State Road Transport Corporation (SRTC) increased by 27% (re. the Monthly Review of Uttaranchal Economy, February 2006 published by the Centre for Monitoring the Indian Economy).
[4] Between 2003 and 2005, tourist arrivals in Uttaranchal showed an average annual growth of 12%, re PWD Road Network Master Plan and the Uttaranchal State website http://goc.ua.nic.in).

which connects Dehradun and Delhi, to a 4 lane divided carriageway standard. Under Phase IV, a further 640 km of single lane roads will be upgraded to 4 lane divided highway standards and 780 km of two lane roads will be repaired or rehabilitated.

18. At the lower end of the road network, provision of new and upgraded roads to connect villages and settlements to the state road network is being progressed under the nationally administered and funded Pradhan Mantri Gram Sadak Yojana (PMSSY) program. To-date, roads to 93 of the villages sanctioned for connections by central government have been completed. Another 842 villages are expected to be connected by 2010, which would increase the length of the State's road network by around 3,500 km.

19. A more detailed analysis of Uttaranchal's road sub-sector is contained in Appendix B.

B. Analysis of Key Problems and Opportunities

1. Challenges

20. The Government of India (GOI) is committed to the alleviation of rural poverty across India, and in order to achieve this, it places a high priority on stimulating economic growth through the provision of improved infrastructure. This commitment to poverty alleviation is shared by the State Government of Uttaranchal (SGOU), which has published its 'Infrastructure Vision' that sets itself general development targets for the period up to 2014. These targets include doubling of per capita income and reducing the proportion of the population below the poverty line by half. In order to double per capita income by 2014, an annual growth rate for GDP of 7.4%, in real terms, will need to be achieved, but to date GDP growth has been around 4%.

21. Uttaranchal's agriculture, tourism and industrial sectors together account for around 50% of the State's GDP, and employ over 60% of the State's labor force. In the hill areas of Uttaranchal, there is considerable potential for increased production of fruit, medicinal herbs and floriculture, due to the favorable climate. The poor condition of the secondary and tertiary road networks as well as the lack of packing and distribution centers is hampering growth in this sub-sector. Similarly, there is also significant potential for increased development of the industrial and tourist sectors in Uttaranchal, but the sub-standard access conditions resulting from relatively poor condition of the road network would deter private sector investment. Transport costs have been increased by the poor road condition and it has been reported that wastage of fruit production in the hill areas is as high as 25% through damage incurred during transport and the lack of temperature controlled storage facilities[5].

22. In support of its 'Infrastructure Vision', the SGOU has now embarked on the ambitious 10 year Uttaranchal State Road Improvement Program (USRIP), that will be implemented through its Public Works Department. It is envisaged that the USRIP will cover improvement of the existing secondary and tertiary road network, as well as provision of new roads to improve village connectivity. The initial stage I is planned to be implemented over a 4 year period and it will focus on the rehabilitation and reconstruction of existing roads, with works generally confined to the existing right-of-way (RoW) to minimize resettlement and environmental impacts. Stage II will continue this theme and extend over a further 3 years.

23. The USRIP will compliment the existing NHDP and PMGSY programs, by providing necessary improvements to the secondary and tertiary road networks, to give efficient

[5] Re. the draft "Network Development Master Plan", November 2005 commissioned by PWD.

linkage between the two national programs. These improvements will give efficient road links within the State for: (i) long distance traffic entering the State on the national highways; and (ii) rural traffic using the new village connectivity roads to access trade, health and educational facilities located at regional centers, via the tertiary and secondary road networks.

24. Up to now, the development and maintenance of the secondary and tertiary road network has been carried out, largely on a project-by-project basis in the absence of any long term strategic development plan. Sound technical and economic appraisal techniques are not used in developing the capital investment program and no documented prioritization criteria are used in the selection of both capital investment works and periodic maintenance works. The lack of a clear planning strategy for the development and maintenance of the road network has resulted in many of PWD's investment decisions being based largely on perceived need at a local level and external pressure exerted by elected officials. Indeed, PWD are planning to increase their expenditure on periodic maintenance and road rehabilitation works in 2006, prior to the State elections in February 2007, in response to requests from present government administration. .

25. The TA has assisted PWD in finalizing the Master Plan for the USRIP, and during this process, it became evident that PWD's district level offices had short-term re-surfacing schemes recently sanctioned for implementation in 2006 on 2,700 km of roads that had previously been included in the short-list for more extensive road improvement works under Stage I of the USRIP. This demonstrates a lack of co-ordination and communication between state level planning carried out at PWD's Dehradun headquarters and local level planning carried out by PWD's district administrations.

26. Routine and periodic maintenance operations are restricted by under-funding as well as inefficient planning and implementation procedures. There are no formal planning procedures in place to prioritize maintenance needs across the network, and much of the maintenance operations are carried out either on a reactive basis, or to satisfy external political pressure. Due to the lack of planning, maintenance operations tend to focus on the higher category roads in the network, which has resulted in an increasing maintenance backlog and deteriorating condition on the less trafficked Other District Roads, as well as the Village Roads and Light Vehicle Roads.

27. Road construction and periodic maintenance is generally carried out by local contractors using mostly outdated and inefficient labor intensive construction methods. PWD's general practice of letting small contracts, often valued at less than $0.5 million has provided no incentive to contractors to invest in modern construction plant which would raise production rates and improve quality. The effectiveness of PWD's construction supervision and quality control procedures are severely hampered by the lack of testing and staff transport facilities. Overall, the use of outdated and inappropriate construction techniques coupled with weak quality control has reduced the effective working life of the asset to around 50% of that expected using international best practice. This, in turn, has lead to increased maintenance and replacement costs.

28. The majority of routine road maintenance operations are now carried out by local contractors, albeit in small size contracts, although PWD still has its own direct labor workforce, some 5,000 strong, which also carries out routine maintenance work, often in the more remote hill and mountain areas. PWD is now planning to move towards letting area wide, performance based maintenance contracts, following the proven PMGSY model. This is a positive development and it would be expected to lead to increased cost efficiency and effectiveness of road maintenance operations.

29. There is an urgent need for the reform of PWD's network management operations, to rectify the weaknesses in its capacity for planning and implementing capital investment and maintenance works. Without such reform, the sustainability of the USRIP and the effective future development of the road network are both threatened. PWD are aware of the need for reform and is planning organizational changes that will move the present emphasis on implementation of capital investment schemes towards integrated network planning and maintenance activities.

2. Opportunities

30. Annual state allocations to the PWD road network have increased by 120% since 2003[6]. Central government funding to the national highways and PMGSY has also been increasing in line with the high priority given to alleviating rural poverty through provision of improved transport infrastructure. In the last two years, PWD's budget allocations for capital investment road improvement projects have been $110 million and $126 million, respectively. PWD's master plan for the USRIP shows implementation of the first two stages of the USRIP taking place between 2006 and 2013, which would require annual expenditures of around $120 million. Implementation of the first two stages of the USRIP would upgrade some 65% of the road network to a good or very good condition and eliminate the maintenance backlog on these roads. The additional expenditure required for the USRIP would double PWD's capital investment funding requirements and the SGOU, through GOI, have requested external funding from ADB.

31. If the capital investment costs of Stages I and II are covered by cost effective external borrowings from ADB, PWD's reliance on more costly borrowing from the Indian market would be reduced. In the short term, a higher proportion of the PWD's normal capital investment budget could be diverted to asset preservation through effective systematic maintenance. In the mid term, after completion of the road improvement works in the USRIP, it is estimated that the current level of maintenance expenditure would be adequate for the full network.

32. PWD is already aware of the need for widespread reform at all levels of its organization if it is to be transformed into an effective road agency with a strong focus on supporting the State's economic growth targets through the delivery of cost effective asset preservation and network management. Sustainability of the USRIP capital investment works would be at a high level of risk, if these reforms were not carried out. Implementation of the USRIP through external funding will give the opportunity for the skill levels of PWD staff to be improved through on-the-job training gained by working alongside private sector consultants engaged to carry out contract management and construction supervision tasks. Other institution support could also be provided under the loan funding to support PWD in its reform process.

3. Policy Issues

33. PWD has recently prepared a preliminary framework of a draft road policy for Uttaranchal State, covering the next 10 years, which is aimed at supporting economic growth and ensuring an equitable distribution of benefits among regions and population groups. The policy emphasizes the need for: (i) preserving road network investments through asset

[6] Re. Table B-8 in Appendix B

management strategies, including the application of performance based management contracts; (ii) increasing the level of private sector participation in the expansion, improvement and maintenance of the road network; (iii) establishing a Road Maintenance Fund; (iv) developing a legal framework in support of these targets, including a Road Act and an update of the Road Side Land Control Act; and (v) developing PWD's capacity to support and manage the policy objectives. On the basis of its past experience, ADB would be expected to support: (i) mainstreaming of performance based contracts into PWD's procurement procedures; and (ii) restructuring of PWD to be more proactive and responsive to stakeholders.

4. External Assistance

34. ADB's support for the road sub-sector has been developed in close collaboration with the other donors active in supporting the roads sub-sector in India[7]. ADB and the World Bank have adopted a Coordinated Strategy for the Road Sector, which was prepared jointly in March 2001 and updated in January 2002. Following on from this strategy, regular tripartite meetings are held with the Government of India (GoI) to discuss road policy issues. ADB also meets regularly with the other donors, shares experiences and co-ordinates investment programs. A summary of external assistance given to India's roads sub-sector is given in Appendix C.

5. Lessons Learned

35. In order to ensure effective and timely delivery of intended output, the Investment Program would incorporate features reflecting lessons learnt from ADB's experience in previous rural road improvement programs. These features would include: (i) allowing advance procurement of civil works contractors and construction supervision consultants; (ii) the establishment of an operational project management unit (PMU) in advance of loan effectiveness; (iii) provision of adequate training and support to PMU staff in following ADB's requirements for the administration of an investment program under a multi-tranche financing facility (MFF), as well as ADB requirements for procurement, disbursement and safeguarding; and; (iii) streamlining of procedural requirements related to safeguarding to take account of the large number of road sub-projects that generally have similar, relatively low levels of resettlement and environmental impacts; (iv) increasing the size of civil works contract packages to attract experienced national contractors; and (iv) incorporating the proven performance based road maintenance specifications developed by PMGSY in the civil works contracts.

6. Asian Development Bank Sector Strategy

36. ADB has been actively supporting the transport sector in India since 1988 and loan finance has been provided for over 12 road projects, totaling over $3 billion. Technical Assistance (TA) has also been provided by ADB that has covered project preparation, institutional strengthening, management of the road sector, increasing private sector participation in the road sector and environmental management.

[7] The Department for International Development (UK), the Japan Bank for International Cooperation and the World Bank.

37. The initial emphasis of ADB's loan program in India was directed towards supporting the National Highway Authority of India (NHAI) to improve the primary road network, but in the last 4 years, ADB's support has widened to cover project and sector loans to advance the secondary and tertiary road networks that are administered and managed by the State Public Works Departments. These loans have helped to reduce poverty and increase living standards for the rural poor by increasing mobility and accessibility through the provision of improved roads. The proposed multi-tranche finance facility (MFF) support to the State Government of Uttaranchal (SGOU) would continue this theme.

38. In the state roads sub-sector, ADB recognizes that the main reform initiatives to be addressed are: (i) rationalization of staffing and capacity development in the Public Works Departments; (ii) provision of adequate funding for road maintenance and effective implementation of road maintenance; and (iii) facilitating private sector participation. These reforms are necessary to assist the State Government's agencies to restructure so as to enable them to better manage and preserve the existing road assets, as well as the newly created assets. Measures are included in the Investment Program to improve PWD's capacity and capability to carry out cost-effective planning, quality control and maintenance of the road network. Private sector participation will also be increased through the introduction of area wide performance based road maintenance contracts.

39. The proposed Investment Program is included in the ADB Country Strategy and Program Update for India dated 2006 – 2008. It would continue the present rural road development theme, with its proven poverty alleviation benefits.

III. INVESTMENT PROPOSAL

A. Impacts and Outcome

40. The overall objective of the Investment Program is to support the SGOU in implementing Stages I and II of the overall 10 year Uttaranchal State Road Improvement Program (USRIP). This USRIP, in turn, supports the SGOU in achieving the general development targets it has set itself in its published 'Infrastructure Vision', which include doubling of per capita income and reducing by half, the proportion of the population below the poverty line.

41. Stages I and II of the USRIP focus on the improvement of rural roads across the State and they will result in significant improvements in access, particularly in the hill areas where the road infrastructure is not so well developed. Outcomes of the Investment Program will support economic growth in rural areas by :

(i) providing enhanced access to markets, employment opportunities, education, health facilities and social services;

(ii) reducing costs of inter-state transport;

(iii) stimulating increased investment in the agricultural, industrial and tourism sectors.

B. Outputs

42. The outcome of the Investment Program would be achieved through implementation of the following two components:

(i) Infrastructure Improvement Component, through which approximately 10,800 km of the State's road network would be improved to raise the level of service offered to road users. Improvement standards would be commensurate with the status and classification of each road in the network;

(ii) Infrastructure Management Component which would improve the efficiency and sustainability of PWD's road network management function by supporting and assisting PWD to (a) improve their planning, quality control and maintenance capability; (b) improve the effectiveness and cost efficiency of road maintenance operations; (c) raise general staff skill levels and motivation through training in areas including general management techniques, information technology and the use of modern technology for road network planning, construction and maintenance.

C. Infrastructure Improvement Component

1. Scope of Component

43. It is proposed that the Infrastructure Improvement Component be implemented through seven separate projects, with each project being funded by a separate loan under the MFF. The SGOU, through PWD, would submit a periodic financing request for each of

the seven individual project loans which would be converted into a loan and project agreement by ADB.

44. This component is focusing on improvement of the PWD rural road network in all thirteen Districts of the State and it would compliment activities being carried out under the nationally funded Pradhan Mantri Gram Sadak Yojana (PMGSY) program[8]. It is expected that in total, around 10,800 km of rural roads would be improved under this component, in seven separate projects, as indicated in the implementation program contained in Appendix J. Table 1 below shows details of the road improvement works to be carried out in each project. Overall, 64% of the PWD road network would be improved under the Investment Program.

Table 1 Proposed Scope of Infrastructure Improvement Component (Km)

	State Highways (SHs)	Major District Roads (MDRs)	Other District Roads (ODRs)	Village Roads (VRs)	Light Vehicle Roads (LVRs)	Total
Project 1	137	138	236	62	-	573
Project 2	106	459	601	88	16	1,270
Project 3	89	-	990	660	104	1,843
Project 4	-	36	818	750	356	1'960
Projects 5, 6 & 7	63	469	2,307	1,730	585	5,154
Total Program	395	1,102	4,952	3,290	1,061	10,800
Total PWD Road Network	437	1,369	6,910	5,631	2,633	16,980
% of Total PWD Road Network	90%	81%	72%	58%	40%	64%

Source: TA Consultants

45. Out of the 10,800 km of roads to be improved under the Investment Program, approximately 62% (6,720 km) presently have a bituminous surfacing and 38% (4,080 km) are un-surfaced. Some 40% (2,680 km) of the bituminous roads are in a poor condition, where the surfacing has either broken up or has frequent potholes and 69% (2,808 km) of the un-surfaced gravel roads are in a poor condition with a rough, bumpy surface. A breakdown of the condition of the road sub-projects included in the Investment Program is given below in Table 2.

46. On completion of the Road Improvement Component, all 10,800 km of roads would be brought to a good condition. This would give significant improvements in riding quality, reduce transport costs, reduce the overall maintenance backlog and reduce future

[8] This PMGSY program is a major rural roads program that was instigated by the Prime Minister in 2000 and it focuses on connecting villages and settlements to the rural road network by providing new all-weather roads. This PMGSY program is a major rural roads program that was instigated by the Prime Minister in 2000 and it focuses on connecting villages and settlements to the rural road network by providing new all-weather roads.

maintenance expenditure. The road improvement works would also include slope protection works on road sections at risk from fallen debris and these works would significantly reduce periods when roads would be blocked and impassable.

Table 2 Present Condition of Roads to be improved under the Investment Program (Km)

Present Condition	Good	Fair	Poor	Total
Bituminous Surfaced Roads	1,020	3,020	2,680	6,720
Un-surfaced Roads	112	1,160	2,808	4,080
Total Investment Program	1,132	4,180	5,488	10,800
% breakdown	10.5%	38.7%	50.8%	100.0%

Source: TA Consultants

2. Selection Criteria for Sub-projects

47. The individual sub-projects were selected for the Investment Program from the prioritized road lists for each District that were prepared for the Master Plan, using an empirical multi-criteria ranking system[9]. These road lists were updated during the TA to take account of road improvement works being carried out in the current 2006/2007 implementation year under other committed national and state level funding. Roads having lengths of less than 5km were not selected for the Investment Program, as they are generally from the lower category VRs and LVRs, and individually, they contribute less to the state wide road network.

48. Provision is made in the Investment Program for an annual review to be made of the prioritized road lists for the remaining projects. This review would consider road improvement schemes sanctioned in other programs, proposals for new sub-projects to be added to the Investment Program, as well as updating the costs to take account of detailed design cost estimates and tender sums. Any proposals for new sub-projects would need to comply with the selection criteria given in Appendix D. Each Project's proposed sub-projects would need to be approved by PWD, SGOU and ADB prior to implementation. Appendix D also outlines this approval process.

3. Design and Construction Arrangements for Sub-projects

49. PWD has established a design strategy for the Investment Program that gives design standards appropriate the different road categories. This strategy recognizes the different levels of service and traffic characteristics relevant to each road category. Appendix E contains details of the design standards and technical features to be incorporated in the sub-projects.

50. In all, the Investment Program would consist of around 680 separate sub-projects, which would be grouped together into contract packages for construction, according to

[9] Re. the Pre-Feasibility Study dated August 2005, commissioned by PWD.

locality. Individual contract packages would have values of between $3 million and $10 million in value, in order to keep below the $10 million maximum threshold agreed with ADB for local competitive bidding in India. It is envisaged that the Investment Program would be implemented through around 80 to 100 contract packages. Appendix H contains lists of the road improvement sub-projects to be implemented in each of the first four projects, with costs at 2005 values. These four projects would form Stage I of the Investment Program.

4. Maintenance of Sub-project Roads

51. At least 25% of the sub-project civil works contracts in the second project would incorporate requirements for the contractors to perform routine maintenance for a period of 3 years following construction completion. This routine maintenance would be carried out using a performance based specification, similar to that used in PMGSY. If this arrangement proves to be successful and cost effective, PWD should extend it to all subsequent civil works contracts in the Investment Program. PWD should also extend the use of area-wide performance based routine maintenance contracts to replace the present system of using small maintenance contracts or direct labor maintenance works.

D. Infrastructure Management Component

52. The main objective of this component is to increase the sustainability of the investment by assisting PWD to: (a) restructure and adopt improved operational skills; and (b) increase staff skills. To this end, consultants engaged under the MFF, will assist PWD to:

(i) establish a separate unit at PWD headquarters to be responsible for the development of policy directives and performance targets to ensure quality and consistency;

(ii) create two additional operational zones to reduce the average area of an administrative zone and increase supervision capacity;

(iii) finalize and implement the draft Road Policy;

(iv) establish a Road Stakeholder Board to increase stakeholder participation and transparency of decision making;

(v) revise operating manuals for planning, design, construction and maintenance in line with the updated vision and mission of PWD;

(vi) assess staff numbers and skills-mix needed for efficient and timely execution of future work programs,

(vii) prepare a Human Resources Strategy (HRS), detailing, among other aspects, staff training and retention programs;

(viii) design specific training programs for enhancing the skills of the categories of staff identified in the HRS in areas such as information technology, technical design, project preparation, design review, contract administration (especially performance-based maintenance), construction supervision, quality assurance and use of the Management Information and Project Management System (MIPMS) that is presently being installed;

(ix) establish a formal agreement with one or more recognized state educational institutions such as the Indian Institute of Technology at Roorkee, and other state educational institutions to deliver the training programs and ensure successful completion of the courses by the selected staff; and

(x) develop and deliver a training program for private contractors on topics such preparation and bidding for performance based contracts, quality control, management of construction works, equipment and labor, and environmental and social safeguard compliance.

53. Appendix G contains a Capacity Development Plan for Uttaranchal PWD that identifies and analyses institutional weaknesses and gives details of proposals for the necessary strengthening to reform PWD into a modern road agency, driven by clearly defined performance targets, and held accountable to the SGOU and stakeholders for the delivery of agreed investment programs and management of the road network.

E. Special Features

54. Measures have been incorporated in the Investment Program to ensure that environmental and resettlement impacts have been minimized at all stages of sub-project preparation and implementation. In the initial sub-project selection and ranking process, any sub-projects passing through environmentally sensitive areas are penalized by the scoring system. Thereafter, the road improvement works are to be designed to specifically minimize environmental and resettlement impacts by ensuring that all works are generally carried out within the existing right-of-way (RoW), unless carriageway widening is justified on traffic capacity grounds. An environmental management plan is to be incorporated in all civil works contracts that will require contractors to minimize and mitigate all impacts arising from the construction process.

55. Although the PWD senior management is forward thinking and is planning measures to modernize and reform its organization, implementation of the reform process will be challenging. The Investment Program would support PWD in this reform process by ensuring that training and capacity building for PWD staff is integrated into all relevant activities of the Program to: (a) assist PWD in the implementation and management of the Investment Program; and (b) facilitate and support PWD in reforming and modernizing the management and maintenance of the State's road network. It is intended that the reform momentum build up during implementation of the Investment Program would be continued into PWD's regular day-to day activities. Training and capacity building activities to be carried out under the Investment Program would include:

(i) training of PWD staff seconded to the Project Management Unit (PMU) and Project Implementation Units (PIUs) in ADB procedures for MFF loan application, procurement, disbursement and safeguarding. This training would be given in stages prior the commencement of each relevant activity and an effective way of providing this training would be through seminars given by appropriate ADB specialists in the India Resident Mission (INRM).

(ii) secondment of PWD staff to the consultant's construction supervision teams, where on-the-job training can be given in quality control, cost control and contract management;

(iii) training of PWD staff carried out under the Infrastructure Management Component in information technology, technical and management topics associated with road network management.

56. The Investment Program has been formulated with outputs that are relatively modest in the first Project, but which ramp up in stages to more ambitious, but achievable, outputs by the third Project. This will enable PWD's PMU and PIUs to build up their expertise in implementing the Program, whilst still achieving realistic planned outputs.

57. Measures will be included in the design of the road improvement works to mitigate existing road safety "black spots" and enhance safety conditions across the network. These safety measures would be particularly relevant in the single lane hill roads, where forward visibility is often compromised due to the bendy alignment. The safety measures incorporated in the road improvement sub-projects would include provision of: (i) adequate signage and road markings; (ii) improved forward sight distances, where feasible; (iii) improved safety fences, parapets and carriageway edge delineation; and (iv) clear indications of priority at junctions, through proper junction layout design, road makings and signs. Road safety audits would be included in the sub-project design process to ensure that all appropriate safety measures are being incorporated.

F. Cost Estimates

58. The total cost of the Investment Program is estimated at $830 million equivalent, which is all local currency costs, except for $22 million interest during construction and $1.5 million for consulting services and training. The EA is proposing that all civil works contract packages will be below the $10 million threshold agreed for India, for national bidding. This cost includes for taxes, duties and interest during construction. Table 3 overleaf shows a summary of the project cost estimates. Detailed breakdowns of the cost estimates for the Investment Program and Project 1 are contained in Appendix H.

Table 3 : Summary Cost Estimates
($ million)

Item	Foreign Exchange	Local Currency	Total Cost[a]
A. Infrastructure Improvement Sub-projects[b]	-	770.0	770.0
B. Infrastructure Management Component	0.4	1.1	1.5
C. Project Management and Program Support	1.1	4.4	5.5
D. Contingencies			
Physical Contingency	-	20.0	20.0
Financial Contingency	-	11.0	11.0
E. Interest during Construction	22.0	-	22.0
Total Investment Program Cost[c]	**23.50**	**806.5**	**830.0**

[a] in mid-2006 prices for Project 1 and current prices at the start date of the remaining six Projects
[b] Including social and environmental mitigation, resettlement, civil works and consultancy services for design and supervision
[c] including taxes estimated to be $30.5 million.

G. Financing Plan

59. It is understood that the SGOU has requested financing up to an equivalent of $550 million from ADB's ordinary capital reserves to fund the Investment Program covering the implementation of Stages I and II of the USRIP Stage I. The financing would be provided under a multi-trance financing facility (MFF) in accordance with ADB policy[10]. The MFF would extend multiple loans to finance a range of road improvement sub-projects under the Investment Program, subject to submission of a related periodic financing request (PFR) by the SGOU and the execution of the related loan and project agreements. Prior to this, the SGOU would need to enter into a Framework Financing Agreement (FFA) with ADB, which would satisfy the requirements given in Appendix 4 of the Pilot Financing Instruments and Modalities (see footnote 10). The SGOU would be required to comply with the FFA requirements. Pursuant to the FFA, the SGOU would need to submit the first PFR in the amount of $50 million to cover the implementation of Project 1. This first PFR would be submitted to ADB's Board, together with the FFA. The loans under the MFF would finance civil works and consulting services, as well as other capacity building support. The minimum amount of a loan request would be $50 million. All of the provisions of the ordinary loan regulations would apply to each loan, subject to modifications, if any, that might be included in any loan agreement. The SGOU would have the option to choose between eligible currencies and the interest rate regime for each loan. The specific terms of each loan would be based on the related PFR with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR) – based lending facility. The SGOU will need to provide ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based facility; and (ii) an undertaking that these choices were its own independent decision and not made in reliance on any communication or advice from ADB.

[10] ADB, *Pilot Financing Instruments and Modalities*, Manila 2005

60. If the SGOU were to request any co-financing arrangements or related assistance for the sub-projects under the ADB MFF, ADB would provide appropriate assistance, subject to related ADB policy and procedures.

61. The SGOU would provide the proceeds of the loans to PWD in local currency and the SGOU would bear the foreign exchange risk on the loans.

62. Details of a preliminary financing plan for the Investment Program are shown below in Tables 4 and 5.

Table 4 : Financing Plan for Investment Program
($ million)

Source	Foreign Exchange	Local Currency	Total Cost	Percent of Cost
Funding for Investment Program				
Asian Development Bank (ADB)	1.5	548.5	550.0	66%
State Government of Uttaranchal (SGOU)	22.0	258.0	280.0	33%
Total			**830.0**	

Source: TA Consultants' estimates

Table 5 : Itemized Financing Plan
($ million)

Item	ADB	SGOU	Total Cost	% of Total Cost
A. Road Improvement Sub-projects	547.0	223.0	770.0	92.8%
B. Infrastructure Management Component	1.5	-	1.5	0.2%
C. Project Management and Program Support	1.5	4.0	5.5	0.6%
D. Contingencies				
Physical Contingency	-	20.0	20.0	2.4%
Financial Contingency	-	11.0	11.0	1.3%
E. Interest during Construction	-	22.0	22.0	2.7%
Total	**550.0**	**280.0**	**830.0**	100.0%

Source: TA Consultants' estimates

H. Implementation Arrangements

1. General

63. Two previous rural road improvement programs funded by ADB[11] have been carried out as part of the GoI PMGSY initiative, which is aimed at providing all-weather road connections to currently un-served villages in rural areas. The PMGSY is administered at GoI level through the Ministry of Rural Development (MORD), and it is mandatory that each state establishes a Rural Development Agency (RDA) that is responsible for implementation.

[11] Loan No. 2018 Rural Roads Sector I Program and the Rural Roads Sector II Investment Program,

Standard operating and accounting procedures have been developed for PMGSY schemes that are again mandatory. These two ADB projects each covered several States and it was necessary in both of them to appoint the MORD as an upper tier Executing Agency (EA), with the respective State level RDAs having responsibility for implementation. The aim of the USRIP Stage I is the improvement of existing roads in the PWD network and it does not fall under the PMGSY initiative. This Program is therefore able to select operating procedures that comply fully with ADB policies and it is intended that the Program would be administered solely at State level, through the State Government of Uttaranchal's (SGOU's) Public Works Department (PWD). This removes the necessity for having a double tier EA arrangement and simplifies the policy and institutional arrangements for the Program.

2. Project Management

64. The Public Works Department (PWD) of the State Government of Uttaranchal (SGOU) would be the Executing Agency (EA) for the Program. A Program Steering Committee (PSC) consisting of representatives of the SGOU, PWD and other concerned agencies has already been established by the SGOU, with terms of reference (ToR) to monitor and coordinate implementation of the project preparation technical assistance[12]. The overall structure of the PSC would be satisfactory for monitoring the implementation of the MFF, however its ToR would require relatively minor adjustment to suit the MFF. Duties of the PSC would need to include: (i) overseeing and coordinating the Program activities, including liaison among the agencies involved in sub-project implementation; (ii) reviewing the status of the implementation of project components; (iii) monitoring the progress achieved and resolving difficulties encountered; (iv) ensuring that the necessary action is taken to ensure that the SGOU counterpart funds are provided to suit the Program requirements, and (v) serving as a forum for discussions on, and review of, the Program's impacts. The structure and remit of the PSC would be reviewed and finalized with three months of loan effectivity. This PSC would be chaired by the Chief Secretary of the SGOU (or his representative) and it would meet at least twice every year, and more often if required.

65. The PWD would be responsible for the overall implementation of the proposed Program, and it would be assisted by a dedicated Project Management Unit (PMU), that has already been established, headed by a Project Director. This PMU would be responsible for sub-project preparation, procurement, preparation of loan disbursement requests, accounting and preparation of progress reports. The PMU would also assure that SGOU and ADB financial and reporting requirements are met, and that ADB safeguarding and procurement procedures are followed. A team of qualified engineering, procurement, financial and administrative staff would need to be established in the PMU to assist the Project Director in the technical, financial, accounting, procurement and contract administration duties. Day to day administration of the construction contracts would be delegated to the Project Implementation Units (PIUs) established in the PWD district circle or divisional offices.

66. PWD, through its PMU would manage all pre-construction and construction activities related to the civil works contracts in accordance with ADB's procurement procedures and standards. These pre-construction and construction activities would include preparation and acceptance of detailed designs, obtaining statutory engineering and environmental approvals, preparation of tender documents for ADB approval, pre-qualification of contractors, arranging pre-bid meetings, evaluation of bids, award of contracts, arranging payments to contractors, and accepting the completed works on behalf of PWD.

[12] ADB TA 4607 (IND), Technical Assistance to India for Preparing the Uttaranchal State Roads Project.

67. The PIUs would carry out the majority of the formal duties assigned to the Employer in the construction contracts, which would include processing of the payment certificates issued by the supervision consultants, authorizing variation orders and take-over of completed works. The PIUs would also be responsible for arranging resettlement in accordance with the agreed Resettlement Framework and Resettlement Plans, as well as general liaison with the construction supervision consultants. It is envisaged that up to nine PIUs would be required to provide effective cover across the State.

68. Provision of adequate and appropriately qualified PMU and PIU staffing, together with support consultants where required, could be a condition of disbursement of the MFF.

3. Implementation Schedule

69. It is expected that the Program would be implemented under the MFF in seven separate projects, with implementation of the first two projects commencing in 2007, subsequent projects commencing in each of the following years, and the last project commencing in 2012. Preparation activities for Project 1 commenced in 2005, with State funding and the detailed designs for these sub-projects have now been almost completed. PWD is also proposing to award design consultancy contracts for the second project by June 2006, again using State level funds, to avoid delays in the implementation of this project. The loan funded preparation and implementation activities for the seven Projects would extend over an 81 month period from March 2007 to November 2013, as detailed in the Indicative Implementation Schedule contained in Appendix J.

70. A tentative schedule for the pre-construction activities for Project 1 is shown below, which assumes that arrangements for commencing the procurement activities for the construction supervision consultants and civil works contractors could commence in advance of loan effectiveness:

submission of pre-qualification documents to ADB	July 2006
issue of pre-qualification invitation notice	July 2006
short listing of construction supervision consultants	August 2006
pre-qualification of civil works contractors	August 2006
submission of civil works bid documents to ADB	July 2006
issue of Invitations to Bid to contractors	October 2006
evaluation and selection of contractors	January 2006
appointment of construction supervision consultants	January 2007
award of civil works contracts	February 2007.

4. Procurement Arrangements

71. All procurement to be financed by the loans under the MFF would be carried out in accordance with ADB's *Guidelines for Procurement*. It is PWD's intention that all civil works contracts would be procured using ADB's local competitive bidding (LCB) procedures. All contracts would be packaged so that they have values below the $10 million maximum threshold agreed by ADB for LCB procedures in India. It is envisaged that individual civil works contracts would have values of between $3 million and $10 million and they would be packaged to include individual sub-project roads in the same geographical area. A Procurement Plan for the first Project of the MFF is given in Appendix K.

72. Pre-qualification of bidders would be required for all civil works contracts, using the current version[13] of ADB's *Standard Procurement Document for Pre-qualification of Bidders*. Bidding documents for all civil works contracts would be based on the current version[14] of ADB's *Standard Bidding Documents for the Procurement of Works, Small Contracts*, which adopts a single stage, one envelope system.

73. In the first Project, there would be eight separate contract packages with costs ranging from $3 million to $10 million.

74. PWD's PMU would be responsible for evaluation of bids received on all LCB contract packages. In order to facilitate timely contract approvals, whilst ensuring sound practice, ownership and accountability, it is proposed that the PWD would submit bid evaluation reports to ADB for all contracts in Project 1 and for five contracts in Project 2, for ADB's review and approval, before award of the contracts. If ADB finds the bid evaluation satisfactory for these contracts, PWD would then proceed with procurement procedures and contract award for subsequent contract packages without prior ADB review and approval. In these cases the following post facto approval procedures would apply: (i) PWD would retain a record of all procurement documentation, including copies of all signed contracts and bid evaluation reports, which would be available for inspection; (ii) at the time of each contract award, PWD would provide ADB with a certified summary sheet reporting on the main aspects of the bid evaluation and contract award; (iii) the procurement processes and contract awards would be audited annually as part of the performance audit; and (iv) if any contract award is found to be unsatisfactory, ADB might refuse to finance the contract.

5. Consulting Services

75. Consulting services would be used for the design and construction supervision of all sub-project roads in the Investment Program. For expediency, PWD engaged national consultants to carry out the design of the Project 1 sub-projects and it is their intention to also engage national consultants to carry out the design of the Project 2 sub-projects, using State funding that would form part of the local funding contribution for the Investment Program. Loan funded consultants would then be employed for the design of the remaining Projects, as well as the construction supervision of all sub-project contract packages. Outline terms of reference for the design and construction supervision consulting services are given in Appendix S.

[13] The current version of the ADB Standard Prequalification Documents is September 2005.
[14] The current version of the ADB Standard Bidding Document for Procurement of Works, Small Contracts is September 2005.

76. An international consulting firm would be engaged by the PWD under loan funds to provide technical and other specialist support to PWD's PMU. Duties to be carried out by the Program Support Consultants would include assisting the PMU to: (i) update the Master Plan prioritized road lists on an annual basis; (ii) select each of the future Project's sub-projects from the prioritized Master Plan road lists, in accordance with the selection criteria given in Appendix F; (iii) carry out an economic appraisal of the combined sub-projects to be implemented in each of the future Projects; (iv) assist the PMU to prepare the supporting documentation required for each of the future MFF Project loans; (v) carry out a technical review the sub-project designs and ensure that all safeguarding measures required by ADB and GoI have been taken during sub-project preparation; (vi) monitor that the PWD PIUs, construction supervision consultants and contractors are taking all necessary measures to minimize and mitigate the environmental and social impacts of the construction works. Outline terms of reference for the PMU support consulting services are given in Appendix T.

77. Consulting services would also be used in the Infrastructure Management Component to assist PWD in its reform process and prepare a training program. Outline terms of reference for these consulting services are given in Appendix U.

78. The consultants financed by the loans under the MFF would be selected and engaged in accordance with ADB's *Guidelines on the Use of Consultants* and other arrangements for recruitment of national consultants acceptable to ADB. Procedures acceptable to ADB would be used by PWD for the selection and engagement of any national consultants and ADB's approval would be obtained with regard to their competence and experience for carrying out the assignment, prior to engagement. As soon as proposals have been received and evaluated, but prior to the commencement of negotiations, ADB would be provided with three copies of: (i) a list of consultants invited; (ii) an evaluation of the proposals (together with one copy of the first-ranked proposal); and (iii) justification for the selection. After the conclusion of negotiations, but before the signing of the contract, the contract as negotiated would be provided to ADB for approval. Promptly after the contract is signed, ADB would be provided with three copies of the signed contract. If any substantial amendment of the contract is proposed during execution of the services, the proposed changes would be submitted to ADB for prior approval.

6. Disbursement Arrangements

79. Loan disbursements under the MFF would be in accordance with ADB's *Loan Disbursement Handbook* (2001) and Interim Guidelines for Disbursement Operations, LIBOR-Based Loan Product (2002), using direct payment and reimbursement procedures. Any individual payment to be reimbursed under statement of expenditure procedures would not exceed $100,000.

80. It is proposed that MFF loan funds would be disbursed into a dedicated program bank account in PWD's name that would be operated by the PMU. Each PIU would submit contractor payment certificates to the PMU who would arrange for the necessary bank transfers to be made into the contractors' nominated accounts. The total balance of the main PMU bank account would not exceed the estimated expenditures for the next 6 months or 10% of the loan amount, whichever is lower. PWD would be responsible for monitoring the PMU program bank account and they would make a monthly reconciliation of the account and prepare withdrawal applications for its liquidation / replenishment.

7. Accounting, Auditing and Reporting

81. PWD would maintain separate records and accounts to identify the goods and services financed from each of the MFF loan proceeds, as well as the Investment Program expenditures incurred for each sub-project. These accounts and related financial statements would be audited annually in accordance with sound auditing standards acceptable to ADB, by independent auditors, again acceptable to ADB. The SGOU would submit to ADB, within 9 months after the end of each fiscal year, consolidated annual audited reports and financial statements under each MFF loan, identifying separate accounts of sub-projects in each Project. The auditor's opinion of that part of the examination relating to the PMU bank account and the statement of expenditure should be separately set out in the auditor's opinion.

82. In addition, the SGOU would be required to undertake an objective and independent audit of sub-project contract packages and individual sub-projects on a sample basis to evaluate adherence to procurement procedures, safeguarding requirements, overall contract performance and value for money. ADB would also conduct procurement audits during implementation as part of its regular review process.

83. The PMU would submit a monthly progress report of sub-project implementation to the SGOU / PSC, through PWD, in such form and detail as required. Day to day reporting between the PIUs, the PMU and PWD would be through a management information system that is presently being developed. The PWD, with the assistance of its PMU, would prepare and submit to ADB quarterly reports on sub-project implementation. These quarterly reports would include a report on progress achieved during quarter, contract package payments made during the quarter, changes if any made to the implementation schedule and cash flow schedule, problems or difficulties encountered and remedial actions taken, and work to be undertaken in the coming quarter. The quarterly reports would be submitted to ADB within 45 days of the close of each quarter and they would also include a summary financial account for each sub-project contract package, expenditures to date and benefit monitoring activities.

84. PWD would submit to ADB a project completion report within 3 months of physical completion of the sub-projects financed under each individual loan, as well as a MFF completion report within 3 months of the physical completion of the full MFF funded Infrastructure Improvement Component and the Infrastructure Management Component. These reports would include a detailed evaluation of that Project and the Investment Program, respectively, covering design, costs, contractors' and consultants' performance, social and economic impact, economic rate of return, and other details pertaining to each individual Project and/or the overall Investment Program, as may be requested by ADB.

8. Project Performance Monitoring and Evaluation

85. At the present time, PWD maintains manual databases at divisional level covering road links, road condition, as well as existing and planned improvement and periodic maintenance works. It is understood that PWD plan to consolidate these manual databases into a computerized geographic information system (GIS) database that would interface with the Management Information and Project Management System (MIPMS) being developed for PWD. Although the form of the proposed GIS database has not been finalized, it would utilize data prepared during preparation of the USRIP Master Plan and it is envisaged that the GIS database would be expanded if required, so that it includes data required for monitoring the impact of the Program, as contained in the design and monitoring framework

shown in Appendix A. This data to be included in the GIS database would include traffic levels before improvement, population served, social facilities along each sub-project road and progress of all road works, including those carried out under the Investment Program, to enable reliable base line data to be established for performance monitoring. PWD should ensure that the GIS database would be expanded where necessary and be established in Uttaranchal within 3 months of the effective date of the first loan agreement.

86. A comprehensive project performance monitoring system (PPMS) would be developed by the PMU within 3 months of loan effectivity, with the assistance of the support consultant and the sub-project design consultants, for monitoring and evaluating the performance of the proposed project in relation to its goals, purposes and outputs. ADB would review and approve the PPMS. The consultants would assist the PMU in establishing baseline values for: (i) traffic volumes and journey times; (ii) freight tariffs and bus fares, (iii) environmental impact indicators, (iv) socio-economic indictors and (iv) social and poverty reduction impact indicators. Where relevant, social indicators would be disaggregated by gender. Implementation and evaluation monitoring indicators would be measured at the necessary agreed frequency during project implementation by the design and construction supervision consultants. Thereafter PWD would be responsible for collecting and analyzing the monitoring data every two years after completion of each Project, until a time four years after the completion of the full Infrastructure Improvement Component. Measurements of these indicators, together with relevant comments would be included in the quarterly reports that are submitted to ADB during the construction phase. Outline details of indicators to be measured by the PPMS and monitoring frequencies are shown in Appendix L.

87. A final monitoring and evaluation report would be prepared by PWD that evaluates changes that have occurred in the four year period following completion of the Road Improvement Component.

88. For the socio-economic monitoring prior to sub-project implementation, the design consultants would be required to carry out a poverty and social analysis of the impact area of each sub-project that would include household surveys to establish baseline information on the socio-economic condition of households. Monitoring would also be carried out during the implementation of the civil works to monitor benefits in terms of employment and income generation, as well as to identify any difficulties encountered by local people due to the Program implementation. The results of this monitoring would be used to develop mitigation measures that would immediately address the identified issues. The post implementation socio-economic monitoring to be carried out by PWD would determine changes in the socio-economic conditions that are attributable to the Program and ascertain if Program benefits to the area are being maximized. In coordination with local non-governmental organizations (NGOs) and other concerned Government agencies, the survey findings could be used to develop social development programs that would be responsive to the needs of people within the Program area. Other socio-economic indicators at the local, regional and national levels relevant to the Program would also be analyzed. Monitoring of transportation costs would be undertaken to confirm if savings in vehicle operating cost (VOC) have resulted in reduced transport costs along the project road.

9. Project Review

89. In addition to the regular reviews, including a midterm review of each loan by ADB staff, a detailed midterm review of the overall Investment Program would be made by ADB and PWD that would identify any problems or weaknesses in implementation arrangements, and agree on any changes needed to achieve the Program objectives. It is envisaged that

this midterm Investment Program review would be conducted during the first quarter of 2008. Terms of Reference for the review would be included in the MFF administrative memorandum prepared by ADB's inception mission for the MFF.

10. Anti-corruption Measures

90. ADB's *Anti-Corruption Policy* (1998) requires that Borrowers (including beneficiaries of ADB loans), as well as all bidders, suppliers and contractors under ADB financed contracts, observe the highest standards of ethics during the procurement and execution of such contracts. Through the use of ADB's standard bidding documents, provision is incorporated for: (i) rejection of any proposal for contract award; and/or (ii) declaring any firm ineligible for award of any ADB financed contract, either indefinitely or for a stated period of time, if the firm has engaged in corrupt or fraudulent practices.

91. Consistent with its commitment to good governance, accountability and transparency, ADB would reserve the right to investigate directly, or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the sub-projects under the MFF. To support these efforts, relevant provisions of ADB's Anti-Corruption Policy would be included in the loan regulations and the bidding documents for the sub-projects under the MFF. In particular, all contracts financed by ADB in connection with the MFF would need to include provisions specifying the right of ADB to audit and examine the records and accounts of the EA and all contractors, suppliers, consultants, and other service providers as they relate to the sub-projects under the MFF.

IV. INVESTMENT PROGRAM BENEFITS, IMPACTS AND RISKS

A. Overall Impacts and Benefits

92. ADB support to the Investment Program will enable the SGOU to complete around 65% of its ambitious 10 year road improvement program. This, in turn, will make a significant contribution towards the achievement of the general development targets the SGOU has set itself in its 'Infrastructure Vision', which include doubling of per capita income and reducing the proportion of the population below the poverty line by half.

93. Although the benefits of the Investment Program will be spread across the State, there will a particular focus on improving access in the under-developed hill areas, which account for 93% of the State's land area. The improved access will result from raising the condition of 10,800 km of the rural road network to good or very good and this will improve the economic well-being of rural communities and alleviate poverty. In these communities, economic activity has been constrained by the poor condition of the road network. The Investment Program outputs will be of considerable benefit to rural agriculture. Agricultural input distribution will be eased, as will the dispatch of produce to markets. The transport costs associated with distribution of inputs and produce will decrease. Greater and better access to markets will inevitably make a difference, and increased farm income can be expected. Improved market access would also fuel competition, benefit customers and stimulate inward investment in the much needed distribution facilities. Labor mobility could be expected to benefit both rural and urban populations, as there would be less incentive for the young to migrate to cities and there would be more impetus for the provision of improved education and health services[15].

94. Aside from the savings in vehicle operating costs, travel time costs and direct maintenance costs, the benefits of the Investment Program would include others that are more difficult to quantify with any degree of precision. These benefits include: (i) cost savings resulting from relieving the maintenance backlog; (ii) increased utilization of the PMGSY and NHDP networks; and (iii) reductions in accidents.

B. Sustainability of Investment

95. SGOU is committed to sustaining the level of funding needed to fully implement its roads master plan, which would be completed in 10 years with support from ADB's MFF. That would allow substantially more resources from the regular road sector budget to be allocated to routine and periodic maintenance. Additionally, there would be a reduction in maintenance costs over time, which would allow those savings to be used for activities to further increase mobility and accessibility. The EA would award combined civil works and performance based maintenance contracts, initially for selected subprojects starting with second Project contract packages, on a trial basis. On the basis of lessons learned from those contracts, the EA would award all possible contracts under this Investment Program as

[15] ADB's recent studies on the impact of infrastructure on poverty reduction, *Assessing the Impact of Transport and Energy Infrastructure on Poverty Reduction*, 2005, confirmed that the impacts of past rural transport improvements in India include: (i) transport cost savings; (ii) increased employment opportunities and higher wages; (iii) increased availability and accessibility of education and health services; (iv) reduced vulnerability of the poor; and (v) a positive effect on participation of the poor in activities outside the rural community.

construction and maintenance contracts. The EA would simultaneously extend the practice of performance-based contracting to all state maintenance works, which would allow it to outsource all construction and maintenance activities, This would enable the EA to focus on: (i) planning for the expansion and upgrading of the road network in a systematic manner to support the economic development of the State; (ii) monitoring the efficiency of the performance based contracting; (iii) refining service levels achieved by the performance based contracting; (iv) supervision and contract management to ensure that the required quality standards are achieved and that payments are made in strict conformance with contract conditions; and (v) managing the overall delivery of capital investment and major periodic maintenance schemes.

96. Physical sustainability of the Investment Program would be safeguarded by ensuring that the design of the sub-project follows the agreed standards. Provision is incorporated in the project for adequate construction supervision to ensure that quality standards are upheld.

C. Sustainability of Policy and Institutional Interventions

97. The Infrastructure Management Component would help the momentum of the USRIP and the Infrastructure Improvement Component to be maintained at a level needed to achieve the national and state development goals. The mix of interventions planned under the infrastructure management component, which range from staff training to management reorganizations to involvement of road users in planning, will increase the long term sustainability of the investment. The training program, in particular, is expected to increase staff moral, productivity and asset performance by providing the skills necessary for efficient execution of the work loads using information technology and better equipment. Training and awareness programs designed to increase civil works contractor capacity would lead to higher quality of work and hence longer asset lives.

D. Economic Analysis

98. An economic appraisal of the Project 1 has been carried out at the sub-project and contract package levels, which has considered the following quantifiable benefits accruing from the road improvement works:

(i) reduced vehicle operating costs resulting from the improvements in riding quality;

(ii) passenger and freight time savings resulting from the improvements in riding quality;

(iii) vehicle operating cost savings and time savings resulting from the slope stabilization works carried out on the hill roads. These works would reduce periods when the hill roads are blocked by fallen debris that would force traffic to take lengthy detours;

(iv) savings in routine and periodic road maintenance costs;

(v) additional road user cost savings[16] to traffic generated by implementing Project 1, as well as additional traffic induced by improvements to connectivity.

99. Total (discounted) traffic benefits of the 23 no. sub-project roads implemented in Project 1 would amount to Rs 2,181 million, of which Rs 1,851 million (85%) results from savings in vehicle operating cost and Rs 330 million (15%) results from savings in travel time. Car and light vehicle operators and passengers would be major beneficiaries, taking 40% of these benefits. This group includes the light vehicles that operate a widely used informal passenger service in the hill areas. Freight operators and their clients would take 34% of the benefits, bus operators and passengers 18% of the benefits and the remaining 8% of the benefits would be enjoyed by motorcycle owners and passengers. A further analysis was carried out to distribute benefits across the various stakeholder groups, which demonstrated that 51% of the total benefits of the project would be passed onto passengers and freight customers. Car and bus passengers would enjoy 24% and 11% of the total project benefits, respectively, whilst freight customers would enjoy 17% of these benefits.

100. The economic appraisal has demonstrated that collectively, the 23 no. sub-project roads implemented in Project 1 are economically viable with an economic rate of return (EIRR) of 16.3% and a net present value (NPV) of Rs 648 million at a 12% discount rate.

101. Sensitivity testing has been carried out to investigate the effects of cost overruns and decreases in benefits. This testing has demonstrated that Project 1 remains viable, with EIRR values remaining above the normally accepted viability threshold value of 12%, if costs increase by 20% or benefits decrease by 20%. In a severe worst case test, when both costs increased by 20% and benefits decreased by 20%, the EIRR drops to 11.2%. A summary of the various sensitivity tests carried out is shown below in Table 5.

Table 5 Summary of Economic Appraisal Sensitivity Tests

Sensitivity Test	EIRR %	NPV Rs million
Base Case	16.3	647.9
Benefits reduced by 20%	13.5	211.7
Initial Construction Costs increased by 20%	13.7	297.4
Benefits reduced by 20% and Initial construction Costs increased by 20%	11.2	-138.7
Traffic Growth reduced by 20%	14.9	408.2
Traffic Growth reduced by 50%	12.8	104.7

Source: TA Consultants' evaluation

102. A probabilistic risk analysis has also been carried out that assesses the combined effects of varying key input parameters including, costs, benefits and traffic growth, on the EIRR and NPV. This risk analysis gives a more realistic indication of the robustness of the overall EIRR than the conventional sensitivity tests reported above. The risk analysis demonstrated that the EIRR for Project 1 has a 5 percentile value of 13% and a 95 percentile value of 20%. There would only be a 3% probability of the EIRR falling below 12%.

[16] The generated traffic was estimated by adopting a price elasticity demand of one (i.e. a 10% decrease in transport costs would give a 10% increase in traffic.

103. The economic viability of the project is considered to be reasonable, given the low traffic flows that are characteristic of the secondary and tertiary road networks. Further details of the economic appraisal are contained in Appendix M.

E. Social Impact

1. General

104. The Road Improvement Component would be spread across all thirteen districts of Uttaranchal. The State is among the poorest in the country in terms of per capita income, economic growth, and human and social development, and the Planning Commission estimates reveal that more than 35% people of the state are living under the poverty line. Chamoli, Tehri and Uttarkashi are the poorest districts of the State. The Road Improvement Component would therefore be expected to have a significant positive impact on reducing poverty in the sub-project catchment areas, given that road transport dominates the transport sector. Further, the support for the roads was universal with all stakeholders identifying positive outcomes.

105. Vehicle ownership in the State is low, and is generally limited to two wheelers. There is a heavy government interest in the operation of bus services, with the state government effectively setting fares. As a result it is unlikely that significant operating cost savings would be passed on to bus passengers, but these passengers would however, benefit from time savings. In the hill areas, there is a thriving informal passenger transport service that is provided by light vehicle owners, which is largely unregulated. This informal, but heavy used passenger service is much more competitive than the bus services, and it is expected that more of the transport cost savings resulting from the Road Improvement Component would be passed on to its passengers. Freight services are also competitive, with a high proportion of these benefits likely to be passed on to the community through lower transport costs. A Summary Poverty Reduction and Social Strategy (SPRSS) for the Investment Program is given in Appendix N.

2. Poverty Impact

106. The population in the Program road catchments areas consists largely of rural people (75%), the majority of who are farmers and unskilled laborers. The Road Improvement Component would directly benefit approximately 3.5 million people living in the villages falling along the sub-project roads. It would also benefit those who use the sub-project roads to access district towns and centers, and the national highway network. These people would benefit from lower transport costs leading to reduced consumer prices and induced economic and social development.

107. The Road Improvement Component would also generate significant employment opportunities for skilled and unskilled labor during its implementation phase. Unskilled labor (males and females) would be employed directly in road construction and indirectly by providing materials and services to the construction and maintenance activities. Project 1 would be expected to generate employment opportunities of approximately 912,600 person days of work for unskilled workers and the whole Component is expected to generate 8.4 million person days of employment. The Program would have positive externalities, which

will improve the livelihood of the poor. The Poverty Impact Ratio (PIR) of Project 1 is 0.30 and details of the PIR assessment are given in Appendix M.

3. Gender Issues

108. Women in the region are largely involved in household work, cultivation and other agricultural activities. They use the sub-project roads for their routine household activities and economic activities such as agriculture and marketing etc. Availability of improved all weather roads with safe connectivity and better transport services would benefit the women of the area. Their mobility would be augmented through improved access to social services, higher levels of schooling and better health facilities.

109. No women headed households have been identified who would be negatively affected by Project 1. Due care has been taken in the preparation of the entitlement matrix of the Resettlement Framework to avoid hardships and adverse impacts on any women headed households that might be affected by future sub-projects, by making provision for them to regain their lost income and livelihood. During the project implementation, women would receive preferential treatment for employment in the civil works with proper safeguards for the safety of their health. The PIUs would ensure that affected women are consulted and invited to participate in group based activities in order to enable them to gain access and control over resources. Further, during implementation of any Resettlement Plans, non-governmental organizations (NGOs) would ensure that affected women receive compensation and assistance in their own names.

4. Indigenous Peoples

110. Nationwide, 8.2% of the total population are classified under Scheduled Tribes (STs). In comparison 256,129 in Uttaranchal or only 3.0% are classified under STs. There are five major tribal groups (Bhotia, Buska, Jannsari, Raji, and Tharu) in Uttaranchal, and these are hill tribes who have been observed to interact closely with mainstream society. None of Uttaranchal's STs are Primitive tribal groups. Uttaranchal's STs are concentrated mostly in Udham Singh Nagar and Dehradun districts. As the Road Improvement Component would be confined to the existing road alignment, it would not affect such groups within its area of influence. The improved road network would improve access to services and economic opportunities for tribal people and scheduled caste groups, as well as all segments of the state's population. The impact on the ST group was assessed for all sub-project roads in Project 1 and no such affected persons (APs) have been identified who would be affected by the Investment Program.

111. The indigenous groups would be more likely to gain most from the improved sub-project roads through the improved and higher quality connectivity they would offer. However, as per ADB safeguard policy, an Indigenous People Development Framework (IPDF) has been developed to deal with any significant adverse impacts that might result from the Investment Program. This IPDF is included in Appendix O.

5. Land Acquisition and Resettlement

112. The scope of proposed project includes strengthening and reconstruction of selected sections of State Highways, Major District Roads and Other District Roads (ODR). The existing single lane carriageways would be upgraded to intermediate and two lane

carriageway in relatively few cases, only where this is justified on traffic capacity grounds. All improvement work would be limited within the existing RoW. The project roads pass mostly through hilly terrain, where the available RoW varies from 6 meters to 15 meters. The required formation width varies from 5 meters to 7.5 meters respectively in single lane and intermediate lane carriageway.

113. Minimization of resettlement is generally being achieved by restricting the road improvement works to within the existing RoW. Out of the 23 individual sub-projects selected for Project 1, 19 sub-projects have no resettlement impacts. Initial social impact assessments were carried out on the other 4 sub-projects that require resettlement and they show that the negative impacts would not be significant. In most of the cases there would be partial loss of structures erected in the RoW, which would not cause a resettlement problem, although some people will loose their source of income from petty businesses. A Resettlement Framework (RF) has been prepared addressing all such issues and mitigation measures and this RF is given in Appendix P.

114. The minor resettlement impacts would be confined to only four sub-projects out of the 23 selected for implementation in Project 1. Considering the negligible resettlement impacts, four Short Resettlement Plans for the four individual subprojects have been prepared for mitigation of the adverse impacts of involuntary resettlement. There would be no land acquisition required for the project; hence no legal title holders would be affected. The resettlement impacts are restricted to some encroachers and squatters who would lose their structures and source of livelihoods. Compensation payments would also to be made for lost assets and the restoration of livelihoods, particularly for the poor and vulnerable section of the APs. A Summary Resettlement Plan is attached in Appendix Q.

115. Surveys and consultations carried out during the preparation of the sub-projects in Project 1 show that all affected households and their communities considered the Investment Program to be of crucial importance for the benefit of themselves, the project area population and beyond.

6. HIV/AIDS[17]

116. Uttaranchal is one of the low prevalence States of India in regards to spreading of HIV/AIDS and the latest information available from the National AIDS Control Organization (NACO) shows no reported cases. Consultations carried out during the preparation of the sub-projects for Project 1 have also verified that the impact areas of these roads do not seem to be vulnerable to any such problem. The State AIDS Control Society (SACS), in collaboration with NACO, is active in preventing the spread of AIDS into the State.

117. The sub-project roads, being generally part of the secondary and tertiary road networks are used almost entirely by local people and no inter-state or cross-border traffic is expected. However, considering the overall quantum of AIDS cases in India and the tourism potential of Uttaranchal State, the Investment Program would not be complacent about the risk of HIV/AIDS. Attempts would be made to reduce the vulnerability of population groups who are most at risk to HIV/AIDS and trafficking during the implementation of project by providing increased access to HIV prevention services. Beneficiaries would include road construction workers, employees with local government, program staff, drivers, sex workers, and migrants living along the road corridor. Specific activities to be carried out under the Investment Program would include:

[17] Human immunodeficiency virus / acquired immunodeficiency syndrome

(i) increasing the level of awareness about prevention of HIV/AIDS among the different communities and groups especially the vulnerable groups and high-risk groups;

(ii) development of effective and viable procedures to mitigate and prevent AIDS and trafficking along the sub-project corridors.

118. An awareness campaign would be designed by establishing linkages with SACS, donors and suitable local NGOs. Specific activities under this campaign would include dissemination of HID/AIDS related information, local capacity building, preventive measures such as distribution of condoms, promotion and provision of testing, counseling and treatment services to counter the spread of HIV/AIDS and other sexually transmitted infections in the project area. Appropriate attention would be paid to the identification of vulnerable people among the stakeholders during the implementation of the Investment Program and participating NGOs would explore possible measures to counter any incidence of HIV/AIDS.

F. Environmental Impact

119. The Investment Program was initially categorized as a "B" project. However, during implementation of the TA, it was found that two roads in Project 1 pass through the Binsar Wildlife Sanctuary. Consequently, the overall categorization was changed to "A", although due to the differences in the types of activities and locations, the environmental classifications of individual sub-projects range from "A" to "B", in accordance to the ADB's environmental policy. The Environmental Impact Assessment (EIA) report for Project 1 has been prepared to cover rehabilitation and improvement of the road connecting Almora to Bageshwar, and the road connecting Barechhina to Sheraghat, which pass through the Binsar Wildlife Sanctuary (BWS). These two sub-project roads are also subject to review by the Government of India, and require clearance permits from the Ministry of Environment and Forests (MOEF). An Initial Environmental Examination (IEE) has been prepared for the rest of the sub-project roads in Project 1.

120. The EIA studies were carried out by PWD's consultants and the TA consultants from July 2005 to April, 2006. The EIA and IEE reports, which include Environmental Management Plans (EMPs), were prepared in accordance with the relevant Government regulations as well as ADB's *Environment Policy* (2002) and *Environmental Assessment Guidelines*. The Summary EIA, which covers findings of the IEE and EIA for all sub-project roads to be implemented in Project 1 is contained in Appendix R. This summary EIA would be disclosed through the ADB's website and submitted to the ADB Board of Directors 120 days prior to ADB Board meeting to discuss this proposed Investment Program.

121. The findings from the IEE and EIA studies show that certain environmental impacts would occur during the construction, which are temporary and reversible. These impacts include: possible landslides and soil erosion, temporary reduction in quality of water in nearby streams, temporary increases in particulate emissions and noise levels near settlements and minor impacts on flora and fauna, especially in sections located in forests and protected areas. All necessary mitigation measures would be integrated into the construction works, and in addition, the EMPs would ensure that all the required mitigation measures are implemented and monitored during all stages of the Program. To avoid long-term impacts related with the roads passing through the wildlife sanctuary and forested

areas, the improvement and rehabilitation works would be limited to the existing right of way. Furthermore, there will be no asphalt mixing plants, crusher plants, construction camps, and disposal of construction material within the sanctuary and forested areas. The contractors would be required to work in close consultation with the Sanctuary Wardens and Forest Conservators. PWD would be responsible for implementing the overall EMP and the contractors would responsible for implementing the mitigation measures during construction.

122. For the subsequent Projects of the Investment Program, the EIA / IEE studies will be prepared prior to approving each sub-project. An EIA including an EMP and a Summary EIA would be prepared for any road sub-project that passes through environmentally sensitive areas such as National Parks, Wildlife Sanctuaries, and others designated by GoI or SGOU for environmental protection. For other sub-projects, an IEE and an EMP will be required. For Village Roads and Light Vehicle Roads, an IEE checklist and standard EMP would be employed. After the EIA studies, the EA would need to obtain the necessary permits from relevant Agencies as per GOI's requirements, prior to commencing any civil work. The environmental assessment studies required for sub-project categorization, review and approval procedures as well as the responsibilities of ADB and the EA are described in an Environmental Assessment Review Framework (EARF).

G. Risks

123. In previous road development and improvement programs in India, including NHDP and PMGSY, implementation performance has been affected by factors outside the direct control of the EA and ADB. These factors include delays in obtaining environmental and forest clearances, permits from railway authorities, land acquisition delays and poor contractor performance. Measures have been incorporated in the Investment Program to mitigate and minimize these risks, as described below.

124. Risks of incurring implementation delays through extended periods required to obtain necessary permits and clearances would be minimized by ensuring the PMU is staffed by an adequate number of suitably qualified core staff. These staff would be able to provide effective management to make sure that the initial applications are in order and that progress in obtaining these clearances is tracked so that timely remedial action can be taken. Assurances could be included in the loan documentation that would require PWD to retain key staff in the PMU for a minimum period of 12 months, to ensure staff continuity. Similarly, land acquisition, resettlement and procurement delays can be minimized by ensuring that the PMU and PIUs provide effective management to these processes, the processes are started at the appropriate time and that the requirements of the various implementation frameworks are duly followed. Provision is included in the Investment Program for the PMU to be provided with consultancy support in areas where PWD staff might not have certain specialist skills, such as monitoring and implementation of resettlement, financial management and transport economics.

125. Risks of poor contractor performance and a shortage of contracting resources have been addressed by ensuring that the contract packages are large enough to: (i) attract interest from national contractors; and (ii) provide sufficient incentive to contractors based in Uttaranchal to invest in modern construction plant that would improve production and quality. Pre-qualification of civil works contractors would be carried out to ensure that contractors invited to bid for contract packages have adequate experience and capability.

126. Risks associated with the economic performance of each Project would be mitigated by engaging qualified construction supervision consultants who would be required to exercise strong cost control to minimize cost over-runs, and strong quality control to ensure that the anticipated working life of the road improvement works is not compromised.

127. Risks of adverse social and environmental impacts has been addressed through: (i) the sub-project selection process which screens out those sub-projects having high resettlement and environmental impacts; (ii) the sub-project preparation process which confines road improvement works to the existing RoW, unless there are over-riding grounds for widening on traffic capacity grounds; and (iii) requirements included to effectively mitigate and minimize short-term construction impacts.

128. ADB could address the risks associated with the MFF, which is relatively new to both India and the ADB, by ensuring that adequate resources are allocated to reviewing and monitoring the implementation of the Investment Program, particularly with respect to fiduciary and safeguard oversight. ADB would also need to provide adequate support to the SGOU in the management and implementation of projects under an MFF, through the provision of training seminars and other technical assistance.

V. CONCLUSIONS

129. The proposed Investment Program would improve 10,800 km (65%) of Uttaranchal's secondary and tertiary rural road network to a good or very good condition. This would result in a significant improvement in rural access which would facilitate and stimulate economic growth in the agricultural, tourist and industrial sectors. The Investment Program would make a major contribution to the achievement of Uttaranchal's general development objective to double per capita income and half the number of people falling below the poverty line.

130. Sustainability of the Investment Program's Infrastructure Improvement Component would be achieved through a complimentary Infrastructure Management Component that would assist and facilitate the reform and modernization of PWD. This component would seek to strengthen PWD's capacity and capability to effectively plan, implement and maintain the State's road network, increase private sector participation in the development and maintenance of the road network and have a higher degree of consultation with road users and other stakeholders.

131. The total cost of the project, including 3 year post-completion routine maintenance contracts is estimated at $830 million, and it is proposed that ADB would provide $550 million of loan finance through a multi-trance financing facility. This facility would have significant benefits as loan charges would be reduced and SGOU would have the flexibility of drawing loan funding as required, up to the maximum agreed limit.

132. An economic appraisal has been carried out of the sub-projects in Project 1 which shows an EIRR of 16.3%, based on quantifiable transport cost and maintenance cost savings. A risk analysis shows that there would be a 3% probability of this EIRR falling below 12%. The economic viability of the Program is considered to be reasonable, given the low traffic flows.

133. No significant long term environmental impacts would result from the project and adequate safeguards are incorporated in the Investment Program to mitigate short-term environmental impacts during construction. Although the direct poverty and social impacts of the project are small, but there would be scope for providing additional pro-poor components, if further finance or technical assistance was committed. The sub-project selection and preparation processes have been specifically chosen to minimize resettlement requirements.

134. Adequate measures are incorporated in the Investment Program for mitigating risks.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact 1. Increased economic growth and reduced poverty in Uttaranchal	By 2017: 1.1 Increase in Per Capita State Domestic Product from Rs. 20,000 to R. 40,000 1.2 Increase in annual growth rate of tourist arrivals in the state from 5% to 7% 1.3 Percent of households below the poverty line decrease from 6% to 3%	• National and state public statistics • Reports of Center for Monitoring Indian Economy Pvt. Ltd.	**Assumptions** • State transport service regulations and taxes are further relaxed to encourage new entrants into the operator market **Risk** • Crops, plantations, and tourist arrivals are affected by bad weather
Outcomes 1. Increased efficiency of inter- and intra-state transport services	By 2010 1.1 Road Board holds quarterly meetings to discuss user concerns and Investment Program performance 1.2 Central Planning Unit produces annual updates of the programs and budgets in accordance with RDP By 2012: 1.1 Increase in the number of goods vehicle permits issued from 600 to 750 per month 1.2 Increase in SRTC bus utilization rate from 200 to 250 km/bus/day 1.3 Increase in stage carriage permits issued from 15 to 20 per month	• Post-implementation surveys • Facility and Project Performance Management Systems	**Assumptions** • State funds for road sector are sustained at the level required to maintain the network roads • PWD staff are provided adequate time to attend training programs **Risk** • Rise in fuel prices and vehicle sales taxes • Contractor base and capacity are not increased in a timely manner • Environmental clearances and resettlement are delayed
2. Enhanced Sustainability of road network in good condition	2.1 Routine maintenance cost reduced from $1400 to $1000 per km through area-wide PBCs 2.2 Average service life of periodic maintenance		

	works increased from 3 to 5 years 2.3 Number of grade A state contractors qualified to undertake >$10 million contracts increased from 2 to 10 2.4 Number of engineers per $1 million investment reduced from 3 to 1 2.5 Reduction in road length managed by each zone by 1 January 2008		
3. Increased transparency of planning and investment decision-making	3.1 Quarterly meetings held by the Road Board and minutes are published commencing 1 January 2008 3.2 MIPMS replaces the paper-based system for monitoring performance by 1 January 2008		
4. National road development programs synergized	4.1 Increase in the share of good roads between roads NHDP projects and PMGSY projects from 10 to 30% by 2010		
Outputs 1. Paved, repaired or rehabilitated state roads	1.1 At least 8,000 km of state roads are in good condition (IRI < 4.5) by 2012 1.2 At least 12,000 km of state roads are at IRI<4.5 by 2017	1. Engineers' Progress Reports and Audit Reports submitted to ADB 2. Review missions and project completion reports	**Assumptions** • First loan is effective by 1 March 2007 • Advance action for Project 1 is completed by 1 March 2007 • Implementation of MIPM system completed by 1 June 2007
2. Improved staff skills and revised operating procedures	2.1 At least 200 PWD staff of various grades trained in strategic planning, quality control, computer usage, contract administration, and MIPMS usage by 2010		**Risks** • Shortage of qualified contractors

	2.2 Planning unit commences programming and budgeting by 2008 2.3 Financial management system is based on MIPMS by 2008 2.4 PBCs are made the default mode of all maintenance works procurement for PWD works by 2012 2.5 At least 25% of all PWD civil works contracts are procured under PBCs by 2012		
Activities with Milestones 1.1 First PFR received by 1 September 2006 1.2 Supervision consultants mobilized by 1 February 2007 1.3 All contracts for Project I are awarded by 1 March 2007 1.4 Environmental and social safeguard documents and PFR for Project 2 submission to ADB by 1 April 2007 1.5 Approval of post-facto review by ADB by 1 June 2008 1.5 All Investment Program contracts awarded by 31 December 2012 1.6 All civil works are completed by 31 December 2014 2.1 Completion of HRS by 31 December 2007 2.2. Finalization of the modules and completion of first training session for PWD staff by 1 December 2007 2.3 Establishment of Road Board by 1 December 2007 2.4 Establishment of Planning Unit by 1 December 2007 2.3 Training for PWD completed by 1 June 2008 2.4. Establishment of two new operational zones by 1 June 2008			**Inputs** • ADB $550 million • The State $280 million

ADB: Asian Development Bank; HRS; Human Resources Strategy; NHDP: National Highway Development Program; MIPMS: management information and project management system; PBC: performance-based maintenance contract; PMGSY: Pradhan Mantri Gram Sadak Yojana; PFR: periodic funding request; PWD: Public Works Department; RDP: road development plan; SRTC: State Road Transportation Corporation

SUB-SECTOR ANALYSIS

A. Economy and Governance

1. Uttaranchal is a relatively new State and it was formed in 2000 by bifurcating the State of Uttar Pradesh. Around 90% of Uttaranchal's land area is comprised of hilly and mountainous terrain, and this gives rise to a number of development challenges that differ significantly from those in the majority of India's States. Economic growth in Uttaranchal has lagged behind that in Uttar Pradesh and other neighboring States, and in 2001, Uttaranchal was accorded the 'Special Category' status by the Central cabinet. This status was granted on account of Uttaranchal's low economic growth, low population density, poor financial position and high importance with respect to national security. The 'Special Category' status enables Uttaranchal to receive preferential funding from Central Government.

2. The state domestic product (SDP) was Rs 233.1 billion in 2005-06[18] and since 2001-02, it had registered an average annual growth rate of 11.2%, in real terms. This growth rate is significantly higher than the previous average annual growth rate of 4.2% achieved between 1993-94 and 2000-01. Per capita income in 2005-06 was Rs 25,466 in current prices and since 2001, it has shown an average annual growth rate of 9.4%, in real terms. This growth rate is more than double the national average growth rate for India, over the same period. This very significant recovery demonstrates the success of the economic growth policies established by the new State Government. In Uttaranchal, the share of the primary sector of the economy (mostly agriculture) showed a steady decline over the last ten years and in 2005-6, it formed 26% of the State's total economy. In contrast, the secondary (industrial) sector has grown by 16.6% per year since 2001-02 and it now forms 30% of the State's economy. Similarly, the tertiary (services and transport) sector has also shown an 8.3% annual growth rate since 2001-02 and forms 44% of the State's economy. The economic growth in the secondary and tertiary sectors is largely confined to the lower plain areas of the State, which account for only 16% of the State's land area, but hold 47% of the population.

3. High transport costs, resulting from the poor condition of the road network have contributed to the decline in agricultural production. In the hill areas, it has been reported that wastage of fruit production is as high as 25%, due to damage incurred during transport and lack of temperature controlled facilities. Similarly, the stagnation of industry in the hill areas is largely attributed to poor infrastructure, lack of connectivity, problems of availability of raw materials and limited access to markets.

4. The State Government of Uttaranchal (SGOU) shares the Government of India's (GOI's) commitment to the alleviation of rural poverty by stimulating economic growth through the provision of improved infrastructure. Accordingly, the SGOU has published its *'Infrastructure Vision'*, in which it set itself general development targets for the period up to 2014 that include doubling of per capita income and halving the proportion of the population below the poverty line. In order to double per capita income by 2014, an annual growth rate for the State's gross domestic product (GDP) of 7.4%, in real terms, will need to be achieved. Sustained economic growth in the agricultural and tourism sectors, as well as the development of other related industries is presently hampered by the under performance of the road sector. This under performance is largely attributed to the poor condition of the State's road infrastructure.

[18] Re. the Directorate of Economics & Statistics, SGOU

5. Uttaranchal's road infrastructure is managed by the State's Public Works Department (PWD). Road passenger and freight services are managed and regulated by the State Road Transport Corporation (SRTC), who also operate a thriving bus service.

B. Demography and Terrain

6. Uttaranchal's terrain varies considerably from the densely populated lower plains, to the less densely populated hill areas and the upper mountainous regions that can only sustain very low population levels. These varying terrain conditions dictate the population densities, transport demand and road network coverage.

7. The land area of Uttaranchal can be broadly divided into the following three regions:

(i) the lower plain (or Terai) region in the south of the State which is generally below an elevation of 600 meters and is fertile and densely populated. In this region, the road and rail networks are relatively well developed, irrigation facilities are good and there is higher agricultural productivity than the rest of the State;

(ii) the hill region, between elevations of 600 meters and 2,400 meters, where road transport is only viable transport mode. The hill roads are cut into the steep valley sides and the road alignments contain frequent sharp curves which are necessitated by the topography. Many of the valley sides are prone to landslides which can block the roads. The population is mainly confined to towns located in the valleys and villages on the hillsides. Much of the hillsides are forested and there is fruit and vegetable production in the valleys and on terraced areas of the hillsides. There are a number of tourist and religious centers in this region that attract visitors from other States in India;

(iii) the upper region, above an elevation of 2,400 meters, which is hilly and mountainous. Above an elevation of 3,000 meters, the area is snow covered for much (or all) of the year, and the terrain is mostly mountainous, with steep rocky slopes. Road transport is largely confined to light vehicles, as the roads are steep with sharp curves. In the highest reaches, above 4,500 meters, the terrain consists of deep gorges and steep barren snow covered slopes. Here, communications are almost non-existent, apart from foot tracks.

8. Table B-1 illustrates the marked differences in population density and road network coverage across the 13 Districts, that have been grouped together according to terrain. The Districts in the Terai and hill regions together account for 58% of the State's land area, but contain 87% of the population.

Table B-1 Summary of Uttaranchal's Demography and Road Network

District	Population		Area		Population Density	State Road Network							Road Density	
						SH	MDR	ODR	VR	LVR	Total	Total		
	No.	% of State	Sq km	% of State	persons / sq km	Km	km	km	km	km	km	% of State	per 100 sq km	per lakh population
Terai Region														
Haridwar	1,447,187	17.0%	2,360	4.4%	613		89	145	598		832	5.0%	35	57
Udam Singh Nagar	1,235,614	14.6%	2,908	5.4%	425	7	5	139	1,083		1,234	7.4%	42	100
Dehradun	1,282,143	15.1%	3,088	5.8%	415	35	390	594	674	471	2,164	12.9%	70	169
Subtotal	3,964,944	46.7%	8,356	15.6%	475	42	484	878	2,354	471	4,230	25.3%	51	107
Hill Region														
Tehri Garwhal	604,747	7.1%	4,080	7.6%	148	49	222	889	286	492	1,938	11.6%	48	321
Rudraprayag	227,439	2.7%	1,891	3.5%	120			376	168	105	650	3.9%	34	286
Pauri Garwhal	697,078	8.2%	5,400	10.1%	129	56	136	1,111	819	509	2,631	15.7%	49	377
Almora	630,567	7.4%	3,083	5.8%	205	166	204	1,089	207	126	1,793	10.7%	58	284
Nainital	762,909	9.0%	3,860	7.2%	198	26	215	404	809	243	1,696	10.1%	44	222
Bageshwar	249,462	2.9%	2,302	4.3%	108		150	236		50	436	2.6%	19	175
Champawat	224,542	2.6%	1,781	3.3%	126			120	248	119	486	2.9%	27	216
Subtotal	3,396,744	40.0%	22,397	41.9%	152	296	926	4,226	2,537	1,644	9,628	57.6%	43	283
Upper Region														
Uttararkshi	295,013	3.5%	8,016	15.0%	37		75	393	316	158	941	5.6%	12	319
Chamoli	370,359	4.4%	7,614	14.2%	49			637	97	202	936	5.6%	12	253
Pithoragarh	462,289	5.4%	7,100	13.3%	65			321	512	154	987	5.9%	14	213
Subtotal	1,127,661	13.3%	22,730	42.5%	50	0	75	1,351	925	513	2,864	17.1%	13	254
State Total	8,489,349	100.0%	53,483	100.0%	159	338	1,485	6,455	5,816	2,628	16,722	100.0%	31	197

Source: PWD Road Network Master Plan

C. Elements of the Transport Sector

9. The predominant mode of passenger and freight transport into and out of the State is road transport on the National Highway network and this transport takes around 80% of the total passenger and freight transport market. Rail services offer freight and passenger connections to the neighboring State of Uttar Pradesh and New Delhi through four rail heads located in the Uttaranchal's southern low lying plain region[19]. There are no rail services operating for inter-state transport and the hilly and mountainous terrain that exists over 93% of State's land area would preclude the development of railway infrastructure catering for such services. Although there is an air service that presently operates between the State capital Dehradun and New Delhi, this service has a low capacity and poor reliability.

D. Performance of the Road Sub-sector

1. Transport Demand

10. The primary mode of inter-district freight and passenger transport within Uttaranchal is road transport and this will continue to be the case, because of the State's hilly and mountainous terrain.

11. There are no published statistics of modal passenger and freight transport demand for Uttaranchal State, so transport demand cannot be quantified. Other indicators, such as the relatively slow rates of economic growth at State level, coupled with high increases in registered vehicles and public transport usage in the more densely populated areas in the plains and urban areas do however indicate an underlying strong demand for transport, which in the hill areas is likely to be suppressed by the relatively poor condition of the road infrastructure.

12. The National Highways carry 90% of the total freight tonnage moved in Uttaranchal, and the 10% balance of freight tonnage is carried on the PWD secondary and tertiary road networks[20]. The freight movement on the PWD network is predominantly inter-district. This imbalance of freight movements is due partly to the relatively low population densities in the hill areas served by the PWD rural road network and partly to the narrow width and tight curvature on the PWD network of hill roads which limits the use of heavy trucks. Similarly, the PWD road network carries approximately 20% of the total passenger movements in the State, and of these movements, around 60% are intra-district and 35% are inter-district.

13. Tourism is a key driver of Uttaranchal's economy and it contributes around 8% to the State's gross domestic product. In 2005, approximately 16.3 million tourists traveled to Uttaranchal, and the annual growth of arrivals has been around 12% over the last two years. A study carried out in 2004[21] showed that the tourist arrivals in Uttaranchal could be broadly split into five main groups as shown below in Table B-2.

14. Tourists would generally travel to Uttaranchal on the National Highways or by railway. The largest group of tourists indicated in Table B-2 visit destinations centered around the Dehradun area, and this group would mostly travel within Dehradun on the National Highways. Other groups of tourists would again generally travel to their respective regional

[19] Rail heads are located at the State capital, Dehradun as well as at Kotdwar, Ramnagar and Kathgodam.
[20] Re. PWD "Strategic Options Study" dated May 2005.
[21] Re. CRISIL Report, 2004

centres on the National Highways and then use the PWD rural road network for local travel within each region. The religious pilgrims account for the second largest group of tourists and they would use the PWD rural road network for travel between the four sacred Hindu temples of Badrinath, Kedernath, Gangotri and Yamunotri, in northern Uttaranchal. Travel to these temples is restricted to the period between May and October, as the roads become impassable in the winter months due to snow. In 2005, there would have been up to 3.5 million people visiting at least one of these temples.

Table B-2 Breakdown of Tourist Arrivals in Uttaranchal

Type of Tourism	Arrival Point in Uttaranchal	Key Destinations Visited	% of Total Tourist Arrivals
Leisure and Religious	Dehradun	Rishikesh, Mussorie, Pauri, Haridwar	60%
Eco-tourism	Pantnagar	Almora, Ranikhet, Kausani, Champawat, Nainital, Kathgodam, Corbett National Park	7%
Scenic	Uttarkashi	Tehri, Uttarkashi, Ganotri, Yamunotri	10%
Adventure	Pithoragarh	Pithoragarh	1%
Pilgrims	Rudraprayag	Srinigar, Kotdwar, Rudraprayag, Kedarnath, Joshimath, Badrinath	22%

Source: CRISIL Report, June 2004

2. Vehicle Fleet

15. Uttaranchal's vehicle fleet has been growing steadily over the last 5 years. Vehicle registration data shows consistent annual growth rates of between 12% and 14%, since 2001 and at March 2005, the total number of registered vehicles was 565,700. Of these vehicles, some 77% are two wheelers and 10% cars. Commercial vehicles (buses, trucks, vans, etc.) account for only 13% of the total registered vehicles. Table B-3 presents a breakdown of the vehicle registration statistics, taken from the official Uttaranchal State website.

16. Although the registration statistics indicate a buoyant vehicle fleet, with high growth rates, these statistics would tend to represent conditions in the plains where population densities are higher and in the main urban centers which are more affluent than the rural areas. These statistics are not considered to be representative of general conditions in the hill areas where the vehicle fleet is relatively old and traffic densities are low.

17. The average number of registered vehicles per 100,000 population are shown in Table B-4, alongside comparative figures for India and it can be seen that vehicle ownership rates in Uttaranchal are generally less than average ownership rates for India.

Table B-3 Vehicle Registration Statistics

Vehicle Category	2001 – 2002			2002 – 2003			2003 - 2004			2004 - 2005			
	Annual Increase No.	Total No.	Annual Increase %	Annual Increase No.	Total No.	Annual Increase %	Annual Increase No.	Total No.	Annual Increase %	Annual Increase No.	Total No.	Annual Increase %	% of all Vehicles
Private													
Two Wheelers	32,306	297,672	12.2%	40,587	338,259	13.6%	44,467	382,726	13.1%	54,042	436,768	14.1%	77.2%
Cars / Jeeps	4,539	31,095	17.1%	5,430	36,525	17.5%	7,956	44,481	21.8%	9,163	53,644	20.6%	9.5%
Commercial													
Buses	259	2,840	10.0%	195	3,035	6.9%	361	3,396	11.9%	670	4,066	19.7%	0.7%
Trucks	570	4,795	13.5%	917	5,712	19,1%	1,215	6,927	21.3%	1,042	7,969	15.0%	1.4%
Delivery Vans	533	3,084	20.9%	701	3,785	22.7%	1,270	5,055	33.6%	1,401	6,456	27.7%	1.1%
Taxis / Maxis	1,721	10,411	19.8%	1,165	11,576	11.2%	899	12,475	7.8%	1,038	13,513	8.3%	2.4%
Auto Tempos	797	4,626	20.8%	529	5,155	11.4%	577	5,732	11.2%	291	6,023	5.1%	1.1%
Tractors	1,332	28,166	5.0%	1,318	29,484	4.7%	1,418	30,902	4.8%	1,686	32,588	5.5%	5.8%
Trailors	44	656	7.2%	117	773	17.8%	190	963	24.6%	295	1,258	30.6%	0.2%
Others	46	2,152	2.2%	601	2,753	27.9%	175	2,928	6.4%	462	3,390	15.8%	0.6%
Total	42,147	385,497	12.3%	51,560	437,057	13.4%	58,528	495,585	13.4%	70,090	565,675	14.1%	100.0%

Source: TA Consultants' analysis of data obtained from SGOU Website

Table B-4 Number of Registered Vehicles per 100,000 population at 2003

	Vehicle Category	All India Average	Uttaranchal
Private Vehicles	Two Wheelers	4,378	3,985
	Cars / Jeeps	652	430
Commercial Vehicles	Buses	57	36
	Goods Vehicles	327	173
	Taxis	82	136

Source: www.morth.nic.in

3. Road Transport Industry

18. Uttaranchal's State Road Transport Corporation (SRTC) operates passenger services on key routes across the State. The bulk of the freight and passenger services however, are provided by private operators under permits issued by the State transport authorities. These private operations are responsive to customer demand and they are not constrained by fixed schedules. The private passenger and freight transport operators have formed independent unions and associations to safeguard their interests and lobby the State government for various concessions.

19. SRTC operates bus services across Uttaranchal. In December 2005, the SRTC operated a fleet of 968 buses from 15 depots across the State[22]. These buses had an average utilization of 288 km per day and they ran at an average occupancy of 63%. Gross income from SRTC bus operations in 2005 was approximately $28.5 million, and during the year, monthly income increased by 27%. SRTC has embarked on a program to replace the aging bus fleet it inherited from Uttar Pradesh, and it is planned that the full fleet will have been replaced by the end of 2007. Although SRTC's bus operations are well used and show a healthy growth, these operations focus on the connecting the main population centers throughout Uttaranchal as well as serving Delhi and other important cities in the neighboring Uttar Pradesh.

20. Privately operated passenger transport predominates in the rural hill areas of Uttaranchal. These services often serve the smaller villages located off the main inter-town routes and they provide a more convenient service than that offered by the SRTC. In the hill areas, the private passenger services are provided by jeeps that are frequently grossly overloaded with passengers. Operators of these jeeps are free to set their own fares, within maximum and minimum limits prescribed by SRTC. There is also no State control over freight tariffs, which are market driven.

[22] Re. "Monthly Review of Uttaranchal Economy" for February 2006, published by The Centre for Monitoring Indian Economy.

4. Road Network

21. The road network administered by PWD presently comprises of:

National Highways (NHs)	1,328 km[23]
State Highways (SHs)	437 km
Major District Highways (MDHs)	1,369 km
Other District Roads (ODRs)	6,910 km
Village Roads (VRs)	5,631 km
Light Vehicle Roads	2,633 km
Total Length of motorable roads	18,308 km
Total Length managed by PWD	16,980 km[24] (excluding NHs).

22. In addition to the roads listed above, there are a further 1,195 km of NH's, SH's, MDRs and ODRs that are managed by the Border Roads Organization, as well as approximately 8,100 km of lower category roads managed by local authorities and other State Government departments.

23. In the PWD rural road network, only 103 km of roads have been constructed to a two lane standard with a carriageway width of 7.0 meters or more[25]. This length represents a meager 0.6% of the PWD road network. More than 97% of the PWD rural road network has been constructed to a single lane standard with a carriageway width of 3.75 meters or less[26]. In a planning study commissioned by PWD[27], only three roads totaling 150 km in length[28] were identified as requiring widening on traffic capacity grounds[29]. Daily traffic flows on the hill roads in Uttaranchal average around 500 vehicles per day for SHs; 300 vehicles per day for MDRs; and 150 vehicles per day for ODRs.

24. In total, 62% of the PWD road network has a bituminous or concrete surfacing, and the remaining 38% of the road length is un-surfaced. Table B-5 shows the proportions of surfaced and un-surfaced roads for the various road categories.

[23] The National Highways fall under the overall control of the National Highway Authority of India (NHAI), who have delegated maintenance responsibility to PWD.
[24] The road inventory details shown above were taken from more recent records held by PWD, than the District-wise breakdown shown in Table B-1. There are some differences in the total road lengths obtained from the two sets of data. This length excludes 3,881 km of walkways maintained by PWD.
[25] This excludes National Highways, where a further 455 km out of the total of 1,328 km has two or more lanes.
[26] Re. the PWD Road Network Development Master Plan dated November 2005.
[27] Strategic Options Study dated May 2005 and Pre-feasibility Study dated August 2005.
[28] Mussorie – Dehradun Road (SH- 31 km), Tehri – Ghansyali Road (MDR – 83 km) and Pithoragarh – Jhulaghat Road (ODR – 36 km).
[29] Re. Indian Roads Congress (IRC) : 64-1990 Guidelines for Capacity of Roads in Rural Areas and IRC: SP 48-1998 Hill Roads Manual. These standards set a maximum traffic threshold of 1,400 passenger car units (pcus) per day for a 3.75 metre wide single lane road in hill areas.

Table B-5 Type of Surface in the PWD Road Network in 2004/5

Road Category	Type of Road Surface expressed as % of Length		
	Surfaced	Un-surfaced	Total
State Highways (SHs)	100%	0%	100%
Major District Roads (MDRs)	99%	1%	100%
Other District Road (ODRs)	66%	34%	100%
Village Roads (VRs)	69%	31%	100%
Light Vehicle Roads (LVRs)	10%	90%	100%
Total PWD Road Network	62%	38%	100%

Source: PWD Road Network Development Master Plan (November 2005)

25. Condition surveys carried out in 2004 / 2005 over the full PWD road network showed that only 12% of the PWD road network was rated as being in good condition, 45% was in fair condition and 43% was in poor condition. Of the State Highways, 22% were in poor condition and this proportion increased in the lower category roads, with 42% and 76% of the village roads and light vehicle roads being in poor condition, respectively. A more detailed breakdown of the condition of the PWD road network is given below in Table B-6.

Table B-6 Condition of the PWD Road Network in 2004/5

Road Category	Condition Rating expressed as % of Length			
	Good	Fair	Poor	Total
State Highways (SHs)	32%	46%	22%	100%
Major District Roads (MDRs)	19%	75%	6%	100%
Other District Road (ODRs)	12%	48%	40%	100%
Village Roads (VRs)	13%	45%	42%	100%
Light Vehicle Roads (LVRs)	1%	23%	76%	100%
Total PWD Road Network	12%	45%	43%	100%

Source: PWD Road Network Development Master Plan (November 2005)

E. Improvement of Uttaranchal's Road Infrastructure

1. The Uttaranchal State Road Improvement Program (USRIP)

28. In support of its 'Infrastructure Vision', the SGOU has now embarked on the ambitious 10 year Uttaranchal State Road Improvement Program (USRIP), that will be implemented through its Public Works Department. It is SGOU's intention that the USRIP will cover improvement of the full length of the existing secondary and tertiary road network, and raise its condition up to a good or very good standard. The road improvement works would

generally be confined to the existing right-of-way (ROW) to minimize resettlement and environmental impacts. The initial stage I is planned to be implemented over a 4 year period and it will focus on the rehabilitation and reconstruction of the higher priority existing roads, having individual lengths in excess of 5km. Stage II will continue this theme over the next 3 years and cover further roads having individual lengths in excess of 5km. Stage III would then cover all secondary and tertiary roads shorter than 5km, as well as the balance of roads in the network, which have recently had (or will soon have) periodic maintenance treatment and which would be due more extensive improvement in the later years of the program. The scope and costs of the three stages of the USRIP are summarized below in Table B-7.

Table B-7 Scope of Uttaranchal State Road Improvement Program

Stage	Years	Road Length - Km	Cost $ million (at 2005 prices)
I	1 to 4	5,650	352
II	5 to 7	5,150	262
III	8 to 10	6,180	346
Total		16,980	960

Source: USRIP Master Plan

29. A master plan has recently been finalized, with the assistance of the TA, which defines the overall scope of each stage of the USRIP, as well as giving costs and priority rankings for individual road sub-projects. Schedules of the individual sub-projects identified for each of the four Projects in Stage I are given in Appendix F. It is envisaged that the master plan road priority lists would be reviewed annually, prior to selection of sub-projects for each subsequent Project.

2. Other Complimentary Road Improvement Programs

30. Uttaranchal embarked on its contribution to the national Pradhan Mantri Gram Sadak Yojana (PMGSY) program in 2000. This program is administered at the national level through the Ministry of Rural Development (MORD) and its objective is to connect villages and settlements to the respective state road networks by constructing all-weather roads. PWD is responsible for implementing the PMGSY program within Uttaranchal, and to date, roads to 93 of the 472 villages sanctioned for connections have been completed. PWD are planning to connect another 842 villages by 2010 and this would add around 3,500 km to the road network.

31. A program of improving and upgrading the National Highways within Uttaranchal is also being implemented under Phases III and IV of the National Highway Development Program (NHDP). Under Phase III, the 120 km long section of NH-72 within Uttaranchal will upgraded to 4 lane standard, by 2010. NH-72 is a main road link between the State Capital Dehradun and National Capital New Delhi. Under Phase IV, 640 km of single lane national highways will be upgraded to two lane standard and a further 780 km of two lane highway will be rehabilitated or repaired.

F. Financing the Road Improvement Plan

1. Existing Road Expenditure and Funding

32. Funding for the PWD's operations in the road sector originates from a combination of national and state level sources. The national sources include the Central Road Fund, as well as the Economic Importance and Inter-State Connectivity funds. In the current 2006/07 fiscal year, the State budget is contributing approximately 83% of the total PWD budget of Rs 7.0 billion ($159 million equivalent) and national funding makes up the balance of Rs 1.2 billion ($27 million). Table B-8 gives a breakdown of PWD budget allocations over the last 5 years[30] and this shows an increasing trend from 2003/04 onwards, with capital investment construction projects taking between 65% and 80% of total funding. In this current year, PWD's budget for road maintenance has more than doubled from $14.7 million to $32.5 million which demonstrates an increased focus on maintenance operations. It is estimated however, that the current road maintenance budget would cover around 70% of the network's requirement for routine and periodic maintenance. The current maintenance budget would however cover road maintenance requirements for the network in 2014, after completion of the planned Investment Program.

Table B-8 PWD Funding for the Road Sector ($ million)

	2002-03	2003-04	2004-05	2005-06	2006-07
Capital Investment	82.0	57.1	74.1	110.9	126.1
Maintenance	9.1	8.3	10.1	14.7	32.5
Establishment, Others	19.7	21.5	22.9	24.7	34.3
Total	**110.8**	**86.9**	**107.1**	**150.3**	**192.9**

Source: PWD

2. Revenue Earned by the Road Sector

33. In the period since 2000, direct revenue earned in the road sector through road tax, license fees, freight operator's licenses and passenger transport operator's licenses has been increasing steadily at an average rate of around 15%. This revenue amounted to $21.9 million in 2004-05, which was around 20% of the total expenditure budget for that year. The transport tax revenue goes into the State reserves and it is not ring fenced for the road sector.

3. Funding Requirements for the Road improvement Program

34. Annual state allocations to the PWD road network have increased by 120% since 2003. Central government funding to the national highways and PMGSY has also been increasing in line with the high priority given to alleviating rural poverty through provision of improved transport infrastructure. In the last two years, PWD's budget allocations for capital investment road improvement projects have been $110 million and $126 million, respectively. PWD's master plan for the USRIP shows implementation of the first two stages of the USRIP

[30] These budget allocations are for the PWD road network and they exclude central government funding for National Highways and PMGSY.

taking place between 2006 and 2013, which would require annual expenditures of around $120 million. Implementation of the first two stages of the USRIP would upgrade some 65% of the road network to a good or very good condition and eliminate the maintenance backlog on these roads. The additional expenditure required for the USRIP would double PWD's capital investment funding requirements and the SGOU, through GOI, have requested external funding from ADB.

G. Road Maintenance

35. Routine and periodic maintenance operations are restricted by under-funding as well as inefficient planning and implementation procedures. There are no formal planning procedures in place to prioritize maintenance needs across the network, and much of the maintenance operations are carried out either on a reactive basis, or to satisfy external pressure exerted by local residents or elected officials. Due to the lack of planning, maintenance operations tend to focus on the higher category roads in the network, which results in an increasing maintenance backlog and deteriorating condition on the less trafficked ODRs, as well as the VRs and LVRs.

36. Periodic maintenance is generally carried out by local contractors using mostly labor intensive, outdated and inefficient construction methods. The general practice of letting small contracts covering at most 2 or 3 km of re-surfacing provides no incentive to contractors to invest in modern construction plant which would raise production rates and improve quality.

37. The majority of routine road maintenance operations are now carried out by local contractors, albeit in small size contracts. PWD still has its own direct labor workforce, some 5,000 strong, which carries out operations such as temporary pot hole repairs, clearing of vegetation, removal of minor land slip debris and painting of road side signs and edge delineators. There has been a moratorium in place since 1990 on employing new maintenance labor and this workforce is reducing through natural attrition. PWD tend to use their own maintenance workforce in the higher, more remote areas, where local contractors are not so cost-effective. The PMGSY program requires its contractors to carry out road maintenance for 5 years after completion of construction, using a performance based specification. This form of road maintenance has been proved to be successful, and the use of performance based road maintenance contracts has been increasing in India. PWD intends to follow this trend and move towards letting area wide maintenance contracts, following the PMGSY model. This is a positive development and it would be expected to lead to increased cost efficiency and effectiveness of road maintenance operations.

EXERNAL ASSISTANCE TO THE ROAD SUB-SECTOR

A. Asian Development Bank

No.	Project Name	Type	Amount (S'000)	Date Approved
Technical Assistance				
0955	Road Improvement	PP	75	24 Feb 1988
1058	Pavement Management	A&O	490	3 Jan 1989
1059	Expressway System Planning	A&O	260	3 Jan 1989
1164	Second Road	PP	100	9 Jun 1999
1325	Vadodara-Bombay Expressway	PP	600	15 Jun 1990
1402	Pavement Management for National Highways	A&O	760	30 Oct 1990
1403	Private Sector Participation in Expressway Financing, Construction and Operation	A&O	500	30 Oct 1990
1404	Road Construction Industry	A&O	340	30 Oct 1990
1325	Vadodara-Bombay Expressway (Supplementary)	PP	250	19 Mar 1991
1678	Third Road	PP	250	26 Mar 1992
1942	Faridabad-Noida-Ghaziabad Expressway	PP	550	27 Aug 1993
1951	Bombay-Vadodara Expressway TA Project Environmental Impact Assessment	PP	90	10 Sep 1993
2001	Road Safety	A&O	210	29 Nov 1993
2002	Environmental Management of Road Projects	A&O	240	29 Nov 1993
2003	Technical Standards of Highway Concrete Structures	A&O	350	29 Nov 1993
2986	Western Transport Corridor-Facilitating Private Participation	PP	1,000	9 Feb 1998
3142	North-South Corridor Development in Bengal	PP	1,000	23 Dec 1998
3361	Capacity Building for Contract Supervision and Management in the National Highways Authority of India	A&O	600	22 Dec 1999
3365	Capacity Development for Social Development	A&O	800	23 Dec 1999
3445	Establishing a Public Private Joint Venture for West Bengal North-South Economic Corridor Development	A&O	150	25 May 2000
3538	Preliminary Engineering for the West Bengal Corridor Development	PP	150	13 Nov 2000
3539	Resettlement and Environmental Assessment for the West Bengal Corridor Development	PP	150	13 Nov 2000
3540	Economic and Poverty Analysis for the West Bengal Corridor Development	PP	150	13 Nov 2000
3724	Enhancing the Corporate Finance Capability of the National Highways Authority of India	A&O	700	20 Sep 2001
3751	Madhya Pradesh State Road Sector Development	PP	600	29 Oct 2001
3752	National Highway Corridor and Public-Private Partnership	PP	700	29 Oct 2001
3845	Madhya Pradesh State Road Development	PP	1,000	14 Mar 2002
3914	Economic Studies for the Rural Roads Sector Development	PP	150	3 Sep 2002
3915	Engineering Studies for the Rural Roads Sector Development	PP	150	3 Sep 2002
3916	Environmental Analysis for the Rural Roads Sector Development	PP	100	3 Sep 2002
3917	Institutional and Policy Development Studies for the Rural Roads Sector Development	PP	150	3 Sep 2002
3918	Social Analysis for the Rural Roads Sector Development	PP	150	3 Sep 2002
3995	Chhattisgarh State Roads Sector Development	PP	800	21 Nov 2002
4013	Institutional Strengthening and Capacity Building for Madhya Pradesh State Road Sector	A&O	1,500	5 Dec 2002
4036	National Highway Corridor (Sector)	PP	500	16 Dec 2002
4152	National Highway Sector II	PP	300	21 Jul 2003
4220	Rural Roads Sector II	PP	1,000	20 Nov 2003
4271	Development of High-Density Corridors under the Public-Private Partnership	A&O	700	18 Dec 2003
4355	High Priority National Highways	PP	1,000	8 Jul 2004
4378	Northeastern State Roads	PP	800	23 Aug 2004
4013	Institutional Strengthening and Capacity Building for Madhya Pradesh Road Sector (Supplementary)	A&O	600	29 Apr 2005

No.	Project Name	Amount ($ million)	Date Approved
Loans from Ordinary Capital Resources			
0918	Road Improvement	198.00	10 Nov 1988
1041	Second Road	250.00	30 Oct 1990
1274	National Highways	245.00	29 Nov 1993
1747	Surat-Manor Tollway Project	180.00	27 Jul 2000
1839	Western Transport Corridor	240.00	20 Sep 2001
1870	West Bengal Corridor Development	210.00	11 Dec 2001
1944	East-West Corridor	320.00	26 Nov 2002
1958	Madhya Pradesh State Roads Sector Development (Program Loan)	30.00	5 Dec 2002
1959	Madhya Pradesh State Roads Sector Development (Project Loan)	150.00	5 Dec 2002
2018	Rural Roads Sector I	400.00	20 Nov 2003
2029	National Highway Corridor (Sector) I	400.00	4 Dec 2003
2050	Chhattisgarh State Roads Development Sector	180.00	15 Dec 2003
2154	National Highway Sector II	400.00	21 Dec 2004
	Rural Roads Sector II Investment Program	750.00	23 Dec 2005

B. Other Funding Sources

Region / State	Project Name	Project Length (km)	Loan Amount (yen million)	$ Million Equivalent
Japan Bank for International Cooperation				
Uttar Pradesh	Mathura-Agra	51	4,855	43.3
Uttar Pradesh	Allahabad-Naini Bridge	5	10,037	89.6
Andhra Pradesh	Chilakaluripet-Vijayawada	83	11,360	101.4
Orissa	Jagatput-Chandikhol	33	5,836	52.1
Uttar Pradesh	Ghaziabad-Hapur	33	4,827	43.0

		Amount ($ million)		
		IBRD	IDA	Date Approved
Countrywide	Roads		72.11	1 Jun 1961
Bihur	Bihur Rural Roads		35.00	1 Nov 1980
Countrywide	National Highway	200.00		1 May 1985
Gujarat	Gujarat Rural Roads		119.60	1 Feb 1987
Countrywide	State Roads		80.00	1 Oct 1988
Countrywide	State Roads	170.00		1 Oct 1988
Countrywide	Second National Highways	153.00		1 May 1992
Countrywide	Second National Highways		153.00	1 May 1992
Countrywide	State Road Infrastructure Development Technical Assistance		51.50	1 Dec 1996
Andra Pradesh	State Highways	350.00		1 Jun 1997
Countrywide	Third National Highways	516.00		12 May 2000
Gujarat	Gujarat State Highways	381.00		15 Sep 2000
Countrywide	Grand Trunk Road Development	589.00		21 Jun 2001
Karnataka	Karnataka State Highways Improvement	360.00		24 May 2001
Kerala	Kerela State Transport	255.00		14 Mar 2002
Mizoram	Mizoram State Roads		60.00	14 Mar 2002
Uttar Pradesh	Uttar Pradesh State Roads	488.00		19 Dec 2002
Tamil Nadu	Tamil Nadu Road Sector	348.00		17 Jun 2003
Himachal Pradesh, Jharkhand, Rajasthan, Uttar Pradesh	Rural Roads	99.50	300.00	23 Sep 2004
Uttar Pradesh, Bihar	Lucknow-Muzaffarpur National Highway		465.00	21 Dec 2004

A&O = advisory and operational, IBRD = International Bank for Reconstruction and Development, IDA = International Development Association, PP = project preparatory
Sources: Asian Development Bank, Japan Bank for International Cooperation, and World Ban

SELECTION CRITERIA AND APPROVAL PROCESS FOR SUB-PROJECTS

A. General

1. The Investment Program will be carried out in accordance with implementation and safeguarding procedures established by the Uttaranchal State Public Works Department (PWD) for the Program, that have been agreed by the Asian Development Bank (ADB), together other guidelines and procedures required by ADB that are specific to the multi tranche financing facility (MFF), including those of the agreed environmental assessment and review framework (EAF) and the resettlement framework (RF).

B. Sub-project Selection Criteria

2. Selection and preparation of sub-projects in each of seven Projects will be the responsibility of the executing agency, the Uttaranchal State Public Works Department (PWD), assisted by its Project Management Unit (PMU). The following criteria will apply in selecting sub-projects intended for financing under the MFF:

(i) sub-projects will cover on-line road improvement works to existing State Highways (SHs), Major District Roads (MDRs), Other District Roads (ODRs), Village Roads (VRs) and Light Vehicle Roads (LVRs) in the Uttaranchal State road network administered by PWD;

(ii) sub-project roads shall be selected from the prioritized road lists prepared for the USRIP Master Plan, with precedence given to the highest ranking roads. These prioritized road lists are to be updated annually so that roads being improved under other funding can be deleted and new candidate roads proposed by the PWD Circle or Divisional can be ranked alongside the existing roads in the list;

(iii) sub-project roads are generally to be in excess of 5 km in length. Roads shorter than 5 km in length will only be considered for the USRIP if improvement would offer: (a) significant benefits to the road network; or (b) specific social benefits to disadvantaged groups of the population; or (c) improved access to firm local development proposals; or (d) improved access to identified tourist sites.

(iv) consultation with local communities should show a majority opinion in favor of the improvement of each road;

(v) sufficient counterpart funding will be allocated by the SGOU to cover the implementation of the sub-project as scheduled and to maintain the road;

(vi) all necessary central and state government approvals will have been obtained.

C. Prioritization of Sub-projects

3. Any new sub-projects nominated for inclusion in the Investment Program shall be prioritized in accordance with the multi-criteria ranking method set out in PWD's Pre-feasibility Study report dated August 2005. The weighted scoring system to be used for the ranking is given below in Table D-1 and further details of the scoring methodology are given in the Pre-Feasibility Study report.

Table D-1 Weighted Scoring System for Sub-project Prioritization

Sl. No.	Parameter		Score	Max. Score
1.	Type of Road	ODR	5	5
		VR	3	
		LVR	1	
2.	Road length		5	5
3.	Population	Total population per km	17	25
		% of SC/ST population	8	
4.	Road condition	Bituminous – poor	15	15
		Bituminous – fair	7.5	
		Bituminous – good	3.75	
		Gravel	15	
		Earthen	15	
5.	Existing pavement width	3.75m	5	5
6.	Existing formation width	5.95m	15	15
7.	Connectivity		5	5
8.	Forest area		5	5
9.	Agriculture area		8	8
10.	Industries		4	4
11.	Fruits/vegetables production		8	8
Total Score			**100**	**100**

Source: PWD Pre-Feasibility Report dated August 2005

D. Approval Process for Sub-projects

3. Approval procedures for sub-projects intended for financing under the MFF will be as follows:

(i) the PMU will carry out an annual review of the master plan road lists, consult with the PWD Circle and Divisional offices and update the road lists as required. Proposals for the sub-projects to be adopted in each implementation will then be prepared by the PMU and submitted to PWD;

(ii) PWD will review the PMU proposals, check compliance with the selection criteria, verify that no other road improvement works have been sanctioned on the sub-project roads from other funding and confirm that adequate counterpart funding can be secured from SGOU to cover the full implementation of the proposed Project;

(iii) the SGOU, through PWD will submit the sub-project proposals it intends to implement under each MFF loan to ADB for review and approval, before formally approving each Project for implementation.

E. Monitoring during Implementation

4. Adherence to operating guidelines established by PWD will be monitored by the Program Steering Committee (PSC) in respect of items including implementation progress, quality control, accounting and safeguard compliance.

DESIGN STANDARDS AND TECHNICAL FEATURES OF SUB-PROJECTS

A. General

1. The general philosophy for the design of all road improvement works to be implemented under the Multi-tranche Financing Facility (MFF) provided by the Asian Development Bank (ADB) is to provide cost effective works that are appropriate for the category of each road and its status in the district network, which result in quantifiable benefits in terms of improved access and savings in transport costs, and which minimize resettlement and environmental impacts.

B. Design Standards for Investment Program Roads

2. The design of the road improvement works shall follow the general strategy established by PWD for USRIP road improvement works which defines instances where engineered horizontal and vertical alignments are required and gives guidance on minimum standards of road pavement design. Deviations should only be made from this design strategy where there are sound, justified specific reasons for doing so.

3. The road improvement works shall generally be designed in accordance with design standards and guidelines published by the Indian Roads Congress (IRC), where appropriate. The applicable IRC standards would include the following:

(i) IRC: 73-1980 Geometric Design Standards for Rural (Non urban) Highways;

(ii) IRC: 52-2001 Recommendations about the Alignment Survey and Geometric design of Hill Roads;

(iii) IRC: 64-1990 Guidelines for Capacity of Roads in Rural Areas

(iv) IRC: SP 23-1983 Vertical Curves for Highways;

(v) IRC: SP-48-1998 Hill Road Manual.

C. General Design Requirements

4. The design of the road improvement works will comply with the following general design requirements:

(i) road improvement works on the selected roads shall be chosen so that they offer cost effective solutions that (a) are in accordance with PWD's design strategy; (b) minimize resettlement; (c) minimize environmental impacts;

(ii) road improvement works on selected sub-project roads should generally avoid any realignments that involve cutting into unstable hill slopes;

(iii) road improvement works on selected sub-project roads shall only include carriageway widening where this is justified on traffic capacity grounds;

(iv) on single lane hill roads, the minimum carriageway width shall be 3.75 meters and 3.00 metres, for ORDs and VRs/LVRs, respectively. Shoulder widths shall be selected to generally utilize the available platform width;

(v) locally available pavement construction materials shall be utilized wherever possible;

(vi) the embankments of roads in the plains shall be raised where necessary to ensure that subgrade level is at least 0.6 meters above highest flood level or standing water level; ;

(vii) slope stabilization measures and measures to prevent debris falling on the road shall be incorporated, using cost effective means, wherever appropriate;

(viii) side drainage and cross drainage means shall be provided wherever necessary to ensure all-weather connectivity and to prevent damage of the road pavement through erosion from surface water run-off;

(ix) safety features shall be provided wherever necessary that shall include guard rails with reflectors, road edge delineators etc.;

(x) road markings and signs shall be provided to give clear notification of traffic priorities and give way requirements at junctions;

(xi) road furniture including reflectorized warning signs and direction signs, kilometer posts shall be provided.

SCHEDULES AND ESTIMATED COSTS OF SUB-PROJECTS SELECTED FOR PROJECTS 1, 2, 3 AND 4

Project 1

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Almora		SH	Almora	Bageshwar	72.0	72.9	459.8
Almora		MDR	Raniket	Mohan	70.2	70.2	291.4
Almora		SH	Barechhina (Almora)	(Sheraghat Berinag)	42.0	42.3	203.1
Bageshwar		MDR	Udiyari Bend (Berinag	Kanda Bageswar)	25.0	25.7	164.3
Chamoli		ODR	Nandprayag	Ghat	18.5	18.5	57.1
Chamoli		ODR	Rudrprayag	Pokhri	14.5	14.5	48.8
Champawat		VR	Pula	Chamdewal Silling	6.5	6.5	30.7
Champawat		VR	Lohaghat	Choumel	7.5	7.500	21.8
Champawat		VR	Tuligarh	Bhairav Mandir	6.3	6.300	125.0
Champawat		VR	Kakrali	Thuligarh	13.0	13.000	207.2
Dehradun		MDR	Kalsi	Chakrata	41.6	41.57	133.4
Nainital		ODR	Betalghat	Bhatrojkhan	16.7	16.7	46.7
Nainital		VR	Nathuakhan	Suyalbadi	29.0	29.0	104.1
Pauri		ODR	Pathradkhal	Umrasu	18.0	17.99	52.8
Pauri		ODR	Pauri	Srinagar	42.0	18.0	43.4
Pauri		ODR	Fatehpur	Lansdowne	22.0	21.8	42.8
Pithoragarh		SH	Udiyari Bend	Thal	22.0	22.0	136.3
Rudrprayag		ODR	Jakholi	Guptkashi	54.3	13.1	57.4
USNagar		ODR	Zafarpur	Gularbhoj	13.8	13.8	65.8
USNagar		ODR	Jaitpur	Dhanori	10.8	10.8	67.6
USNagar		ODR	Mukandpur	Dhakiya Gulabo	25.0	25.0	143.4
Uttarkashi		ODR	Naugaon	Purola	19.0	17.89	30.4
Uttarkashi		ODR	Kuwa-Kafnol	Rarhi	48.0	47.55	78.9
			Total for Project 1			**572.6**	**2,612.2**

Project 2

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Almora	Hawalibagh	MDR	Almora	Baijnath	56.0	56.0	126.8
Bageshwar	Bageshwar	ODR	Kalnaband	Pantkwerali	7.0	7.0	25.2
Bageshwar	Bageshwar	VR	Kafligair	Kholseer	8.0	8.0	19.3
Chamoli	Dasoli	ODR	Poukhri	Gopeshwar	24.4	24.4	52.6
Chamoli	Gaisain	VR	Bachhuaban	Kuligrad	19.6	19.6	47.4
Chamoli	Dasoli	ODR	Gopeshwar	Devarkhadora	10.0	10.0	25.6
Champawat		MDR	Loharghat	Valikh	54.4	48.4	109.6
Dehradun	Chakrata	ODR	Moori	Tayoni	20.0	20.0	43.1
Dehradun	Chakrata	ODR	Chakrata	Lakhamandal	65.5	16.2	58.3
Haridwar		MDR	Narsan	Puhana	29.65	29.7	40.7
Haridwar	Bahadarabad	VR	Bahedi	Rajputana	6.0	6.0	7.7
Haridwar	Bahadarabad	VR	Piran Kaliyar	Daluwalakala	5.0	5.0	6.4
Haridwar	Bahadarabad	VR	Aneki	Gadhmirpur	6.0	6.0	7.7
Haridwar	Narsan	ODR	Manglore	Landhora	7.6	7.6	10.2
Haridwar	Narsan	VR	Delhi- Nitipass	Nasirpur	7.3	7.3	9.4
Haridwar	Roorkee	VR	Aasafnagar	Ikbalpur	10.5	10.5	13.5
Nainital		SH	Haldwani	Matkota	25.5	25.5	120.0
Nainital	Okkhalkhand	VR	Bhidapani	Josyuda	5.0	5.0	12.1
Nainital	Okkhalkhand	VR	Maurnela	Majhola	7.0	7.0	13.4
Pauri		MDR	Duggada	Laxmanjhula	114.0	84.0	219.2
Pauri		ODR	Dumakot	Duggada	86.5	86.5	262.5
Pauri	Dugadda	ODR	Kodiya	Kimsar	22.0	21.0	75.7
Pauri	Dugadda	ODR	Kotdwar	karnwashram	13.5	10.5	22.6
Pauri	Dugadda	ODR	Kotdwar	Pulinda	21.7	21.7	64.5
Pauri	Pauri	ODR	Betal	Advani	38.8	38.8	137.0
Pauri	Dugadda	LVR	Nathukhal	Simlana	5.7	5.7	13.8
Pauri	Dugadda	ODR	Hanumanti	Fatehpur	6.7	6.7	14.4
Pauri	Kot	ODR	Nahsen	Khanda	25.0	25.0	90.1
Pauri	Pauri	ODR	Pauri	Ghinvada	26.0	26.0	77.8
Pauri	Dugadda	ODR	Siddhbali	Kumbhichod	5.0	5.0	10.8
Pauri	Dugadda	ODR	Kaudiya	Motadhank	7.2	7.2	15.5
Pauri	Dugadda	ODR	Ramnagar	Kotdwar	37.3	37.3	98.9
Pauri	Dugadda	LVR	Raghubal	Chaukhri Khet	5.0	5.0	12.1
Pauri	Dugadda	LVR	Paukhal	Maundai	5.0	5.0	12.1
Pithoragarh		ODR	Pithoragarh	Julaghat	36.0	36.0	77.6
Pithoragarh		MDR	Thal	Jauljibi	34.0	34.0	77.0
Pithoragarh		MDR	Thal	Berinag	30.0	30.0	67.9
Rudrprayag	Jakholi	VR	Mayali	Jakholi	8.2	8.2	15.7
Rudrprayag	Agustmuni	VR	Agastmuni	Ganeshagar	7.8	5.8	13.9
Rudrprayag	Ukimath	ODR	Jokholi	Bhiri	38.3	38.3	138.2
Tehri		SH	Kirtinagar	New Tehri	80	80.0	253.6
Tehri		MDR	NewTehri	Ghansyali-Tilwara	86.0	86.0	194.7
Tehri		MDR	Chamba	Mussorie	54.0	16.0	36.2
Tehri	Kirtinagar	ODR	Kirtinagar	Sorakhal	59.0	48.0	158.5
Tehri	Kirtinagar	ODR	Kirtinagar	Dangdhari	22.0	22.0	72.1
Uttarkashi		MDR	Bhaldiana	Uttarkashi	75.0	75.0	169.8
Uttarkashi	Naugaon	ODR	Naugaon	Rajgarhi	30.0	30.0	79.9
Uttarkashi	Dunda	ODR	Dunda	Fold	21.5	21.5	61.6
Uttarkashi	Purolla	ODR	Purola	Jarmola Moree	34.5	34.5	74.3
			Total for Project 2			**1,269.7**	**3,367.0**

Project 3

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Almora	Dhauladevi	ODR	Suakhan	Chalnichhena	10.0	10.0	33.2
Almora	Tarikhet	ODR	Siuni	Silore Mahadev	20.0	15.5	55.9
Almora	Chaukutiya	ODR	Chokhatiya	Bachhuvaban	10.0	9.0	32.5
Almora	Takula	ODR	Someshwar	Girichhina	10.0	10.0	34.6
Almora	sult	ODR	Chamkhala	Dabhra	9.4	5.4	19.5
Almora	sult	VR	Harda	Bhikiyasain	12.0	12.0	29.0
Almora	Tarikhet	ODR	Ganiadeoli	Amyari	11.8	8.4	30.3
Almora	Tarikhet	ODR	Ganiadeoli	Vishalkot	10.0	10.0	36.1
Bageshwar	Garur	VR	Bajinath	Gwaldam	19.0	19.0	45.9
Bageshwar	Kapkot	ODR	Shamaniti	Liti Gogina	11.0	11.0	39.7
Bageshwar	Kapkot	ODR	Liti Market	Liti village	5.0	5.0	18.0
Bageshwar	Bageshwar	VR	Bageshwar MDR 17	Kapkot	24.0	24.0	58.0
Chamoli	Dasoli	ODR	Chamoli	Guptakashi	49.0	38.0	81.9
Chamoli	Pokhari	ODR	Pokhri	Karnaprayag	25.8	25.8	55.6
Chamoli	Pokhari	ODR	Pokhri	Gopeshwar	36.0	36.0	77.6
Chamoli	Tharali	ODR	Tharali	Ghat	10.0	10.0	36.1
Chamoli	Dasoli	VR	Chamoli	Sartoli	10.0	10.0	23.2
Champawat	Lohaghat	VR	Kimtoli	Pulla	5.0	5.0	9.6
Champawat	Champawat	ODR	Laluapani	Banlekh	8.3	8.3	17.9
Champawat	Champawat	VR	Champavat Manch	Tamali	52.5	15.5	37.5
Champawat	Champawat	VR	Narsingh Danda	Guroli	7.0	7.0	16.4
Champawat	Champawat	VR	Punave Sipti	Sandark	6.0	5.0	12.1
Champawat	Lohaghat	LVR	P.C.S.	Mandalak	12.0	12.0	29.0
Champawat	Champawat	VR	Sukhidhang	Shyamalatal	5.5	5.5	10.5
Dehradun	Chakrata	ODR	Minas	Atal	5.0	17.0	61.3
Dehradun	Chakrata	ODR	Kharsi (Link Marg)	-	24.8	15.8	56.8
Dehradun	Chakrata	ODR	Tyoni	Kathiyan	30.0	15.0	54.1
Dehradun	Kalsi	ODR	Sahiya	Kwanu	9.3	5.0	18.0
Dehradun	Kalsi	LVR	Koti	Gram Saradi (Sampark Marg)	8.0	8.0	19.3
Dehradun	Chakrata	LVR	Chakrata	Newra	6.5	6.5	15.7
Dehradun	Kalsi	LVR	Lalpool	Bisnoi	6.5	6.5	15.7
Haridwar	Bahadarabad	VR	Ruhalki	Sehedevpur	5.1	5.1	6.6
Haridwar	Bahadarabad	VR	Gaindikhatan	Laldhang	9.9	9.9	13.1
Haridwar	Bahadarabad	VR	Aurangabad	Teliwala	6.0	6.0	8.2
Haridwar	Bahadarabad	VR	Piran Kaliyar	Mujahidpur Sattiwala	15.9	15.9	20.5
Haridwar	Laksar	VR	Raysi	Bhogpur	9.5	9.5	12.2
Haridwar	Bhagwanpur	ODR	Bhagwanpur	Bhalsvagaj	11.6	11.6	15.6
Haridwar	Bhagwanpur	ODR	Bhagwanpur Sikroda	Khedi Shikohpur	13.5	13.5	18.2
Haridwar	Bhagwanpur	VR	Bhagwanpur	Bahedi	9.6	9.6	12.4
Nainital	Haldwani	VR	Haripur	Bachhi	12.7	11.7	22.4
Nainital	Haldwani	VR	Madanpur	Kholia	13.4	13.4	25.7
Nainital	Dhari	VR	Kasiyalekh	Supi	10.5	10.5	24.9
Nainital	Bhimtal	LVR	Mangoli	Khamari	5.0	5.0	12.1
Nainital	Ramgarh	ODR	Malla-Talla	Nathuvkhan	16.0	16.0	34.5
Nainital	Dhari	VR	Kalapataal	Saliyakot	7.8	7.8	18.7
Nainital	Haldwani	VR	Chandni Chak	Haripur Jaman	6.0	6.0	11.5
Nainital	Ramgarh	VR	Odakhan	Pasiyapani	12.0	12.0	29.0
Nainital	Okkhalkhand	VR	Kunwar Band	Dholigaon	7.0	7.0	13.4
Nainital	Kotabagh	LVR	Pangot	Kunjkhorak	23.0	23.0	55.6
Nainital	Dhari	VR	Kashiya Lekh	Dhari	13.0	13.0	30.9
Pauri	Dwarikhal	VR	Chailusain	Singtali	40.0	40.0	93.9
Pauri	Rikhanikhal / Bironkhal	ODR	Rikhnikhal	Birokhal	32.5	32.5	115.7
Pauri	Dwarikhal / Jahrikhal	VR	Satpuli	Dudharkhal	25.0	25.0	54.7
Pauri	Dwarikhal / Jahrikhal	ODR	Satpuli	Sisaldi	22.5	22.5	74.6
Pauri	Kaljikhal	VR	Bhedakhal	Khanda	10.6	10.6	25.6
Pauri	Dwarikhal	ODR	Gumkhal	Singtali	20.0	20.0	43.1
Pauri	Yamkeshwar	VR	Naugaonkhal	Tunakhal	22.3	7.3	17.7
Pauri	Kaljikhal	ODR	Pipla	Teka	15.0	5.0	18.0
Pauri	Yamkeshwar	VR	Nalikhal	Pokhrikhet	9.6	9.6	22.8
Pauri	Nainidanda	VR	Khaludanda	Apolosera	12.0	10.0	24.2

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Pauri	Dwarikhal	ODR	Nalikhal	Banchuri	27.0	15.0	54.1
Pauri	Yamkeshwar	VR	Pipalkoti	Mahadev	5.3	5.3	10.1
Pauri	Dwarikhal	VR	Chailusain	Devikhet	10.0	10.0	23.7
Pauri	Dwarikhal / Jahrikhal	VR	Sisaldi	Satpuli	10.0	10.0	23.2
Pauri	Dwarikhal	ODR	Matiyali	Dwarikhal	19.0	19.0	64.2
Pauri	Bironkhal	VR	Soparkhal	Lalitpur	19.0	19.0	45.9
Pauri	Rikhnikhal/Birokhal/Thalisen	ODR	Rikhanikhal	Thalisain	58.0	21.0	75.7
Pauri	Rikhanikhal	VR	Dudharkhal	Tadkeshwar	6.0	6.0	14.0
Pauri	Kot	VR	Sabdarkhal	Kundadhar	8.0	8.0	19.3
Pauri	Dugadda	LVR	Simliya (Sampark Marg)	-	12.0	12.0	29.0
Pauri		ODR	Satpuli	Pokhara	51.0	51.0	89.4
Pauri	Kaljikhal	LVR	Banekh	Thapala	11.2	11.2	27.1
Pauri		SH	Chipalghat	Chaurikhal	45.0	45.0	211.8
Pauri	Dwarikhal / Jahrikhal	ODR	Dotiyal	Basda	26.5	26.5	95.5
Pithoragarh	Munakot	VR	Satsiling	Thal	50.0	50.0	120.9
Pithoragarh	Bin	ODR	Pithoragarh	Bans	20.0	20.0	48.9
Pithoragarh	Bin	VR	Chandak	Chera - Digtoli	5.0	5.0	9.6
Pithoragarh	Berinag	SH	Sheraghat	Udiyari Bend	44.0	44.0	174.2
Pithoragarh	Munakot	VR	Aicholi	Simalkote	5.0	5.0	12.1
Rudrprayag	Agustmuni	LVR	Raitoli	Jasoli	20.0	20.0	48.4
Rudrprayag	Agustmuni	ODR	Rudraprayag	Pokhri	35.0	35.0	75.4
Rudrprayag	Ukimath	ODR	Chamoli	Guptkashi	35.3	35.3	76.1
Tehri	Devprayag	VR	Roadhar	Gaumukh	14.5	14.5	31.8
Tehri	Devprayag	ODR	Bagwan	Jammikhal	25.0	25.0	88.0
Tehri	Devprayag	ODR	Lachhmoli	Jamni khal	32.0	32.0	115.4
Tehri	Kirtinagar	ODR	Kilkalashwar	Silkhakhal chonikhal	23.0	23.0	75.7
Tehri	Jakhindar	ODR	Pratap nagar	Tehri	36.0	10.0	34.6
Tehri	Juanpur	ODR	Sawakholi	Thatyur	22.0	22.0	47.4
Tehri	Bhilangana	VR	Chatiyara	Kepars	12.0	12.0	29.0
Tehri	Bhilangana	ODR	Ghansali	Ghuttu	31.3	9.0	29.6
Tehri	Kirtinagar	VR	Duggdda	Saur pipaldhar	21.0	12.0	27.5
Tehri	Juanpur	ODR	Kempty	Chadogi	21.8	21.8	62.6
Tehri	Bhilangana	VR	Sendul	Patur Gaon	10.0	10.0	24.2
Tehri	Narendranagar	ODR	Agrakhal	Deoli	13.3	5.0	18.0
Tehri	Pratapnagar	ODR	Jajal Gaja	Devprayag	70.5	70.5	151.9
Tehri	Juanpur	ODR	Aglar	Thathyar	42.5	14.5	52.3
USNagar	Rudrapur	ODR	Kitcha	Dareu	2.9	14.4	19.5
USNagar	Khatima	VR	Pahmia	Sripur Bicchu	11.0	11.0	14.2
USNagar	Sitarganj	VR	Sitarganj	Nakulia	11.0	11.0	14.2
USNagar	Kashipur	VR	Kashipur	Mahna Khera	11.0	13.0	16.7
USNagar	Bajpur	ODR	Kehsowala	Belpadav	9.0	9.0	12.2
USNagar	Bajpur	VR	Rajpura	Baitkhedi	7.6	17.7	22.8
USNagar	Rudrapur	VR	Lalpur	Nagla	9.6	9.6	12.4
USNagar	Rudrapur	VR	Bhorna Remi Channarpur	Madkota	7.0	7.0	9.0
USNagar	Rudrapur	ODR	Godhpuri Viru	Nagala	3.6	5.0	6.8
USNagar	Rudrapur	VR	Azadnagar	Brolrlpur	7.0	7.0	9.0
USNagar	Gadarpur	VR	Sardarnagar	Banna Kheda	10.0	17.7	22.8
USNagar	Gadarpur	VR	Manunagar Marg	Mehtosh	3.9	5.0	6.4
USNagar	Rudrapur	VR	Simla Pistore	Karia	9.0	9.0	11.5
Uttarkashi	Purolla	VR	Purola	Gadoli	12.5	12.5	29.0
Uttarkashi	Chnyalisur	ODR	Silkiyara	Sarot	79.1	77.1	259.1
Uttarkashi	Naugaon	VR	Naugaon	Syuri	12.0	7.0	16.9
Uttarkashi	Chnyalisur	ODR	Dharasu	Jagoth	33.7	18.2	65.6
Uttarkashi	Purolla	VR	Purola	Dharoli	12.0	12.0	27.0
Uttarkashi	Dunda	VR	Dhauntari	Thandi	11.0	11.0	23.6
Uttarkashi	Mori	ODR	Moree	Netvad	34.5	34.5	74.3
			Total for Project 3			**1,843.3**	**4,765.6**

Project 4

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Almora	Tarikhet	ODR	Tarikhet	Mangurkhan	10.7	10.7	39.5
Almora	Chaukutiya	ODR	Chokhutiya	Tadagtal	7.0	5.0	16.6
Almora	dwarahat	ODR	Binta	Gagas	13.1	13.1	28.2
Almora	Dhauladevi	ODR	Dholadevi	Kheti	13.1	13.1	39.3
Almora	Bhatroj khan/Bhikiyasen	ODR	Bhatraungkhan	Ganai	58.0	46.0	99.1
Almora	Bhikiyasen	ODR	Daula	Sinar	7.0	7.0	25.2
Almora	Bhikiyasen	ODR	Jalikhan	Nobada	12.1	12.1	43.6
Almora	sult	ODR	Marchula	Deghat	83.4	83.4	211.6
Almora	Dhauladevi	ODR	Panuvanoola	Vrudh Jageshwar	9.0	9.0	32.4
Almora	Bhikiyasen	VR	Bhikiyasen	Jeena Pani	5.0	5.0	12.1
Almora	Takula	VR	Kapadkhan	Binsar	11.0	11.0	21.1
Bageshwar	Garur	VR	Garur	Dhana Lakhani	5.0	5.0	12.1
Bageshwar	Bageshwar	VR	Bageshwar	Dafot	15.0	15.0	36.3
Bageshwar	Bageshwar	ODR	Josigaon	Paldichhena	22.0	22.0	79.3
Chamoli	Karanprayag	ODR	Sonla-Kothli	Narayan Bagadh	28.5	16.0	54.8
Chamoli	Ghat	ODR	Ghat	Tharali	16.5	16.5	59.5
Chamoli	Dasoli	ODR	Birhi	Gonna	13.0	13.0	28.0
Chamoli	Gaisain	LVR	Sarkot (Sampark Marg)	-	6.0	6.0	14.5
Chamoli	Dewal	ODR	Gwaldam	Nandkeshri	18.0	18.0	60.5
Chamoli	Dewal	VR	Mundoli	Van	19.5	19.5	47.1
Champawat	Barakot	VR	Lohaghat	Simalkhet	38.1	21.0	50.8
Champawat	Lohaghat	VR	Lohaghat	Mayawati	8.6	8.6	16.5
Champawat	Pati	ODR	Dhunaghat	Reetha		38.0	137.0
Champawat	Pati	VR	Chinkachina	Simalkhet	22.1	22.1	42.4
Dehradun	Chakrata	VR	Kanda	Birnad	8.5	8.5	18.0
Dehradun	Sahaspur	VR	Chharba	Horawala	2.6	16.4	31.4
Dehradun	Doiwala	ODR	Doiwala	Dodhali	9.4	9.4	20.1
Dehradun	Sahaspur	VR	Hathi	Badkala	4.2	5.0	9.6
Dehradun	Vikasnagar	VR	Barotiwala	Vikasnagar	4.8	8.0	15.3
Dehradun	Sahaspur	VR	Bhaowala	Horawala	11.0	11.0	21.1
Dehradun	Kalsi	LVR	Kotha Band	Dhwairalani	13.5	13.5	32.6
Dehradun	Vikasnagar	LVR	Lagha	Tauli	6.0	6.0	11.5
Haridwar	Narsan	VR	Delhi- Nitipass	Khedajat	7.0	7.0	9.0
Haridwar	Narsan	ODR	Upper Ganga Canal	Limbarhedi	5.6	5.6	7.6
Haridwar	Bhagwanpur	VR	Jalalpur	Patti Dada	5.0	5.0	6.4
Haridwar	Roorkee	VR	Roorkee	Ikbalpur	6.3	6.3	8.1
Haridwar	Bhagwanpur	VR	Biharigadh	Buggawala	9.0	9.0	11.6
Haridwar	Laksar	ODR	Solani	Manglore	6.5	6.5	8.8
Haridwar	Laksar	VR	Sultanpur	Nihandpur	5.0	5.0	6.4
Haridwar	Bhagwanpur	VR	Chudiyala	Bindukhadak	6.4	6.4	8.2
Nainital	Okkhalkhand	LVR	Dalkanya	Lwardoba	11.0	11.0	26.6
Nainital	Bhimtal	LVR	Jungliya Gaon	Kailash	5.0	5.0	12.1
Nainital	Ramgarh	VR	Talla Ramgarh	Ratighat	8.0	8.0	19.3
Nainital	Okkhalkhand	LVR	Similiya	Sanni	9.0	9.0	21.8
Nainital	Haldwani	ODR	Uchhatar	Lamuchaur	6.7	6.7	14.4
Nainital	Ramgarh	VR	Nathuakhan	Jaurasi	14.0	14.0	30.3
Nainital	Okkhalkhand	VR	Padampuri	Kathgodam	35.0	12.0	26.0
Nainital	Ramgarh	VR	Nathuakhan	Pyuda	12.5	12.5	26.7
Nainital	Okkhalkhand	ODR	Mornola	Bhidapani	8.0	8.0	17.2
Nainital	Ramgarh	VR	Mukteshwar	Shitala	9.8	9.8	20.2
Nainital	Ramgarh	ODR	Mukteshwar	Banglow (Approach Road)	6.7	6.7	14.4
Pauri	Kaljikhal	LVR	Bunga	Saknikhet	14.0	9.0	21.8
Pauri	Kaljikhal	LVR	Aneth	Nansu	8.0	8.0	19.3
Pauri	Dwarikhal/Yamkeshwar	ODR	Chelusen	Ghattugad	14.5	14.5	43.6
Pauri	Kaljikhal	LVR	Kaljikhal	Nalai	15.1	5.1	12.3
Pauri	Kaljikhal	LVR	Nauli (Link Road)	-	5.0	5.0	12.1
Pauri	Rikhanikhal	ODR	Banjadevi	Rikhnikhal	27.0	27.0	89.4
Pauri	Dugadda	VR	Nimbu Choud	Chilarkhal	5.0	5.0	12.1
Pauri	Khirsu	ODR	Khanda	Budhani	18.0	18.0	57.6

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Pauri	Ekeshwar	VR	Satpuli	Chauvahakhal	35.3	35.3	67.6
Pauri	Dwarikhal	ODR	Paukhal	Bhambasi	22.0	22.0	77.5
Pauri	Dwarikhal	ODR	Kandakhal	Chelusen	15.5	15.5	55.9
Pauri	Rikhanikhal	VR	Rikhnikhal	Chhanikhal	11.4	11.4	27.6
Pauri	Ekeshwar	LVR	Berikhal	Jandadevi	12.0	12.0	29.0
Pauri	Bironkhal	ODR	Baijrow	Bachuwban	63.0	15.0	54.1
Pauri	Ekeshwar	LVR	Patisen	Ekeshwar	6.8	6.8	16.4
Pauri		ODR	Dugadda	Rathwadhav	75.0	75.0	218.7
Pauri	Kot	LVR	Danda	Umrasu	5.2	5.2	12.5
Pauri		VR	Chargad	Jharpali	7.0	7.0	16.9
Pauri	Rikhanikhal	LVR	Kandalsera	Dwari	6.0	6.0	14.5
Pauri	Rikhanikhal	LVR	Basda	Badkhet	5.0	5.0	12.1
Pauri	Dwarikhal	LVR	Banchuri	Timali	5.5	5.5	13.3
Pauri		ODR	Sungarkhal	Jwalpadevi	35.0	35.0	94.3
Pauri	Jahrikhal/Rikhnikhal	VR	Gumkhal	Lansdowne	9.6	9.6	18.4
Pauri	Yamkeshwar	LVR	Bukandi (Sampark Marg)	-	9.0	9.0	21.8
Pauri	Yamkeshwar	LVR	Timalyani (Sampark Marg)	-	9.0	9.0	21.8
Pauri	Khirsu	VR	Budhani	Chamdhar	14.0	14.0	33.8
Pauri		VR	Premnagar	Bubakhal	6.0	6.0	14.5
Pauri	Jahrikhal	LVR	Chametha	Buchchakhal	8.0	8.0	19.3
Pauri	Jahrikhal	LVR	Sauliband	Samkhal	7.0	7.0	16.9
Pauri	Dwarikhal/Yamkeshwar	LVR	Devikhet	Syalana	5.0	5.0	12.1
Pauri	Rikhanikhal	LVR	Part between Dudharkhal - Dharkot Marg	Dharkot	17.1	17.1	41.2
Pauri	Dwarikhal	LVR	Ringaalpani	Gwil	6.5	6.5	15.7
Pauri	Jahrikhal/Rikhanikhal	LVR	Vishgadi	Kamalkhet	5.0	5.0	12.1
Pauri	Khirsu	VR	Kwisu	Sumadi	5.0	5.0	9.6
Pauri	Rikhanikhal	LVR	Timalsain	Baanisain	6.0	6.0	14.5
Pauri	Rikhanikhal	LVR	Badkhet	Timalsain	5.0	5.0	12.1
Pauri	Rikhanikhal	LVR	Khimakhet	Takolikhal	5.0	5.0	12.1
Pauri	Nainidanda	VR	Dhumakot	Nainidanda	13.5	13.5	32.6
Pauri		ODR	Chaubattakhal	Chaurikhal	27.3	27.3	83.9
Pauri		VR	Dungripanth	Chandikhal	15.5	15.5	37.5
Pauri	Yamkeshwar/ Dwarikhal	LVR	Jakhnikhal	Vyasghat	10.5	10.5	22.6
Pauri		MDR	Pokhara	Baijrow	36.4	36.4	82.4
Pithoragarh	Munakot	VR	Marhmanley (PWD const)	Ghurchu	15.0	15.0	36.3
Pithoragarh	Munakot	VR	Munkot	Jakhpant	11.0	11.0	26.6
Pithoragarh	Kalichhina	VR	Dewalthal	Kanalichhina	16.0	16.0	36.7
Pithoragarh	Berinag	VR	Satsiling	Singoli	15.0	15.0	31.2
Pithoragarh	Berinag	VR	Guptari	Patal Bhuwaneshwar	8.0	8.0	15.3
Pithoragarh	Munakot	VR	Aicholi	Barawa	23.0	23.0	44.8
Pithoragarh	Didihat	VR	Pamotari	Bhatar	6.0	5.0	12.1
Pithoragarh	Munakot	VR	Nainipatal	Marhmanley	13.9	13.9	26.5
Pithoragarh	Berinag	LVR	Bhatigaon	Quariali	8.0	8.0	19.3
Pithoragarh	Dharchula	VR	Tanakpur	Jauljibi	18.0	18.0	43.5
Pithoragarh	Dharchula	LVR	Tanakpur	Ranthi	8.0	8.0	19.3
Pithoragarh	Dharchula	LVR	Kalika	Basora	5.0	5.0	12.1
Rudrprayag	Ukimath	ODR	Rudraprayag	Pokhri	16.0	16.0	43.2
Rudrprayag	Jakholi	VR	Ratanpur	Jawadi	5.0	5.0	12.1
Rudrprayag	Jakholi	VR	Amkoti	Jawadi	5.0	5.0	12.1
Rudrprayag	Ukimath	VR	Pathalidhar	1 / C Dangi	9.5	9.5	21.5
Rudrprayag	Ukimath	VR	Makku	Paldwadi	7.5	7.5	18.1
Rudrprayag	Ukimath	LVR	Jugasu	Madameshwar	9.0	9.0	21.8
Tehri	Juanpur	LVR	Almas	Bhawan	37.5	37.5	90.7
Tehri	Juanpur	ODR	Nainbagh	Aindi	31.0	19.0	50.4
Tehri	Devprayag	LVR	Rampur	Syampur Bamana	15.0	15.0	36.3
Tehri	Juanpur	ODR	Bareti	Badrigarh	41.2	41.2	96.0
Tehri	Thauldhar	LVR	Suliya	Ramgaon	6.0	6.0	14.5
Tehri	Juanpur	ODR	Raipur	Kumaldra	64.0	64.0	137.9

District	Block	Road Type	Road From	Road To	Road Length (km)	Length to be Improved (km)	Total Cost Rs.million (2005 prices)
Tehri	Juanpur	VR	Thatyur	Maoda	5.8	5.8	13.9
Tehri	Thauldhar	LVR	Kilyakhal	Aulani Uppu	8.8	8.8	21.3
Tehri	Thauldhar	LVR	Nagun	Bhawan	8.6	8.6	20.8
Tehri	Juanpur	LVR	Mason	Dwara-Garh	10.0	10.0	24.2
Tehri	Thauldhar	LVR	Kamand	Barwal (Thouldar)	8.8	8.8	24.2
Tehri	Chamba	ODR	Nagni Jardhar	Kuriyal	14.0	7.0	15.1
Tehri	Chamba	ODR	Chamba	Ranichauri	8.0	8.0	17.2
Tehri	Chamba	ODR	Nagni	Bhatusain	7.8	7.8	16.7
Tehri	Chamba	ODR	Nagni	Mathiyan gaon	12.0	12.0	32.0
USNagar	Kashipur	VR	Jaitpur	Barkheda	5.1	7.0	9.0
USNagar	Rudrapur	ODR	Jawahar	Nagala Post	4.6	9.7	13.1
USNagar	Kashipur	VR	Jaitpur	Nurpur	2.2	6.6	8.5
USNagar	Gadarpur	VR	Gadarpur	Gulabhoj	9.6	9.6	12.4
USNagar	Gadarpur	VR	Masit	Sakainiya	6.6	6.6	8.5
USNagar	Jaspur	ODR	Jaspur	Dhampur	12.4	12.4	16.7
USNagar	Jaspur	ODR	Jaspur	Amangarh	5.3	5.3	7.1
USNagar	Bajpur	VR	Sardarnagar	Banna Kheda	16.7	16.7	21.5
USNagar	Gadarpur	VR	Gularbhoj	Roshappur	5.5	5.5	7.1
USNagar	Gadarpur	VR	Gadarpur	Milakkhanam	9.0	9.0	11.6
USNagar	Jaspur	VR	Jaspur	Kaliyabala	5.0	5.0	6.4
USNagar	Jaspur	VR	Angadpur	Dharampur	6.3	6.3	8.1
USNagar	Jaspur	VR	Shyamnagar	Bawarkheda	6.4	6.4	8.2
Uttarkashi	Purolla	VR	Purola	Kufara	5.0	5.0	11.1
Uttarkashi	Naugaon	VR	Rajstar	Rajgarhi	11.6	11.6	22.3
Uttarkashi	Naugaon	VR	Rajgadi	Sarnaul	7.0	6.0	14.5
Uttarkashi	Dunda	VR	Gyansu	Uprikot	6.0	6.0	13.5
Uttarkashi	Mori	VR	Arakot	Balcha	14.0	14.0	27.8
Uttarkashi	Dunda	VR	Nalupani	Syalna	10.0	10.0	24.2
Uttarkashi	Mori	VR	Maneri	Jakhol	10.7	10.7	25.9
Uttarkashi	Mori	VR	Mori	Khunigad	11.0	11.0	21.1
Uttarkashi	Purolla	LVR	Dhukana	Chhadakhadda	6.0	6.0	14.5
Uttarkashi	Bhatwari	VR	Tekhla	Mahidanda	12.8	12.8	24.4
Uttarkashi	Chnyalisur	VR	Banchora	Bangaon	15.0	15.0	36.3
Uttarkashi	Bhatwari	VR	Gangori	Deodital	10.5	10.5	20.1
Uttarkashi	Bhatwari	VR	Bhatwadi	Raithal		10.0	22.2
Uttarkashi	Naugaon	LVR	Kandi	Diyadi	7.8	7.8	18.7
Uttarkashi	Purolla	VR	Khavli	Gundiyatgaon	10.0	8.0	15.6
Uttarkashi	Bhatwari	VR	Dwari	Jokhal	10.0	10.0	22.7
Uttarkashi	Bhatwari	LVR	Bhatwadi	Gaursali	7.0	7.0	15.9
			Total for Project 4			**1,960.3**	**4,727.8**

CAPACITY DEVELOPMENT PLAN FOR UTTARANCHAL PWD

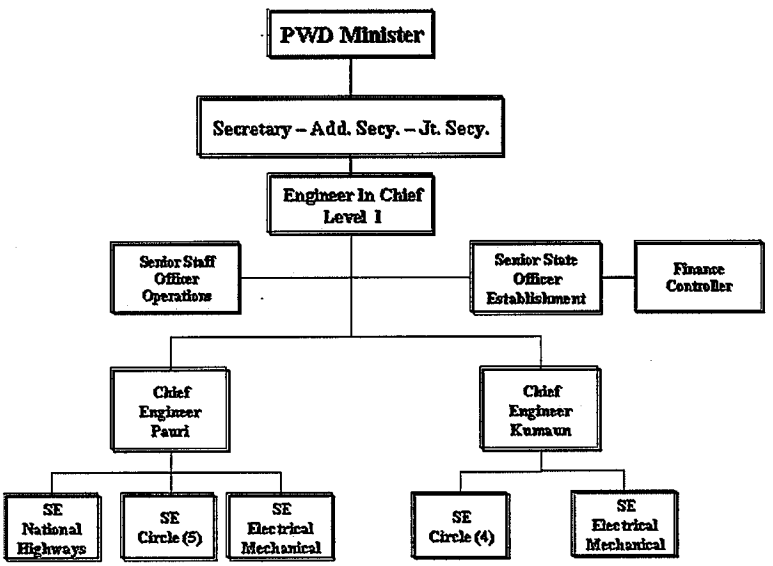
A. INSTITUTIONAL AND ORGANIZATIONAL ASPECTS

1. Structure and Responsibilities

1. The Public Works Department (PWD) of Uttaranchal was established under the Uttar Pradesh Reorganization Act 2000, which created the state of Uttaranchal on November 9, 2000. PWD is responsible for planning, designing, constructing and maintaining the primary road network of 18,308 km of roads, comprising 1,328 km national highways (NHs)[31]; 437 km of state highways[32], and various types of district and village roads totaling 16,543 km. PWD is also responsible for maintaining major public buildings and more than 3,800 km of walk ways.

2. **Organizational Structure**. The current organizational structure for PWD is shown below in Figure G-1.

Figure G-1 PWD's Current Organization Structure



3. The PWD Minister is a member of the State Cabinet reporting directly to the SGOU Chief Minister. The Secretary and Additional Secretary are appointed through the Public Service Commission, an agency of the Central Government, whereas the Joint Secretary is appointed through the State Public Service Commission. They all report to the PWD Minister and are responsible for establishing the policy framework and monitoring organizational performance. The Chief Engineer, Level I reports to the Secretary and is charged with implementation of the work program. The position is supported by (i) a Senior Staff Officer responsible for operations; (ii) a Finance Controller responsible for disbursement and

[31] The total length of NHs within Uttaranchal is 2,107 km. Maintenance for 1,327 km of these NHs has been delegated by MORSTH to PWD, while the remaining 780 km are being maintained by the Boarder Roads Organization (BRO). The roads being maintained by BRO have been declared security sensitive roads by the Ministry of Defence and are located near the boarders of Nepal and the People's Republic of China (PRC).
[32] The total length of State Highways within Uttaranchal is 696 km. PWD is responsible for maintenance of 437 km of these, while the remaining 259 km are being maintained by BRO.

accounting for funds; and (iii) a Senior State Officer Establishment responsible for staff records, including payroll, promotion, transfer and discipline.

4. PWD employs a total of 9,383 staff; consisting of 895 engineers; 2,061 administrative staff; 1,425 field staff, including skilled laborers and drivers; and 5,000 maintenance workers. A hiring freeze on maintenance workers was introduced in 1990 and this staff category is gradually being reduced through attrition. Current staff cost has decreased as a percentage of budget from 25% in 2003 to the current estimate of 16%. This percentage is considerably less than the average in India and no significant staff reduction initiatives are required at this time.

5. The organizational structure is based on a geographical division of the state, currently divided into two Zones, each headed by a Chief Engineer responsible for the implementation of the work program at the Zone level. The Zones are further divided into Circles, Divisions and Areas headed by Superintending Engineers (SE), Executive Engineers (EE) and Assistant Engineers (AE) respectively. Each AE is supported by 3 to 4 Junior Engineers (JE).

B. External Constraints

6. **Funding.** PWD's budget is derived from a combination of allocations from state and national sources[33]. National sources include the Central Road Fund, Economic Importance, and Inter-state Connectivity. PWD collects tolls at 35 bridge locations, which amounted to Rs 72 million in *FY2005-06* and are not earmarked for road sector expenditure. MOSRTH provides funding for maintenance and improvement of NHs. The Pradhan Mantri Gram Sadak Yogana (PMGSY) program provides funding to connect villages to the road network. A 5-year post construction maintenance component by the same contractor is funded by the State Ministry of Rural Development. Historically the maintenance budget has been underfunded contributing to a severe maintenance backlog.

7. **Clearance Procedures**. More than 50% of the PWD road network passes through forest areas and PWD must obtain clearances from the Forestry Department for these roads. Clearances for up to five hectares of land are issued through its District offices. Considering an average of 10 m right of way, clearances issued by the District would cover a maximum of 5 kilometres of roads. Clearance for longer stretches is issued at the State or National level. The combination of the short construction season and the lengthy clearance procedures limits the ability of PWD to complete construction and maintenance activities in a timely manner. As a result construction projects in Uttaranchal often require two construction seasons while in most states only one season is required.

8. **Meetings** One of the constraints listed most frequently by working groups at the Institutional Review Workshop[34] was that PWD Circle and Division Engineers spend too much time in meetings. Some Executive Engineers report that they spend an average of 10 to 20 days a month attending meetings, that many meetings only address one outstanding issue and often do not lead to resolution of issues raised. When combined with administrative duties this leaves very little time for staff coordination and monitoring.

9. **Weather.** The climate in Uttaranchal restricts the effective working season to about six months from mid February to the end of June and from mid September to mid November.

[33] For FY 2006-07 sources of budgetary allocations are State Budget Rs. 5.8 billion ($132 million) Central Sources Rs. 1.2 billion ($28 million)
[34] The Institutional Review Workshop was conducted by the PPTA Consultants in Dehradun on 10 April 2006.

C. Internal Constraints

10. Driving speeds on most of the roads in Uttaranchal are severely constrained by the hilly terrain that characterizes the state, limited to 25 to 30 km per hour on most roads. As a result travelling from many of the divisions to Zone offices can require a day or more, travel time to Circles sometimes exceeds a half day. This constraint causes significant coordination and supervision difficulties for Zone and Circle Engineers. Even after roads are rehabilitated driving speeds will remain low due to narrow road width and poor alignment.

11. **Business Processes.** PWD's procedures follow from the nationwide PWD system created in the mid-1850s and is based on the PWD manuals prepared for Uttar Pradesh. No separate PWD manual has been prepared. For instance, the outline of the basic organizational structure and the duties of the Chief Engineer, Superintending Engineer, Superintendent of works and Divisional Officers applied by PWD are directly based on the "Financial Handbook", Volume VI issued by the Authority of the Government of Uttar Pradesh in 1974. Likewise, the Maintenance Manual for Roads was issued by the PWD of Uttar Pradesh in 1984. Supplementary manuals and guidelines have been issued on an ad-hoc basis and no integrated updated manual for PWD exists.

12. PWD operates in the absence of a strategic planning process incorporating stakeholder views and needs. As a result policy directives often do not support balanced development goals and performance targets are based on short term needs. Lack of policy direction and clearly articulated goals for operational performance creates an organizational environment that hinders effective delegation and accountability for results. PWD's capital investment program consists of projects originating from a political rather than a technical process.

13. **Budgeting Process**. The budgeting process suffers from lack of planning and is based on past allocations. The annual budget proposal is primarily based on amounts received in previous years adjusted for inflation. Proposed capital investment projects are selected from lists submitted by national, state and locally elected officials with technical input from PWD. The capital investment budget includes funding for completing ongoing works as well as proposed new projects. On the basis of the availability of centrally sponsored schemes, SGOU determines additional funding from state sources. The State Legislature allocates available funding to PWD and directs the Ministry of Finance to distribute funds accordingly.

14. The breakdown of past budgetary allocations demonstrates a focus on construction. Although the maintenance allocation doubled from FY 2005-06 to 2006-07 to 1.4 billion rupees and this will allow PWD to double its on-going maintenance contracting activities, it is estimated that this is still about 600 million rupees less than current needs[35]. PWD reports that 100% of its budgetary allocations for construction and maintenance are expended, as budgetary allocations for capital expenditure can be carried forward from one fiscal year to the next. A breakdown of budgetary allocations is shown overleaf in Table G-1, which excludes PMGSY schemes and provision for National Highways.

[35] TA Consultants estimate of Rs 1.05 billion for routine maintenance and Rs 0.95 billion for periodic maintenance. Routine maintenance costs are based on unit per km cost estimates for 5 year post construction performance based contracting on PMGSY roads developed by Uttaranchal State Rural Development Department adjusted for road width and condition of the existing PWD network. Periodic maintenance costs are based on per km costs for 50 mm bituminous concrete overlay applied on a 6 to 8 year cycle depending on road class.

Table G-1 Breakdown of Budgetary Allocations to the PWD Road Network (Rs million)

Fiscal Year	2002 / 03	2003 / 04	2004 / -05	2005 / -06	2006 / 07
Capital Investment	3,606.7	2,513.1	3,259.6	4880.2	5,550.5
Maintenance	401.5	363.5	446.9	648.0	1,430.6
Establishment, Others	868.2	948.1	1,007.1	1,087.0	1,508.5
Total	4,876.4	3,824.7	4,713.6	6,615.2	8,489.6

Source: PWD

15. **Bookkeeping.** Most bookkeeping for financial accounting and management is done manually. Records are kept in a loose archive system.

16. The life cycle of projects is severely curtailed because design, construction, quality assurance and maintenance practices are deficient. Consequently PWD officials report that rehabilitation of roads with relatively high traffic volumes is required every 3 to 4 years. This compares to international standards of 6 to 8 years. Lack of routine maintenance also contributes to hazardous driving conditions.

17. **Design.** Junior Engineers are generally tasked with the design of roads. Designs are based on outdated procedures. There is only limited access to soil testing equipment and survey equipment is again limited and outdated. Consequently required interventions are determined through visual inspection; road length is generally determined through vehicle odometer readings; pavement thickness is not adjusted for soil condition and work quantities are often calculated using average per kilometre values.

18. **Construction and Periodic Maintenance.** PWD outsources all of its construction and periodic maintenance activities using standard PWD forms of contract. Generally contract sizes are very small typically covering only 1 km per contract for construction and 2 to 3 kilometres for periodic maintenance. According to PWD, the tender size is a reflection of the limited financial, technical and equipment capacity of local contractors. It was observed that local contractors are applying outdated methods because they lack proper equipment and technical skills.

19. **Contractor Supervision**. Engineers are not able to visit sites on a regular basis because of the large number of small construction and maintenance contracts coupled with lack of access to vehicles for transportation to the project site. Currently, on the average there are 3 vehicles per Division out of which two are available part time for site inspection. Considering the reduced driving speeds, for a typical division with more than 350 km of roads, PWD engineers estimate that proper supervision would require an average of 4 additional vehicles. As a result engineers inspect construction sites on an average of 2 or 3 times per month rather than on an almost daily basis as required. Engineers also lack proper equipment for aggregate, soil, concrete and bitumen testing or for determining compaction density.

20. PWD maintains records of quality testing but they do not rate contractor performance or have a system for independent checks for quality. However, independent quality testing is carried out for PMGSY by National Quality Monitors. For roads in Uttaranchal under PWD, data posted on the PMGSY website show that more than 50% of tested on-going projects were rated unsatisfactory.

21. **Routine maintenance**. Maintenance workers on the PWD payroll replace lost material on shoulders, undertake temporary repair of potholes using non-bituminous materials, cut vegetation, remove minor land slips and paint roadside signs and structures. PWD reports that these workers are ineffective and for this reason they are being phased out.

22. Most routine maintenance is performed by private contractors. Contracts are prepared in a manner similar to those employed for construction with a Junior Engineer responsible for: (i) inspecting the site and identifying required maintenance interventions; (ii) preparing a bill of quantities; and (iii) initiating the tender process. Quality control normally consists of a monthly inspection to measure quantities and check on the quality of the work.

23. **Incentive Structure**. Low turnover of staff and limited promotion and career development opportunities are key challenges. Currently, more than half of the employees at the Executive Engineer level and above are serving "in charge" without promotion. The issue was identified as a major disincentive in the Institutional Review Workshop and ADB has suggested that it be addressed.

24. **Training Opportunities**. Technical skills with regard to supervisory functions and quality control for both asset development and maintenance have been identified as critical impediments to improving sector performance. The Secretary, PWD has directed Superintending Engineers to ensure that all technical staff has access to training. Staff have, however, not taken advantage of training opportunities, perhaps due to the absence of a defined training program based on training needs that identifies types of training available, training locations and dates.

D. On-going Initiatives

25. To ensure timely issuance of required clearances (para. 7) the Chief Secretary SGOU has instructed District Magistrates to conduct bi-weekly coordination meetings with PWD, Forestry Department and other government agencies charged with construction. He has directed the District Magistrate to ensure that all requests for clearance be processed prior to the next bi-weekly meeting. To permit engineers to visit sites as required (para. 19) and improve design and construction supervision (para. 17 and 19) PWD has allocated funding for purchasing 100 new vehicles and additional surveying and testing equipment in FY 2006-07. PWD has received preliminary approval for the new organizational structure (para. 33) and have been assured that when it is approved by the State Cabinet positions will be authorized allowing promotion of staff (para. 23). PWD will gradually increase contract sizes (para 18) and contractor registration categories to encourage contractors to gradually increase equipment pools and technical capacity.

26. The maintenance budget has been more than doubled from 648 million rupees in FY 2005-06 to 1.4 billion rupees in FY 2007-08 (para. 14). This will allow PWD to increase maintenance contracting to improve riding conditions, decrease deterioration rates, increase road safety and decrease days that roads are closed due to landslides. As the proposed Investment Program is implemented, the condition of the road network will improve from its current state with only 20%[36] of the network in good condition to around 65% by 2013.

[36] Current condition of the network was estimated by the consultant engaged to develop the Road Master Plan. The estimate for 2015 is based on the length scheduled for rehabilitation under the investment component of the loan plus an average allowance of 150 km per year through the PWD investment budget.

27. **Management Information and Project Management System (MIPM).** SGOU has engaged a consultant to develop the MIPM system for state-wide application under World Bank assistance. The system is scheduled for implementation during the FY 2006-07. It provides functionality for a management information database for planning, reporting and performance monitoring. System functions include asset planning, budgeting, construction and maintenance work monitoring, personnel information and procurement systems.

28. **Draft Road Policy.** PWD has developed a draft Road Policy, covering a period of 10 years through 2015, to guide the transformation process. The main policy objective is to support economic growth and ensure an equitable distribution of benefits among regions and population groups. Primary action areas include: (i) prioritizing the Investment Program to promote balanced regional development, increased connectivity and optimization of road user benefits; (ii) preserving road network investments through asset maintenance strategies that rely on leveraging local contractor capacity; (iii) increasing private sector participation; (vi) reforming existing road institutions to ensure that organizational structures and capacity are designed to support policy objectives; (v) establishing a Road Maintenance Fund; and (vi) developing a legal framework in support of these targets, including a Road Act and updating the Road Side Land Control Act.

29. **Strategic Planning Unit.** PWD has proposed that a separate unit be formed at head quarters responsible for quality and strategic planning. The unit is to be headed by an Additional Engineer in Chief, supported by a small core team of professionals who will ensure monitoring and consistency.

30. **Zone Level Reorganization.** PWD intends to introduce organizational changes including: (i) expanding the number of Zones from two to four to reduce the geographical area for which the Zone Chief Engineer is responsible; (ii) designate a Chief Engineer for externally funded projects, including NH, PMGSY and ADB; (iii) designate one Maintenance and one PMGSY Division in each circle; and (iv) establish asset development and asset maintenance cells at the zone level. All of these changes will lead to closer supervision, increased accountability for results and enable more delegation. Smaller geographical areas will reduce travel times allowing more effective monitoring of asset development and asset maintenance targets. A dedicated unit for externally aided projects will promote increased familiarity with the requirements of these agencies and more effective coordination. The establishment of separate Divisions for maintenance and PMGSY recognize the importance of these functions; and also the proposed cells for asset development and asset maintenance will support implementation of good practices in planning, design, contracting and quality assurance.

31. **Road Stakeholder Board (RSB).** PWD has indicated support for the creation of a Road Stakeholder Board for consultation purposes as suggested by ADB during Project processing. This Board would ensure that the views of road users and stakeholders are considered. It would be Chaired by the Secretary PWD and include the Engineer in Chief PWD, and six to eight additional members representing private and public sector freight and passenger transport service providers, consumer protection groups, traffic police, chamber of commerce, engineering and contractor associations and other state stakeholder agencies.

32. The proposed new organization for PWD and the proposed organization for a typical zone are shown overleaf in Figures G-2 and Figure G-3, respectively.

Figure G-3 Proposed Organization Structure for PWD

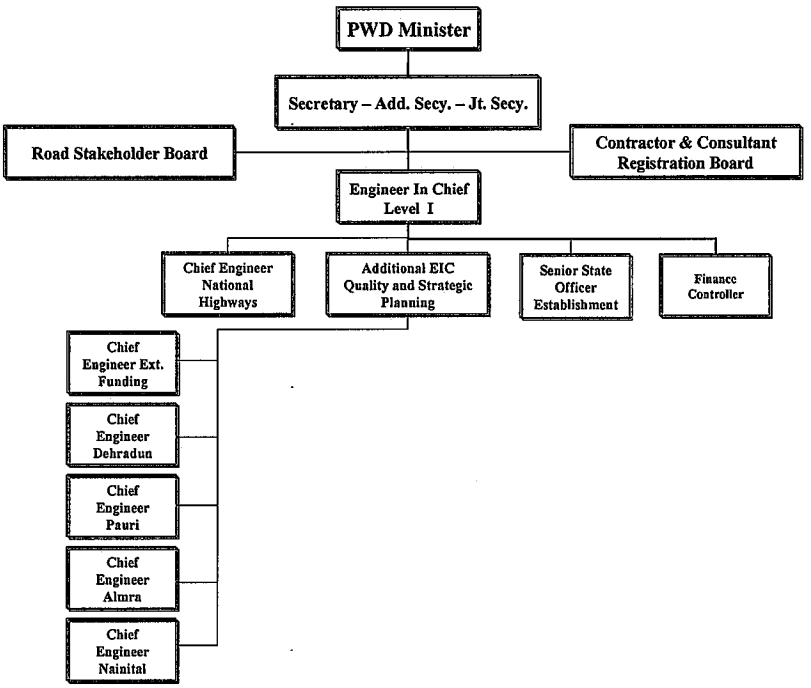
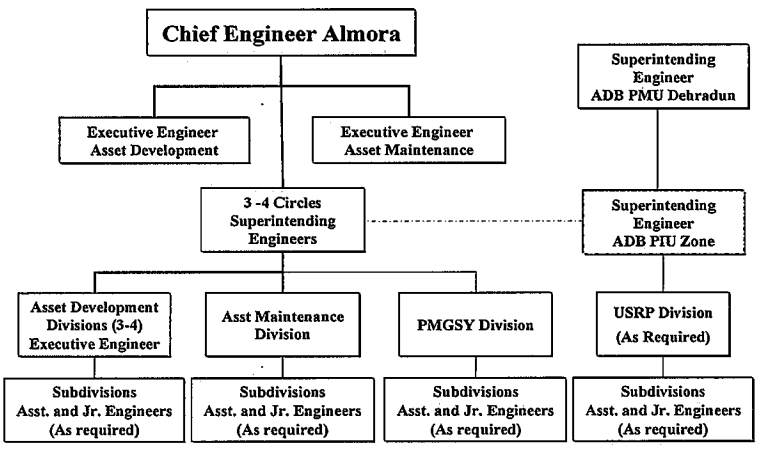


Figure G-3 Proposed Organization Structure for a typical Zone



E. Actions Required to Support On-going Initiatives

33. These actions alone will not fully address external and internal constraints currently facing PWD. The consultant that has been engaged to develop MIMP will provide training in system functionality and the SGOU Department of Information Technology will provide hardware required for system implementation. But successful implementation requires that PWD staff have basic computer skills and although some PWD employees have these skills many do not. Furthermore for databases to be effective in supporting system functionality field data must be accurately collected and updated. Planning, budgeting, reporting and performance monitoring subcomponents of the system will require documentation of standard operating procedures and staff training for their application.

34. The approval of the Additional Engineer in Chief position will support strategic planning but this function cannot be fully implemented until the Road Policy is finalized and approved by the State Cabinet, performance targets have been agreed to by concerned parties and procedures are in place to monitor targets and take corrective action as required.

35. The proposed organizational structure will realign staffing and create positions required to improve planning, design, construction and maintenance services but until business processes are modernized, position descriptions and operating procedures updated to reflect PWD's current mission, and staff is trained and equipped to apply these procedures no significant improvement would occur.

36. The concept of engaging road users and stakeholders in monitoring and decision making for Government agencies is only beginning to take hold in India therefore consultation and planning is required for its successful implementation. After this consultation has occurred and the views of government and private sector players considered, terms of reference and composition of proposed boards needs to be defined.

F. Support from Consulting Services Subcomponent of the Investment Program

37. The Infrastructure Management Component of the Investment Program is designed to provide consulting services to support PWD in taking full advantage of ongoing initiatives by SGOU as well as internal actions currently being pursued. The outline Terms of Reference for the consulting services in Appendix U shows support being provided in four main areas: (i) organizational restructuring; (ii) setting performance targets; (iii) developing a human resources strategy; and (iv) organizing training.

38. **Organizational Restructuring.** Principal tasks under this subcomponent will include general support for implementing organizational changes including organizing consultation among PWD and road users and other stakeholders to agree on the role of the RSB, the composition of the Board, terms of service and duties and responsibilities.

39. **Performance Targets.** Principal tasks under this subcomponent will include (i) review of existing guidelines and manuals, recommend operating procedures that conform to Indian Road Congress and Indian good practices and document approved procedures in operating manuals; (ii) review contracting mechanisms and provide support in introducing improved mechanisms including increasing construction contract sizes, expanding the inclusion of a 5-year maintenance period in the construction contract and introducing performance based area wide maintenance contracting, (iii) assist PWD to define roles, performance targets and verifiable indicators and prepare position descriptions identifying authority and responsibility.

40. **Human Resource Strategy.** PWD's implementation strategy following from the Investment Program will provide significantly increased budgetary allocations for capital investment through 2014 and increased focus on maintenance after that. The Infrastructure Management Component will address the staffing requirements following from implementation of the Investment Program, identified service delivery mechanisms and documented procedures and assess skills mix and staff numbers vis-à-vis these needs. Training needs will be assessed and a training curriculum designed to meet these needs. The training curriculum will contain course objectives, training delivery mechanisms, number of people to be trained and timetable for delivering the training. These components form integral parts of the human resources strategy, which will also address incentive and performance issues.

41. **Training.** Training activities for PWD staff will be organized through the consulting services component to include: (i) a survey of exiting institutions in Uttaranchal to determine availability of existing courses that meet curriculum requirements (ii) assistance to PWD to enter into an agreement with one or more institutions, such as the Indian Institute of Technology at Roorkee, to prepare the remaining course materials; and (iii) support for delivery of the training program including preparing training implementation schedules and identifying candidates for training in coordination with operating units. They will maintain a register of staff trained and compliance with the schedule by operating units. Training will be divided into the following subcomponents: (i) strategic policy formulation training for 15 senior management staff; (ii) technical training for minimum 50% of engineering staff; and (iii) basic computer skills training for minimum 50% of engineering staff and 15% of administrative staff in anticipation of the implementation of the MIPMS.

42. **Training for Contractors.** A curriculum and training materials for private contractors will be made available through the Investment Program and incentives for contractors whose key staff have received training will be incorporated into the selection process.

43. **Component Cost Breakdown.** The cost of consultant services to support PWD's institutional strengthening activities is summarized below in Table G-2.

Table G-2 Cost Estimate for Consulting Services

Subcomponent	Cost ($ 000)	
	Foreign Exchange	Local Currency
Staff Services	236	476
Out of Pocket Expenses	41	45
Training Delivery		
Study Tour	66	
PWD Staff		540
Other Miscellaneous Costs	57	39
Total Cost	**400**	**1,100**

Source: TA Consultants

44. An institutional and organizational reform matrix is shown in Table G-3 overleaf. This matrix summarises the ongoing initiatives being progressed by PWD, together with the areas in which PWD would require consulting services support to facilitate achievement of the objectives. The matrix also shows the optimum time frame in which the various actions should be completed to gain maximum effect, and to link in with the Investment Program implementation schedule.

Table G-3 Institutional and Organizational Reform Matrix

Subject	Issue/Accomplishments	Agenda/Intervention	Time Frame[37]
Strategic Planning and Stakeholder Participation	Road Policy for Uttaranchal to guide the transformation process (i) Draft Policy has been prepared (ii) Approval and implementation pending	(i) Finalize Draft Policy Document (ii) Obtain SGOU approval and endorsement	(i) 2007 (III) (ii) 2007 (III)
	Strategic Planning and Performance Targets to improve quality and accountability (i) Establishment of unit at headquarters under Additional Chief Engineer under consideration	(i) SGOU approval for Chief Engineer Level I position (ii) Position description to define strategic function (w Consultant Support) (iii) Performance Targets (w Consultant Support)	(i) 2006 (III) (ii) 2007 (II) (iii) 2007 (III)
	More Stakeholder participation to improve governance and transparency (i) Establish Road Stakeholder Board (RSB)	(i) SGOU approval (ii) TOR and composition (w Consultant Support) (iii) Appointment of members	(i) 2006 (III) (ii) 2007 (II) (iii) 2007 (II)
Supervision and Accountability	Increase emphasis on delegation, coordination, supervision and monitoring (i) Establish two additional zones under CE II (ii) Establish dedicated divisions for maintenance and PMGSY works under EE (iii) establish asset development and asset maintenance cells at Zone level under SE	(i) SGOU approval of additional SE and EE positions pending (ii) Position description and operations manuals (w Consultant Support)	(i) 2006 (III) (ii) 2007 (III)
MIMP	Implementation and application of MIPM (i) Scheduled for completion in 2007 (I) (ii) Basic computer skills for staff (iii) Operating procedures for reliable data collection and input and application of new functionality	(i) Implementation & user training (MIMP Consultant) (ii) Basic Computer Training (w Consultant Support) (ii) Operations manuals (w Consultant Support)	(i) 2007 (I) (ii) 2007 (IV) (iii) 2007 (III)
Contracting Mechanisms	Improve contracting mechanisms (i) Construction and periodic maintenance (ii) Routine Maintenance	(i) Gradually increase contract sizes for incentive for contractors to upgrade equipment and staff (PWD) (ii) Explore a) expanding 5-year maintenance component b) area wide maintenance contracts (PWD)	(i) 2007 (II) (iii) 2007 (II)

[37] Year and quarter

Subject	Issue/Accomplishments	Agenda/Intervention	Time Frame[37]
Human Resources Capacity Building	Absence of Human Resource Strategy (HRS) (i) Procedures not documented (ii) Skills mix and numbers not rationalized according to present practices (iii) Incentive structure does not support achievement of performance targets	Consultant services component of investment program will prepare HRS to include: (i) Documentation of procedures in operating manuals (ii) Assessment of skills mix and staffing numbers (iii) Addressing incentive and performance issues	(i) 2007 (II) (ii) 2007 (III) (iii) 2007 (III)
	Training needs have not been assesses and addressed through a training plan	Consultant services component of investment program will conduct a training needs assessment to include: (i) Strategic Panning (ii) Basic Computer Skills (iii) Supervision of staff and outsourced service providers (iv) Application of approved, documented procedures	2007 (IV)
	PWD Staff lack management and skills capacity required for organizational transformation	Consultant services component of investment program will organize training delivery to include: (i) Study Tour outside of Uttaranchal (ii) Skills and management training for staff Cost of training will be funded through the Asset Management Component of the Loan	(i) 2008 (I) (ii) 2009 (I)
	Contractor Staff lack project management and construction technology skills	Consultant services component of investment program will organize training delivery to include: (i) Contract management training including preparation of work schedules and quality assurance program (ii) Skills training for foremen and operators	(i) 2009 (I) (ii) 2009 (i)

COST ESTIMATES

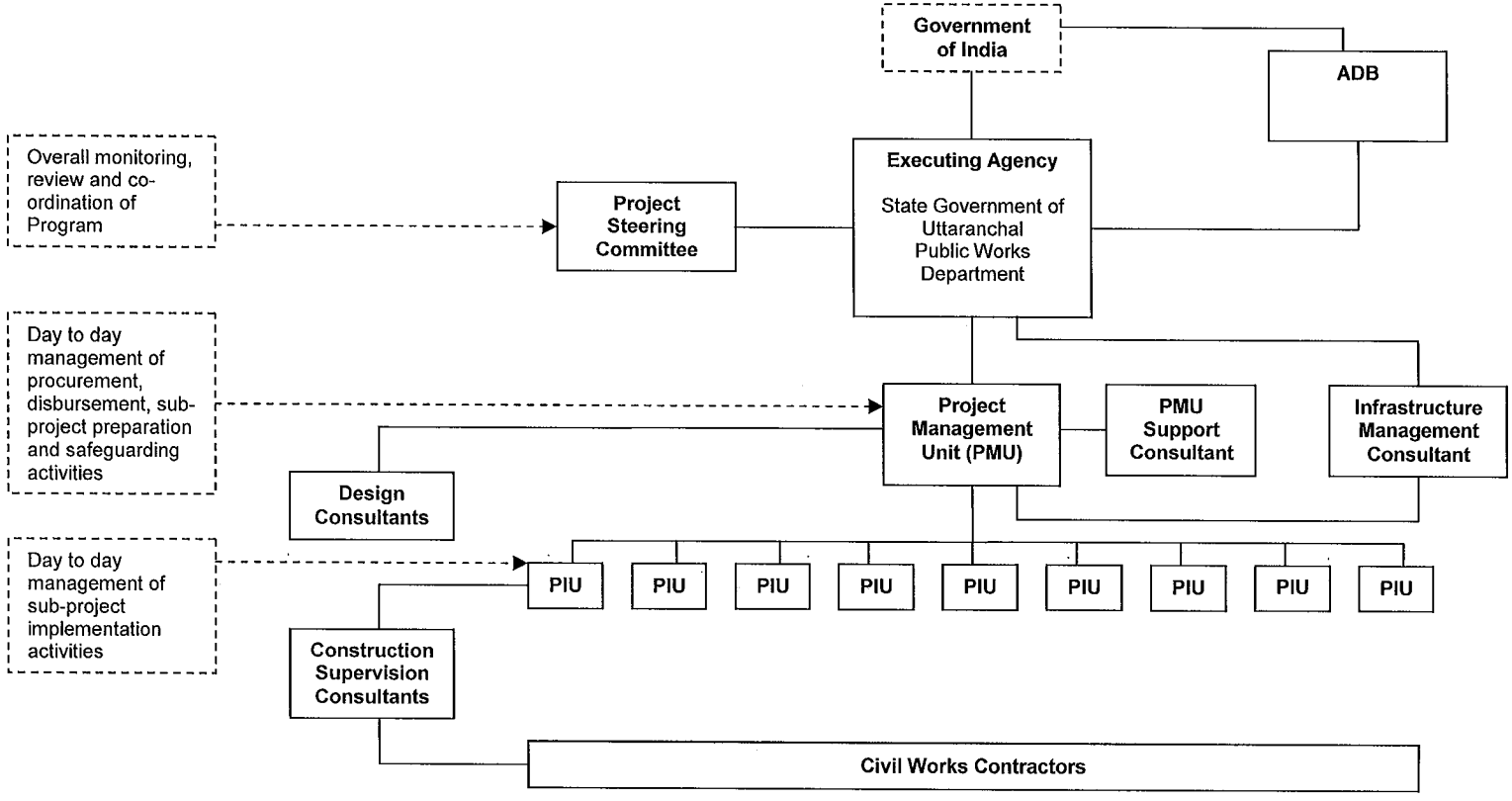
INVESTMENT PROGRAM	Rs millions Foreign	Rs millions Local	Rs millions Total	$ millions Foreign	$ millions Local	$ millions Total	% of Base Cost
A. Investment Costs [a]							
1. Resettlement	-	17	17	-	0.5	0.5	0.1
2. Civil Works [b]	-	31,163	31,163	-	695.5	695.5	89.5
3. Consulting Services - Design	-	591	591	-	13.5	13.5	1.7
4. Consulting Services – Construction Supervision	-	1,257	1,257	-	28.0	28.0	3.6
5. Environmental Mitigation and Monitoring	-	14	14	-	0.5	0.5	0.1
6. Taxes and Duties	-	1,435	1,435	-	32.0	32.0	4.1
Subtotal A	-	34,477	34,477	-	770.0	770.0	99.1
B. Project Management and Administration							
1. Project Management Unit	-	31	31	-	1.0	1.0	0.1
2. Project Implementation Units	-	135	135	-	3.0	3.0	0.4
3. Program Support Consultant	49	18	67	1.1	0.4	1.5	0.2
Subtotal B	49	184	233	1.1	4.4	5.5	0.7
C. Other Program Components							
Infrastructure Management Component	18	49	67	0.4	1.1	1.5	0.2
Subtotal C	18	49	67	0.4	1.1	1.5	0.2
Total Base Cost	67	34,710	34,777	1.5	775.5	777.0	100.0
D. Contingencies							
1. Physical Contingency [c]	-	887	887	-	20.0	20.0	2.6
2. Financial Contingency [d]	-	485	485	-	11.0	11.0	1.4
Subtotal D	-	1,372	1,372	-	31.0	31.0	4.0
E. Interest during construction [e]	953	-	953	22.0	-	22.0	2.8
TOTAL INVESTMENT PROGRAM COST	**1,020**	**36,082**	**37,102**	**23.5**	**806.5**	**830.0**	106.8

Notes:
a - costs given in current prices at the start of each Project
b - includes cost of performance based maintenance for 3 years in Projects 2 to 7
c - computed at 3% of civil works and consulting services cost
d - computed using 4% annual inflation over implementation period of each Project
e - Interest taken as LIBOR floating rate of 5.16%, plus a 0.4% lending spread as quoted by ADB on 7 April 2006

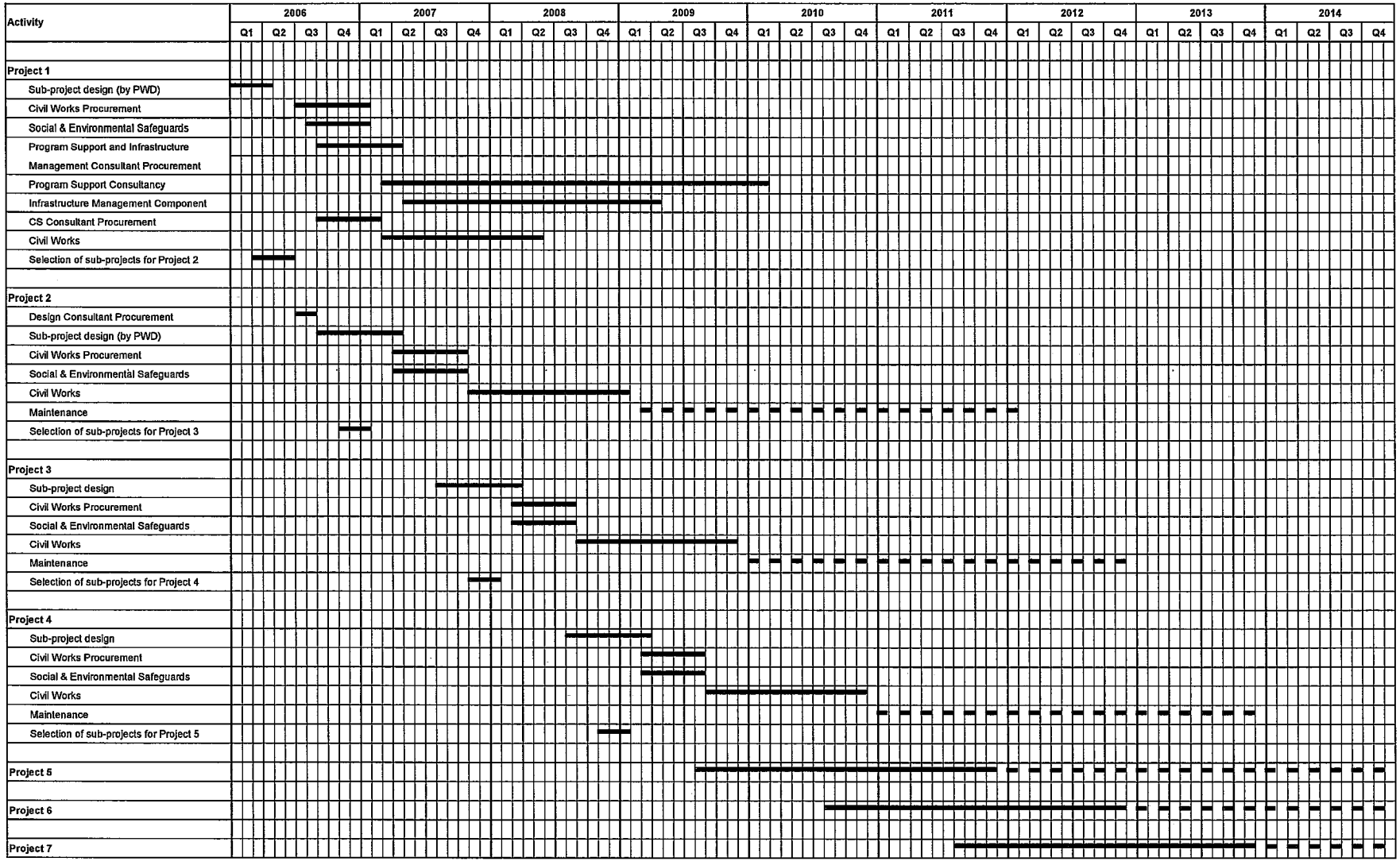
PROJECT 1	Rs millions			$ millions			% of Base Cost
	Foreign	Local	Total	Foreign	Local	Total	
A. Investment Costs [a]							
1. Resettlement	-	1	1	-	0.1	0.1	0.2
2. Civil Works	-	2,531	2,531	-	57.0	57.0	85.1
3. Consulting Services - Design	-	51	51	-	1.1	1.1	1.6
4. Consulting Services – Construction Supervision	-	108	108	-	2.4	2.4	3.6
5. Environmental Mitigation and Monitoring	-	1	1	-	0.1	0.1	0.2
6. Taxes and Duties	-	117	117	-	2.5	2.5	3.7
Subtotal A	-	2,809	2,809	-	63.2	63.2	94.4
B. Project Management and Administration							
1. Project Management Unit	-	9	9	-	0.2	0.2	0.3
2. Project Implementation Units	-	26	26	-	0.6	0.6	0.9
3. Program Support Consultant	49	18	67	1.1	0.4	1.5	2.2
Subtotal B	49	53	102	1.1	1.2	2.3	3.4
C. Other Program Components							
Infrastructure Management Component	18	49	67	0.4	1.1	1.5	2.2
Subtotal C	18	49	67	0.4	1.1	1.5	2.2
Total Base Cost	67	2,911	2,978	1.5	65.5	67.0	100.0
D. Contingencies							
1. Physical Contingency [b]	-	76	76	-	1.7	1.7	2.5
2. Financial Contingency [c]	-	105	105	-	2.4	2.4	3.6
Subtotal D	-	181	181	-	4.0	4.0	6.1
E. Interest during construction [d]	83	-	83	2.0	-	2.0	3.0
TOTAL PROECT 1 COST	**150**	**3,092**	**3,242**	**3.5**	**69.5**	**73.0**	109.1

Notes:
a - costs given in current prices at the start of each Project
b - computed at 3% of civil works and consulting services cost
c - computed using 4% annual inflation over implementation period of each Project
d - Interest taken as LIBOR floating rate of 5.16%, plus a 0.4% lending spread as quoted by ADB on 7 April 2006

ORGANIZATION STRUCTURE FOR PROJECT IMPLEMENTATION



INDICATIVE IMPLEMENTATION SCHEDULE



DRAFT PROCUREMENT PLAN

Program Information

Country	India
Name of Borrower	Government of India
Project Name	Uttaranchal State Road Investment Program
Loan or TA Reference	-
Date of Effectiveness	(Preparation of loan for Project 1 in progress)
Amount US$:	Value of Project 1 is $74 million. Total value of Investment Program is $830 million, which is being part financed from a Multi-tranche Financing Facility (MFF) given by ADB which has a maximum limit of $550 million.
Of which Committed, US$	(zero at present time)
Executing Agency	Public Works Department of the State Government of Uttaranchal
Approval Date of original Procurement Plan	To be inserted (this is the first Procurement Plan)
Approval of most recent Procurement Plan	N/A
Publication for Local Advertisements[38]	Advance Action notice published on ADB website on 7 June 2006. Invitation Notice calling for Submission of EOIs for Design and Construction Supervision Consultants published on ADB website on 13 June 2006
Period Covered by this Plan	Period up to 31 June 2007 covering procurement of civil works and consulting services under Project 1 of the proposed Multi-tranche Financing Facility (MFF)

Procurement Thresholds, Goods & Related Services, Works and Supply and Install

Procurement Method	**To be used above / below (Value $)**
ICB Works	above $10 million
ICB Goods	N/A
LIB Works	below $20 million
NCB Works (see note 1 below)	below $10 million
NCB Goods	N/A
Shopping Works	N/A
Shopping Goods	N/A

[38] General procurement notice, invitations to pre-qualify and to bid, calls for expression of interest.

Exceptional Methods
Where the original bidding process was approved by ADB and considered to be valid, bids may be re-evaluated in instances of mis-procurement.

Note 1: NCB civil works contract packages will be tendered in groups of no more than 4 packages at a time to simplify the evaluation of multi package 'slice and package' discounts. A lag of at least one calendar month will be maintained between calls for tenders for each group.

Procurement Thresholds, Consulting Services

Procurement Method	To be used above / below (Value $)
Quality Cost Based Selection (QCBS)[39]	above $200,000
Consultants Qualifications Selection (CQS)[40]	below $200,000
Least Cost Selection (LCS)[41]	below $100,000
Alternative Methods	
National consulting companies and individuals may be engaged in accordance with the ADB Guidelines to provide short term specialist consultancy support to the PWD Project Management Unit (PMU).	

Project 1 Information:

List of Contract Packages in Excess of $100,000, Goods, Works and Consulting Services

Ref	Contract Description	Estimated Cost	Procurement Method	Expected Date of Advertisement[42]	Prior Review Y/N	Comments
1.	8 no. civil works contract packages as shown on attached sheet	Individual contract packages between $3.8 million and $10 million	NCB	July 2006 ADB advance action notice to be published on website after ADB have reviewed and agreed the draft bidding documents.	Y Draft bidding documents to be submitted to ADB by 15 July 2006. Draft pre-qualification and bid evaluation reports to be submitted to ADB prior to award of contracts.	Draft PQ document submitted to ADB for review and approval end of June 2006. Draft bidding documents will include requirement for 3-year performance based road

[39] Default for procurement above $200,000.
[40] Default for procurement below $200,000
[41] Default for procurement below $100,000
[42] The Invitation for bids, Request for Expressions of Interest, or Invitation to pre-qualify as the case may be.

Ref	Contract Description	Estimated Cost	Procurement Method	Expected Date of Advertisement[42]	Prior Review Y/N	Comments
						maintenance
2.	3 no. consulting Services packages for construction supervision	$1.2 million for each contract package	QCBS with STP	Request for submission of EOIs published on ADB website on 13 June 2006.	Y Draft RFPs to be submitted to ADB by 30 July 2006. Technical proposal evaluation report and overall rankings to be submitted to ADB for approval prior to award of contracts.	Bidding from national consultants encouraged
3.	Consulting Services for Infrastructure Management Component (1 contract)	$1.5 million	QCBS with FTP	Advance action notice published on ADB website June 2006. Request for EOIs to be published July 2006.	Y Draft RFPs to be submitted to ADB by 30 July 2006. Technical proposal evaluation report and overall rankings to be submitted to ADB for approval prior to award of contracts.	
4.	Consulting Services for Program Support Consultant	$1.5 million	QCBS with FTP	Advance action notice and request for EOIs to be published on ADB website August 2006.	Y Draft RFPs to be submitted to ADB by 30 July 2006. Technical proposal evaluation report and overall rankings to be submitted to ADB for approval prior to award of contracts.	

Ref	Contract Description	Estimated Cost	Procurement Method	Expected Date of Advertisement[42]	Prior Review Y/N	Comments
5.	Consulting Services for companies and individuals providing short term specialist support to PMU	$50,000	CQS for companies	January 2007	Y	NGOs and other consultants for monitoring social and environmental safeguards will be financed by PWD

CONTRACT PACKAGES FOR PROJECT 1

Package No.	Name of District	Road Section		Length (Km)	Estimated Cost ($ million)			Mode of Procurement	Supervision Contract No.	PIU No.
		Road Name	Road Type		Construction	Maintenance	Total			
Contract 1	Uttarkarshi	Kuwa - Kafnol - Rarhi Road	ODR	47.5						
	Uttarkarshi	Naugaon - Purola Road	ODR	17.9						
	Dehradun	Kalsi - Chakrata Road	MDR	41.6						
	Contract Package 1 - Total			**107.0**	**6.6**	**0.0**	**6.6**	**LCB**	**1**	**1**
Contract 2	Pauri	Fatehpur - Lansdowne Road	ODR	21.8						
	Pauri	Pathrakhal - Gethichheda Road	ODR	18.0						
	Pauri	Pauri - Khirsu - Srinagar Road	ODR	19.3						
	Contract Package 2 - Total			**59.1**	**4.0**	**0.0**	**4.0**	**LCB**	**1**	**2**
Contract 3	Chamoli	Nandprayag - Ghat Motor Marg Road	ODR	18.5						
	Chamoli	Rudra Prayag - Pokhri - Karnaprayag Road	ODR	14.5						
	Rudra Prayag	Jakholi - Guptakashi Road	ODR	14.4						
	Contract Package 3 - Total			**47.4**	**3.8**	**0.0**	**3.8**	**LCB**	**1**	**4**
Contract 4	Udham Singh Nagar	Dhakia Gulabo - Paiga - Mukundpur Road	ODR	25.0						
	Udham Singh Nagar	Jaitpur - Dhanori Road	ODR	10.8						
	Udham Singh Nagar	Zararpur - Gularbhoj Road	ODR	13.8						
	Contract Package 4 - Total			**49.6**	**6.2**	**0.0**	**6.2**	**LCB**	**2**	**6**
Contract 5	Almora	Raniket - Mohan Road	MDR	70.2						
	Nainital	Betalghat - Bhatrojkhan Road	ODR	16.7						
	Nainital	Nathuakhan - Suyalbadi Road	VR	29.0						
	Contract Package 5 - Total			**115.9**	**9.0**	**0.0**	**9.0**	**LCB**	**3**	**7**
Contract 6	Almora	Almora - Bageshwar	SH	37.0						
	Bageshwar	Almora - Bageshwar	SH	35.9						
	Contract Package 6 - Total			**72.9**	**7.6**	**0.0**	**7.6**	**LCB**	**3**	**8**
Contract 7	Almora	Barechhina - Sherghat Road	SH	42.3						
	Bageshwar	Udiyari Bend - Kanda (Berinag - Bageshwar section)	MDR	15.0						
	Pithoragarh	Udiyari Bend - Kanda (Berinag - Bageshwar section)	MDR	10.7						
	Pithoragarh	Udiyari Bend - Thal	SH	22.0						
	Contract Package 7 - Total			**90.0**	**10.3**	**0.0**	**10.3**	**LCB**	**3**	**8**
Contract 8	Champawat	Pulla - Chamdeol - Shiling Motor Road	VR	6.5						
	Champawat	Lohaghat - Chaumel Motor Road	VR	7.5						
	Champawat	Thuligarh - Bhairav Mandir Road	VR	6.3						
	Champawat	Kakrali - Thuligarh	VR	13.0						
	Contract Package 8 - Total			**33.3**	**7.6**	**0.0**	**7.6**	**LCB**	**2**	**7**
	PROJECT 1 TOTAL			**575.2**	**55.1**	**0.0**	**55.1**			

OUTLINE OF PROJECT PERFORMANCE MONITORING SYSTEM
PROJECT PERFORMANCE MONITORING SYSTEM

Goal and Objectives of the Program	Issues	Indicators	Baseline	Frequency
Goal: To support economic growth and reduce poverty	• Economic development • Local Accessibility • Poverty	Economic indicators: • Per capita GDP at State and District level levels • Unemployment & Underemployment rates at State and District levels • Labour employed in transport sector at State level disaggregated by gender: - % of poor in labour force - % of local versus imported labour - % of women in total labour force • Wage levels in transport sector at State level Local Accessibility indicators: (i) local transport • passenger fares and freight rates to key destinations • availability and frequency of local bus services • migration within State (ii) Access to opportunities in State • no. of unskilled poor workers employed on the program road improvement works • no. of formerly unemployed who found work through program • general employment opportunities within State in agricultural, tourist and industrial sectors (iii) Access to products in the project areas • Retail circulation of commodities in Districts • Volume/quantities and prices of selected consumer products by origins in selected markets and shops in each District. Poverty indicators: • poverty headcount in project area • road use by the poor • income and wages of local population	Start of civil works for Project 1	Every two years until 4 years after the completion of the full Investment Program.
Purpose: : • To provide enhanced access to markets, employment opportunities, education, health facilities and social services; • To reduce costs of inter-state transport;	• demand • operating costs • speed • safety • cost	Average daily traffic and traffic composition on the sub-project roads Average roughness index Travel time between key points Number of accidents, deaths, and injuries Maintenance cost ($/km)	Start of civil works for Project 1	Every two years until 4 years after the completion of the full Investment Program.
• To stimulate increased investment in the agricultural, industrial and tourism sectors.	• trade	Annual traffic entering the State on the railways and on key national highways, by vehicle type, passengers and tonnage Annual trade volume (exports and imports) into the State on the railways and key national highways.	Start of civil works for Project 1	Every two years until 4 years after the completion of the full Investment Program.

REVIEW OF ECONOMIC APPRAISAL

A. General

1. Detailed Project Reports (DPRs) have been prepared for the road improvement sub-projects proposed for implementation in Project 1 of the Investment Program. These DPRs included economic appraisals of the individual sub-projects, and they were prepared by two national consultants engaged by PWD in separate consultancy packages for Uttaranchal's Garhwal Zone and Kumaon Zone, respectively. The appraisals in both Zones adopted a conventional consumer surplus methodology that weighted the savings in vehicle operating costs (VOCs) and travel time costs gained by the sub-projects against the initial investment costs and the savings in future periodic and routine maintenance costs, over a 20 year period. All evaluations were carried out using the Highway Development and Management – 4 (HDM-4) computer model, which is a standard tool accepted by most donors for evaluating road rehabilitation projects.

2. The scope of the road improvement works and traffic conditions in the two Zones were similar, however the DPRs gave significantly different ranges of economic rates of return (EIRRs), as indicated below:

Garhwal Zone	EIRRs between 11% and 54%;
Kumaon Zone	EIRRs between 0% and 20%.

3. Copies of the HDM input files were obtained from PWD's consultants and the various traffic, road condition, works and maintenance standard input data were reviewed by the TA consultants. This review highlighted differences between the road user cost details as well as differences in maintenance strategies adopted in the two zones. The EIRRs in the Garhwal Zone were also found to be unrealistically high due to artificial differences between external constraints imposed on vehicle speeds in the do-minimum and do-something scenarios. These constraints resulted in significant over-estimation of the increases in vehicles speed resulting from the road improvement works.

4. Because of the differences in input data, maintenance data and external speed constraints inherent in each of the two design consultant's work, the TA consultants carried out an independent economic analysis of each of the sub-projects, using consistent input data. These analyses were carried out using an excel spreadsheet model that was based on the HDM vehicle operating cost (VOC) – roughness and speed – roughness relationships. In additional to evaluating the conventional VOC and time saving benefits arising from the road improvement works, the TA consultants' review also included:

(i) estimation of benefits resulting from slope stabilization works to be carried out on the hill roads that will avoid road closures and lengthy detours;

(ii) a risk analysis that examined the overall sensitivity of the NPV and EIRR to changes in construction cost, traffic growth, VOC values and travel time values;

(iii) a distribution analysis that gave a breakdown of the VOC and travel time saving benefits across the various vehicle groups using the road.

5. The economic analysis methodology followed by the TA consultants followed the ADB's *Guidelines for the Economic Analysis of Projects*. Calculation of EIRRs was based on the following general assumptions:

(i) the analysis period for each of the sub-projects was taken as the construction period followed by 20 years of operation;

(ii) all costs and benefits were expressed in Indian Rupees (Rs) at 2005 constant prices;

(iii) the foreign exchange component of the construction and maintenance costs was assumed to be zero, as it is PWD's intention to only engage national contractors. A standard conversion factor of 0.9 was applied to the financial costs of the non-traded local currency costs to calculate economic prices[43].

B. Review of Traffic Forecasts

6. Base year traffic flows on each of the sub-project roads in Garhwal Zone were taken from 7 day traffic counts carried out by the DPR consultant in 2005. No traffic counts were carried out by the DPR consultant in Kumaon Zone, but base year traffic flows were obtained from traffic counts carried out for the earlier Strategic Options Study (SOS) and Pre-Feasibility Study (PFS) for the USRIP[44]. The 2005 base year traffic flows in the two Zones are consistent and they are shown in Table M-1, in terms of annual average daily traffic (AADT). These traffic flows show a relatively low proportion of buses and trucks on the lower category Other District Roads (ODRs) and Village Roads (VRs) in the hills, which is consistent with field observations made by the TA consultants.

7. PWD's Network Development Master Plan study report contains a summary forecast of future traffic growth rates, based on the application of transport demand elasticity coefficients (varying from 1.5 to 1.1) to:

(i) economic and population growth projections for passenger traffic vehicles;

(ii) forecasts of agricultural, mining, industrial and trade growth for freight vehicles.

Tables M-2 and M-3 summarize the assumed transport demand elasticity coefficients and the resulting annual traffic growth rates adopted for the economic appraisal.

[43] The standard conversion factor of 0.9 was first adopted for road projects in India by the World Bank in 1997 (re. World Bank office memorandum dated 7 July 1997), and it has since been endorsed by the Ministry of Road Transport and Highways (MoRTH) for the economic evaluation of road projects in India. This standard conversion factor has also been used consistently for evaluation of road projects funded by the ADB and the World Bank.

[44] Re. the Strategic Options Study (SOS) for the Road Network of Uttaranchal, Final Report dated May 2005 and the Pre-Feasibility Study (PFS) for the Uttaranchal State Road Improvement Program, Final Report dated August 2005.

Table M-1 2005 Base Year Annual Average Daily Traffic (AADT) Flows used in the Economic Appraisal

Zone	Road No.	Road Name	Road Category	Terrain	AADT							
					Car	Light Goods Vehicle	Mini Bus	Medium Bus	Medium Truck (2 axle)	3 Wheeler	Motor Cycle	Total Motorised Traffic
Garhwal	1.1	Kuwa - Kafnol – Rarhi	ODR	Hilly	14	25	-	-	1	-	68	108
	1.2	Naugaon - Purola	ODR	Hilly	220	109	22	6	10	-	194	561
	2.2	Kalsi – Chakrata	MDR	Hilly	157	68	14	-	12	-	74	325
	4.1	Fatehpur - Lansdowne	ODR	Hilly	244	27	13	-	12	-	102	398
	4.2	Pathrakhkal - Gethichheda - Dodal – Umrasu	ODR	Hilly	74	14	9	-	-	-	55	152
	4.3	Pauri – Khirsu – Srinigar	ODR	Hilly	107	10	5	-	3	-	82	207
	5.1	Nandprayag – Ghat Motor Road	ODR	Hilly	309	24	-	7	7	-	112	459
	5.2	Rudraprayag - Pokri – Karanpryag	ODR	Hilly	75	3	-	7	3	15	92	195
	6.1	Jakoli – Guptkashi	ODR	Hilly	102	2	-	-	4	-	33	141
Kumaon	1	Mukandpur - Paigadhakia – Dhakiaa Gulabo	ODR	Plains	151	26	9	43	60	14	281	584
	2	Jaipur - Dhatoli - Kharmasha	ODR	Plains	151	26	9	43	60	14	281	584
	3	Zafarpur - Gularbhoj	ODR	Plains	162	28	10	46	60	15	303	628
	4	Betalghat - Bhatrojkhan	ODR	Hilly	79	19	2	-	7	-	130	237
	5	Nathuakhan - Suyalbadi	VR	Hilly	127	30	4	-	12	-	209	382
	6	Raniket – Mohan	MDR	Hilly	147	175	85	59	90	43	65	664
	7	Almora - Bageshwar	SH	Hilly	264	94	31	27	84	1	94	595
	8	Barechhina - Sheraghat (Berinag - Almora section)	SH	Hilly	270	90	17	20	62	-	64	523
	9	Udiyari Bend - Kanda (Berinag - Bageshwar section)	MDR	Hilly	205	10	13	4	9	-	29	270
	10	Thal - Udyari Bend (Berinag)	SH	Hilly	270	90	17	20	62	-	64	523
	11	Pulai - Dhola - Chamdeval Siling Motor Road	VR	Hilly	81	15	4	4	16	-	67	187
	12	Lohaghat - Choumel Motor Road	VR	Hilly	81	15	4	4	16	-	67	187
	13	Tuligarh - Bhairav Mandir	VR	Hilly	81	15	4	4	16	-	67	187
	14	Kakrali - Thuligarh	VR	Rolling	81	15	4	4	16	-	67	187

Source; PWD Detailed Project Reports for Project 1

Table M-2 Transport Demand Elasticity Coefficients used to determine Traffic Growth Rates

Vehicle	Years			
	2005 - 2009	2010 – 2014	2015 - 2019	2020 onwards
Cars	1.5	1.4	1.4	1.3
Buses	1.4	1.4	1.3	1.2
Trucks	1.3	1.2	1.2	1.1
Light Goods Vehicles	1.3	1.2	1.2	1.1

Source: Pre-feasibility Study

Table M-3 Annual Traffic Growth Rates adopted in the Economic Appraisal (%)

Vehicle	Years			
	2005 - 2009	2010 – 2014	2015 - 2019	2020 onwards
Cars	5.9%	5.5%	5.5%	5.1%
Buses	5.5%	5.5%	5.1%	4.7%
Trucks	5.3%	4.9%	4.9%	4.5%
Light Goods Vehicles	5.3%	4.9%	4.9%	4.5%
Motorcycles	7.4%	7.4%	7.0%	6.6%

Source: Pre-feasibility Study

8. An allowance was made in the economic appraisal for additional traffic generated by the decreases in transport costs resulting from the road improvement works. This generated traffic was estimated by adopting a price elasticity demand of one (i.e. a 10% decrease in travel costs was assumed to give a 10% increase in traffic). An additional allowance was made in the economic appraisal for induced traffic caused by increased development activity in each road's zone of influence that resulted from the road improvement works. Economic growth in the State's hill regions has been restrained by the poor condition of the road infrastructure and one of the main objectives of the Investment Program is to stimulate development of agriculture related industries and tourism. With low trafficked rural roads, relatively high levels of induced traffic, often in excess of 100%, are commonly found[45]. For the economic appraisal, induced traffic was conservatively assessed at 20% of base year traffic. This induced traffic was applied in 2011, 3 years after completion of the road improvement works.

[45] Re. paragraph 6 in Appendix 11 of the ADB RRP: IND 36320 for the Rural Roads Sector I Project in India.

C. Review of Construction and Maintenance Costs

9. Construction costs used in the economic appraisal were abstracted from cost estimates prepared by PWD's design consultants, following a value engineering review carried out by the TA consultants. These construction costs are summarized in Table M-4, at 2005 prices, and they include for design, construction supervision, resettlement and environmental monitoring. A standard conversion factor of 0.9 was applied to the financial costs of the non-traded local currency costs to calculate economic prices, as noted previously in paragraph 2. Two of the road improvement sub-projects in Kumaon Zone (Tuigarh – Bhairav road and Kakrali – Tuligarh road) have relatively high construction costs per kilometer. These high costs result from a requirement to construct new concrete pavements due to the high surface run-off that flows on the roads and causes severe damage to the existing surface.

10. It is anticipated that the road improvement contracts in Project 1 would be awarded early in 2007 and it is intended that each contract would have a 15 month duration. It was therefore assumed that spread of construction costs for each road would be:

2007	72% of construction cost
2008	28% of construction costs.

Table M-4 Summary of Construction Costs at 2005 prices

Zone	Road No.	Road Name	Road Category	Terrain	C'Way Width M	Length Km	Construction Cost (Rs million)		Construction Cost / Km (Rs million)	
							Financial	Economic	Financial	Economic
Garhwal	1.1	Kuwa - Kafnol – Rarhi	ODR	Hilly	3.75	47.55	78.86	70.97	1.66	1.49
	1.2	Naugaon – Purola	ODR	Hilly	3.75	17.89	30.44	27.40	1.70	1.53
	2.2	Kalsi – Chakrata	MDR	Hilly	3.75	41.57	133.41	120.07	3.21	2.89
	4.1	Fatehpur – Lansdowne	ODR	Hilly	3.75	21.81	42.79	38.51	1.96	1.77
	4.2	Pathrakhkal - Gethichheda - Dodal – Umrasu	ODR	Hilly	3.75	17.99	52.84	47.56	2.94	2.64
	4.3	Pauri – Khirsu – Srinigar	ODR	Hilly	3.75	18.00	43.42	39.07	2.41	2.17
	5.1	Nandprayag – Ghat Motor Road	ODR	Hilly	3.75	18.49	57.14	51.43	3.09	2.78
	5.2	Rudraprayag - Pokri – Karanpryag	ODR	Hilly	3.75	14.51	48.78	43.90	3.36	3.03
	6.1	Jakoli – Guptkashi	ODR	Hilly	3.75	13.08	57.39	51.65	4.39	3.95
Kumaon	1	Mukandpur - Paigadhakia – Dhakiaa Gulabo	ODR	Plains	5.50	25.00	138.42	124.57	5.54	4.98
	2	Jaipur - Dhatoli – Kharmasha	ODR	Plains	5.50	10.80	66.98	60.28	6.20	5.58
	3	Zafarpur – Gularbhoj	ODR	Plains	5.50	13.80	64.92	58.43	4.70	4.23
	4	Betalghat – Bhatrojkhan	ODR	Hilly	3.75	16.70	47.58	42.82	2.85	2.56
	5	Nathuakhan – Suyalbadi	VR	Hilly	3.75	29.00	113.50	102.15	3.91	3.52
	6	Raniket – Mohan	MDR	Hilly	3.75	70.20	262.83	236.54	3.74	3.37
	7	Almora – Bageshwar	SH	Hilly	3.75	72.90	366.11	329.50	5.02	4.52
	8	Barechhina - Sheraghat (Berinag - Almora section)	SH	Hilly	3.75	42.30	224.63	202.17	5.31	4.78
	9	Udiyari Bend - Kanda (Berinag - Bageshwar section)	MDR	Hilly	3.75	25.70	126.07	113.46	4.91	4.41
	10	Thal - Udyari Bend (Berinag)	SH	Hilly	3.75	22.00	157.87	142.08	7.18	6.46
	11	Pulai - Dhola - Chamdeval Siling Motor Road	VR	Hilly	3.75	6.50	33.44	30.09	5.14	4.63
	12	Lohaghat - Choumel Motor Road	VR	Hilly	3.75	7.50	26.18	23.56	3.49	3.14
	13	Tuligarh - Bhairav Mandir	VR	Hilly	3.75	6.30	101.13	91.02	16.05	14.45
	14	Kakrali – Thuligarh	VR	Rolling	3.75	13.00	206.48	185.83	15.88	14.29

Source: Detailed Project Reports prepared by PWD's Design Consultants

11. Costs for routine and periodic maintenance works assumed in the review are shown in Table M-5 below, at 2005 prices. These maintenance costs are similar to the costs assumed by PWD's design consultants in the DPR economic appraisals, as well as general cost rates adopted by PWD in their own maintenance operations. The do-minimum routine and periodic costs are higher than the do-something costs because of the necessity for carrying out more regular patching and higher initial surface preparation costs, respectively.

Table M-5 Routine and Periodic Maintenance Costs

Item	Financial Cost (Rs)	Economic Cost (Rs)
Do-Minimum Scenario (Base Case)		
Routine Maintenance	63,000 / Km[46]	56,700 / Km
Clearance of land slip debris on hill roads	Average 10,000 / Km	Average 9,000 / Km
Periodic Maintenance:		
Single layer surface dressing or seal coat	60 / square meter	54 / square meter
Asphalt overlay (nominal 40mm thickness)	100 / square meter	90 / square meter
Do-Something Scenario		
Routine Maintenance	45,000 / Km	40,500 / Km
Periodic Maintenance:		
Single layer surface dressing	50 / square meter	45 / square meter

Source: ADB TA consultants

D. Review of Maintenance Strategies and Pavement Deterioration Assumptions

12. In the economic appraisals carried out by PWD's two design consultants, periodic maintenance interventions on the road pavements were scheduled at 5 year intervals on all roads in the Do-Minimum and Do-Something scenarios. The interventions were assumed to be thin asphalt overlays. The deterioration profile of the roads over the evaluation period, expressed in terms of the international roughness index (IRI), was calculated by the HDM-4 computer model, based on assumptions of residual pavement strength and various deterioration factors. There was a marked difference between the computer generated roughness deterioration rates in the Garhwal and Kumaon Zones, due to different assumptions regarding pavement performance. In the Garhwal Zone, the roughness profiles showed a general trend of deterioration with time, which is expected, however in the Kumaon Zone, the effects of the 5 yearly overlays were shown as giving progressive strengthening which gave an unrealistic general trend for roughness improving with time. These

[46] Routine maintenance costs of Rs 126,000 per km were taken for the do-minimum scenario on the Tuligarh – Bhairav road and the Kakrali – Tuligarh road in the Kumaon Zone due to the severe damage that occurs due to surface water flowing on the road (re. paragraph 9.

differences in the assumed pavement deterioration properties in the two Zones contribute to the difference in the ranges of EIRR values shown in paragraph 2.

13. Pavement deterioration rates on secondary and tertiary network roads with low traffic flows, such as those in the USRIP are influenced as much by external environmental factors (e.g. as surface water flowing on the pavement surface and weathering effects), as by road traffic effects and periodic maintenance interventions. These environmental factors are not always modeled realistically by HDM-4, unless specific calibration of the model has been made to reflect the particular characteristics of a region.

14. In view of the differences in pavement deterioration properties adopted in the two zones, as well as the difficulty in ensuring that HDM-4 realistically models deterioration on lowly trafficked roads, the TA consultants applied consistent periodic maintenance interventions and roughness deterioration rates to all sub-projects in the two Zones. In the review, a more pessimistic maintenance strategy was assumed in the do-minimum (base) case where fewer periodic maintenance interventions were made. For consistency, the following maintenance strategy was assumed for all road sections:

Do-Minimum Scenario:
- surface dressing seal in 2010;
- asphalt overlay (nominal 40mm thickness) in 2018;
- surface dressing seal in 2026.

Do-Something Scenario:
- surface dressing seals in 2015 and 2023.

15. The pavement roughness deterioration rates shown below were used in the TA consultants' review for all sub-project roads:

Do-Minimum Scenario:
- initial 2005 base year roughness assessed from the road condition surveys carried out by the design consultants;
- roughness deterioration rate of 0.3 m/km per year, until the IRI reaches 12 m/km, and then 0.4 m/km up to a maximum IRI value of 16 m/km.

Do-Something Scenario:
- initial IRI value of 4.0 m/km on completion of the road improvement works;
- roughness deterioration rate of 0.05 m/km.

E. Review of Vehicle Operating Costs and Travel Time Costs

16. Vehicle operating costs per vehicle - kilometer were computed by HDM-4 in the DPR economic appraisals for each class of vehicle, using input values for the economic costs of new vehicles, tyres, fuel, lubricants and maintenance labor that were abstracted from the various recognized sources in India[47]. Wherever necessary, the costs were converted to a 2005 price level using the Indian Wholesale Price Index published by the Ministry of Commerce and Industry. Although both design consultants generally obtained the VOC data from the same sources, there were some differences in the values adopted for the economic

[47] New vehicle prices were generally obtained from manufacturers. Fuel prices were obtained from the Ministry of Petroleum. Other input costs were obtained from an "Updated Road User Cost Study" published by the Indian Central Road Research Institute (CRRI) in 2001.

appraisals in each Zone. The TA consultants took consistent input data for both Zones in their review, which is shown overleaf in Table M-6.

17. Unit values of time for passengers and cargo were taken from 2001 "Updated Road User Cost Study" published by the Indian Central Road Research Institute (CRRI), converted to 2005 prices using the Indian Wholesale Price Index. Again there were differences in the unit values of time adopted by the two design consultants. Consistent values of time for passengers and cargo were taken by the TA consultants for both Zones in their review and these values are shown in Table M-6. The unit values of time for passengers and cargo obtained using the CRRI data were reduced by 15% to allow for the lower per capita income and lower load factors, respectively, that exist in Uttaranchal compared with national averages. The time values for car passengers were also reduced from those given in the CRRI study as in the hill regions of Uttaranchal, "jeep" type vehicles are commonly used as taxis by the lower income groups. These "jeeps" generally are overcrowded with passengers, and this factor is reflected in the passenger occupancy data shown in Table M-6, that was obtained from origin – destination surveys carried out in the previous SOS and PFS planning studies.

18. In the TA consultants' review, the unit VOC costs per vehicle and speeds were calculated for IRI values varying from 2 m/km to 16 m/km using the EXCEL based Roads Economic Decision Model (RED), downloaded from the World Bank's website[48]. This model replicates the formulae contained in HDM-4's Road User Effects model to calculate VOCs and speeds from given IRI values and other terrain parameters. Typical VOCs and speeds for hill roads are shown overleaf in Tables M-7 and M-8, respectively.

19. VOC and travel time saving benefits accruing from generated traffic (re. paragraph 8) were calculated using 50% of the unit costs shown in Table M-6, due to the subjective nature of these benefits.

[48] Roads Economic Decision Model, version 3.2 dated June 2004 downloaded from http://www.worldbank.ord/html/fpd/transport/roads/tools.htm

Table M-6 Input Data used in calculation of Vehicle Operating Costs and Time Costs

	Car	Light Goods Vehicle	Mini Bus	Medium Bus	Medium Truck (2 axle)	3 wheeler	Motorcycle
Economic Unit Operating Costs							
New Vehicle Cost (Rs/vehicle)	361,300	577,700	600,000	877,300	759,400	100,000	46,385
Fuel Cost (Rs/litre)	25.20	18.60	18.60	18.60	18.60	26.00	25.20
Lubricant Cost (Rs/litre)	85.00	85.00	85.00	85.00	85.00	85.00	85.00
New Tire Cost (Rs/tyre)	1,150.00	4,500.00	4,500.00	9,000.00	9,000.00	450.00	350.00
Maintenance Labour Cost (Rs/hour)	35.00	35.00	35.00	35.00	35.00	25.00	25.00
Crew Cost (Rs/hour)	60.00	60.00	94.00	94.00	72.00	35.00	0.00
Interest Rate (%)	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Vehicle Utilization and Loading							
Kilometres Driven per Year (km)	25,000	40,000	35,000	50,000	65,000	25,000	10,000
Hours Driven per Year (hr)	650	1,100	1,400	1,800	1,800	1,200	400
Service Life (years)	10	12	10	10	10	10	10
Percent of Time for Private Use (%)	50.00	0.00	0.00	0.00	0.00	50.00	100.00
Gross Vehicle Weight (tons)	1.20	3.50	1.50	6.00	12.00	0.40	0.20
Economic Unit Time Costs							
Passenger Occupancy (No.)	6.5	0.0	25.0	34.0	2.0	4.0	1.9
Work Related Trips (%)	75%	100%	75%	75%	100%	75%	75%
Passenger Work Time Cost (Rs/hr)	19.00	0.00	10.40	10.40	10.00	10.40	20.00
Passenger Non-Work Time Cost (Rs/hr)	9.50	0.00	5.20	5.20	5.00	5.20	10.00
Cargo Delay Time Cost (Rs/hr)		31.60	0.00	0.00	87.20	0.00	0.00
Time Cost per Vehicle (Rs/hr)	108.06	31.60	227.50	309.40	107.20	36.40	33.25

Source: TA Consultants' review of Economic Appraisals carried out by PWD's Design Consultants

Table M-7 Roughness – VOC Relationships

IRI m/Km	VOC per Km (Rs)						
	Car	Light Goods Vehicle	Mini Bus	Medium Bus	Medium Truck (2 axle)	3 wheeler	Motorcycle
2.0	6.05	7.79	7.46	9.65	12.48	1.71	1.29
3.0	6.07	7.83	7.49	9.68	12.53	1.72	1.30
4.0	6.17	8.01	7.62	9.90	12.81	1.75	1.32
5.0	6.27	8.22	7.80	10.15	13.11	1.79	1.35
6.0	6.38	8.46	8.02	10.44	13.42	1.82	1.40
7.0	6.50	8.70	8.26	10.74	13.72	1.86	1.45
8.0	6.61	8.95	8.51	11.04	14.02	1.90	1.50
9.0	6.73	9.18	8.75	11.34	14.32	1.94	1.56
10.0	6.86	9.42	8.99	11.63	14.61	1.98	1.61
11.0	6.99	9.65	9.24	11.92	14.90	2.02	1.65
12.0	7.13	9.89	9.49	12.22	15.19	2.06	1.70
13.0	7.29	10.14	9.74	12.52	15.47	2.11	1.74
14.0	7.47	10.40	10.01	12.83	15.77	2.16	1.78
15.0	7.67	10.67	10.30	13.16	16.07	2.21	1.83
16.0	7.89	10.96	10.59	13.50	16.39	2.28	1.87

Source: TA consultants

Table M-8 Roughness – Speed Relationships

IRI m/Km	Speed Km/Hr						
	Car	Light Goods Vehicle	Mini Bus	Medium Bus	Medium Truck (2 axle)	3 wheeler	Motorcycle
2.0	42.06	41.86	41.23	40.83	40.58	42.03	42.05
3.0	42.06	41.85	41.23	40.82	40.55	42.02	42.05
4.0	42.06	41.84	41.22	40.80	40.51	42.02	42.05
5.0	42.06	41.82	41.20	40.77	40.47	42.02	42.05
6.0	42.05	41.80	41.16	40.72	40.42	42.00	42.03
7.0	42.02	41.76	41.08	40.63	40.35	41.98	42.01
8.0	41.96	41.69	40.93	40.49	40.24	41.91	41.94
9.0	41.83	41.55	40.69	40.25	40.07	41.79	41.82
10.0	41.61	41.31	40.32	39.89	39.80	41.57	41.60
11.0	41.25	40.92	39.79	39.39	39.41	41.21	41.24
12.0	40.69	40.33	39.09	38.72	38.86	40.65	40.68
13.0	39.91	39.52	38.21	37.88	38.12	39.87	39.90
14.0	38.89	38.47	37.18	36.89	37.21	38.86	38.88
15.0	37.67	37.23	36.01	35.76	36.13	37.65	37.67
16.0	36.31	35.86	34.76	34.55	34.93	36.29	36.31

Source: TA consultants

F. Revised Economic Appraisal

20. A revised economic appraisal was carried out using a spreadsheet model for each separate sub-project that produced cost and benefit streams over the 20 year evaluation period, based on:

(i) the 2005 base year traffic flows and growth rates given in Tables M-1 and M-3, together with generated and induced traffic as described in Section B, paragraph 8;

(ii) economic construction costs detailed above in Table M-4;

(iii) routine and periodic maintenance economic costs set out in Table M-5;

(iv) maintenance strategies for the do-minimum and do-something scenarios described above in Section D, paragraph 14;

(v) pavement roughness values and deterioration rates given above in Section D, paragraph 15;

(vi) VOC and time costs for each year, calculated from the predicted pavement roughness values using the roughness – VOC and roughness – speed relationships described in Section E, paragraph 18, as well as the VOC and time input data shown in Table M-6;

21. In addition to the VOC and time saving benefits accruing from the forecast traffic and generated traffic, further VOC and time saving benefits were considered that resulted from slope stabilization works carried out on the hill roads. These benefits were assessed by assuming that in the do-minimum scenario, each of the sub-project hill roads would be closed for 10 days a year due to fallen debris and 50% of the traffic would divert to lengthier alternative routes, between 100km and 150 km long.

22. The revised economic appraisal shows that the 23 no. sub-project road improvement works to be implemented in Project 1 are economically viable with an economic rate of return (EIRR) of 16.3% and a net present value (NPV) at a 12% discount rate of Rs 648 million. Results of the revised economic appraisal are given in Table M-9 which shows the EIRR's and NPV's of the individual sub-projects and contract packages, as well as summary base year traffic and roughness data. Table M-10 shows the cost and benefit streams for the aggregated total of the 23 no. sub-projects in Project 1, over the full evaluation period.

23. Sensitivity tests were carried out to investigate the robustness of the economic viability of the project to cost over-runs and reduction in benefits. The results of the sensitivity tests carried out on the aggregated sub-projects are summarized in Table M-11. These tests demonstrate that Project 1 remains viable with EIRR values staying above the normally accepted viability threshold of 12% if costs increase by 20% or if benefits decrease by 20%. In a severe worse case scenario, with construction costs increasing by 20% and benefits decreasing by 20%, the EIRR would fall to 11.2%.

24. In order to bring the NPV of the project down to zero, initial construction costs would have to increase by 37% (i.e. increase by a factor of 1.37) or benefits would have to reduce by 30% (i.e. a decrease by a factor of 0.70).

Table M-9 Summary Results of the Revised Economic Appraisal

Zone	Contract Package No.	Road No.	Road Name	Road Type	Length Km	2005 AADT	2005 IRI	EIRR %	NPV @ 12% (Rs million)	EIRR for Contract Package %	NPV @ 12% for Contract Package (Rs million)
Garhwal	1	1.1	Kuwa - Kafnol – Rarhi	ODR	47.55	108	10.0	10.2%	-7.6		
	1	1.2	Naugaon – Purola	ODR	17.89	561	8.4	34.9%	51.1		
	1	2.2	Kalsi – Chakrata	MDR	41.57	325	10.2	14.6%	20.8	16.3%	64.3
	2	4.1	Fatehpur – Lansdowne	ODR	21.81	398	6.3	19.0%	18.8		
	2	4.2	Pathrakhkal - Gethichheda - Dodal – Umrasu	ODR	17.99	152	8.3	8.1%	-10.6		
	2	4.3	Pauri – Khirsu – Srinigar	ODR	18.00	207	10.3	15.4%	9.0	14.1%	17.1
	3	5.1	Nandprayag – Ghat Motor Road	ODR	18.49	459	8.0	17.4%	19.4		
	3	5.2	Rudraprayag – Pokri – Karanpryag	ODR	14.51	195	8.0	6.7%	-12.8		
	3	6.1	Jakoli – Guptkashi	ODR	13.08	141	8.3	28.2%	61.8	18.8%	68.4
Kumaon	4	1	Mukandpur - Paigadhakia – Dhakiaa Gulabo	ODR	25.00	584	11.2	14.2%	17.9		
	4	2	Jaipur - Dhatoli – Kharmasha	ODR	10.80	584	8.8	8.6%	-12.8		
	4	3	Zafarpur – Gularbhoj	ODR	13.80	628	6.7	10.0%	-7.5	11.8%	-2.4
	5	4	Betalghat – Bhatrojkhan	ODR	16.70	237	8.6	10.0%	-5.2		
	5	5	Nathuakhan – Suyalbadi	VR	29.00	382	10.7	12.5%	3.3		
	5	6	Raniket – Mohan	MDR	70.20	664	10.2	28.1%	311.4	22.6%	309.5
	6	7	Almora – Bageshwar	SH	72.90	595	11.6	21.4%	221.6	21.4%	221.6
	7	8	Barechhina - Sheraghat	SH	42.30	523	11.0	17.5%	77.2		
	7	9	Udiyari Bend - Kanda	MDR	25.70	270	10.6	9.8%	-15.1		
	7	10	Thal - Udyari Bend (Berinag)	SH	22.00	523	11.6	15.9%	36.3	15.2%	98.4
	8	11	Pulai - Dhola - Chamdeval Siling Motor Road	VR	6.50	187	8.0	13.4%	2.5		
	8	12	Lohaghat - Choumel Motor Road	VR	7.50	187	8.0	17.6%	8.6		
	8	13	Tuligarh - Bhairav Mandir	VR	6.30	187	9.2	3.5%	-38.8		
	8	14	Kakrali – Thuligarh	VR	13.00	187	8.7	0.2%	-101.5	4.4%	-129.1
			Total Project 1							**16.3%**	**647.9**

Source: ADB TA Consultants' appraisal

Table M-10 Cost and Benefit Streams for Project 1 (Rs million)

	Base Case – Do Minimum				Rehabilitation – Do Something				Benefits					
Year	Capital Cost	Routine Cost	Time Cost	VOC	Capital Cost	Routine Cost	Time Cost	VOC	Capital Cost	Routine Cost	Time Cost	VOC	Total	Year
2006		38.71	215.50	656.67		38.71	215.50	656.67						2006
2007		38.71	229.65	702.33	1,607.81	38.71	229.65	702.33	-1,607.81				-1,607.81	2007
2008		38.71	254.07	779.22	625.26	22.93	233.02	622.25	-625.26	15.78	21.05	156.97	-431.45	2008
2009		38.71	280.47	861.93		22.93	255.43	683.56		15.78	25.05	178.37	219.20	2009
2010	120.64	38.71	298.99	920.29		22.93	270.24	723.82	120.64	15.78	28.75	196.47	361.65	2010
2011		38.71	340.59	1,049.71		22.93	307.92	825.81		15.78	32.67	223.90	272.36	2011
2012		38.71	363.83	1,121.95		22.93	325.99	875.04		15.78	37.84	246.92	300.54	2012
2013		38.71	388.59	1,198.34		22.93	344.86	926.48		15.78	43.73	271.86	331.38	2013
2014		38.71	415.66	1,280.42		22.93	364.85	981.01		15.78	50.81	299.41	366.00	2014
2015		38.71	444.30	1,366.52	97.27	22.93	385.54	1,037.53	-97.27	15.78	58.77	328.99	306.27	2015
2016		38.71	473.65	1,455.01		22.93	407.41	1,096.21		15.78	66.23	358.80	440.82	2016
2017		38.71	504.47	1,547.89		22.93	430.56	1,159.48		15.78	73.92	388.40	478.10	2017
2018	201.06	38.71	536.65	1,644.99		22.93	455.04	1,226.48	201.06	15.78	81.61	418.51	716.96	2018
2019		38.71	567.18	1,738.30		22.93	480.94	1,297.41		15.78	86.23	440.89	542.90	2019
2020		38.71	600.98	1,839.82		22.93	506.43	1,367.32		15.78	94.55	472.49	582.83	2020
2021		38.71	636.24	1,945.98		22.93	533.29	1,441.08		15.78	102.95	504.90	623.63	2021
2022		38.71	671.64	2,053.86		22.93	561.61	1,518.90		15.78	110.03	534.96	660.77	2022
2023		38.71	708.98	2,167.47	97.27	22.93	591.47	1,601.02	-97.27	15.78	117.51	566.46	602.48	2023
2024		38.71	748.41	2,287.23		22.93	622.94	1,685.90		15.78	125.47	601.33	742.58	2024
2025		38.71	790.05	2,413.52		22.93	656.13	1,777.24		15.78	133.91	636.28	785.97	2025
2026	116.99	38.71	834.14	2,546.91		22.93	691.14	1,873.63	116.99	15.78	143.00	673.27	949.06	2026
2027		38.71	878.79	2,682.71	-223.31	22.93	728.05	1,975.37	223.31	15.78	150.74	707.34	1,097.18	2027
Total	438.69	851.69	11,182.83	34,261.06	2,204.31	536.01	9,598.0	26,054.54	-1,765.62	315.68	1,584.82	8,206.52	8,341.41	
NPV @ 12%	125.36	295.95	2,918.17	8,951.87	1,752.30	201.96	2,588.50	7,100.70	-1,626.94	93.99	329.67	1851.17	**647.89**	
												EIRR =	**16.3%**	

Source: TA Consultants' appraisal

Table M-11 Sensitivity Analysis of the Revised Economic Appraisal

Sensitivity Test	EIRR %	NPV (Rs million)
Project 1 - Base Case	16.3	647.9
Benefits decreased by 20%	13.5	211.7
Initial construction costs increased by 20%	13.7	297.4
Benefits decreased by 20% and initial construction costs increased by 20%	11.2	-138.7
Traffic growth reduced by 20%	14.9	408.2
Traffic growth reduced by 50%	12.8	104.7

Source: TA Consultants' appraisal

25. The overall EIRR value of 16.3% for the Project 1 road improvement works is considered to be reasonable, especially in view of the relatively low traffic flows that are typical of the secondary and tertiary rural roads in Uttaranchal's hill regions. Although the rather severe sensitivity test, where costs increase by 20% and benefits drop by 20% causes the EIRR to fall below the normally accepted viability threshold value of 12%, the Project is still considered to be justified. This road improvement program is considered to be a vital component of the State's overall initiative to generate economic growth and alleviate poverty by exploiting the considerable development in the agricultural, industrial and tourism sectors.

26. Table M-9 shows that the EIRRs for seven out of the eight contract packages are generally in excess of 12%, however contract package no. 8 has an EIRR of 4.4%. This low rate of return is caused by the relatively low traffic and high construction costs for the Tuligarh – Bhairav road and the Kakrali – Tuligarh road, as discussed in paragraph 9. These two village roads are essential links in the road network as they provide access to a strategic area bordering Nepal and an important religious shrine. Long term benefits will accrue on these two roads through an increase in religious tourism and international traffic. The impacts resulting from these two roads would be closely monitored in relation to base line data in the project performance monitoring system.

G. Risk Analysis

27. A risk analysis has been carried out of the revised economic appraisal using the proprietary software package @RISK. In this risk analysis, triangular probability distributions were assigned to input variables, based on an assessment of likely range of variations and a simulation was performed to quantify the overall probability distributions for the EIRR and NPV output values. Table M-12 below shows the variations in the individual parameters that were considered in the risk analysis.

28. Summary results of the risk analysis of the EIRR and NPV values are shown overleaf in Figures M-1 and M-2. These results show:

(i) the EIRR distribution for Project 1 has a 5 percentile value of 13.0% and a 95 percentile value of 19.9%;

(ii) the NPV for Project 1 has a 5 percentile value of Rs 150.0 million and a 95 percentile value of Rs 1,192.7 million.

Table M-12 Input Distributions in Economic Appraisal Risk Analysis

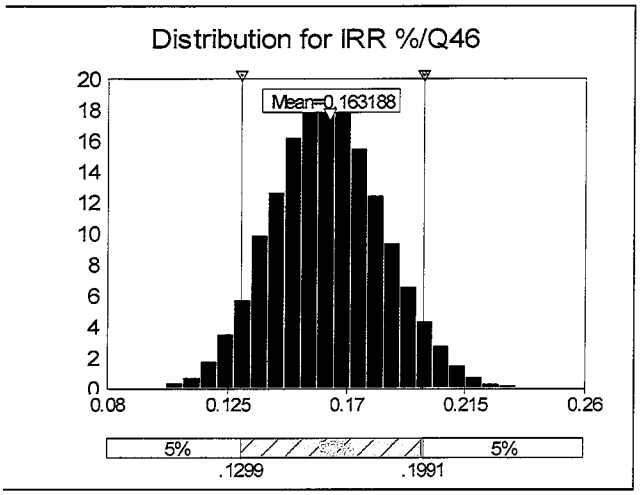
Input	Minimum Value	Average Value	Maximum Value
Base Year traffic flow factor	0.8	1.0	1.2
Traffic growth rate factor	0.75	1.0	1.25
Induced traffic factor	1.0	1.2	1.4
VOC factor	0.8	1.0	1.2
Travel time cost factor	0.6	1.0	1.4
Do minimum periodic maintenance cost factor	0.6	1.0	1.4
Do minimum routine maintenance cost factor	0.6	1.0	1.4
Do something periodic maintenance cost factor	0.7	1.0	1.3
Do something routine maintenance cost factor	0.7	1.0	1.3
Construction cost factor	0.8	1.0	1.2

Source: TA Consultants' evaluation

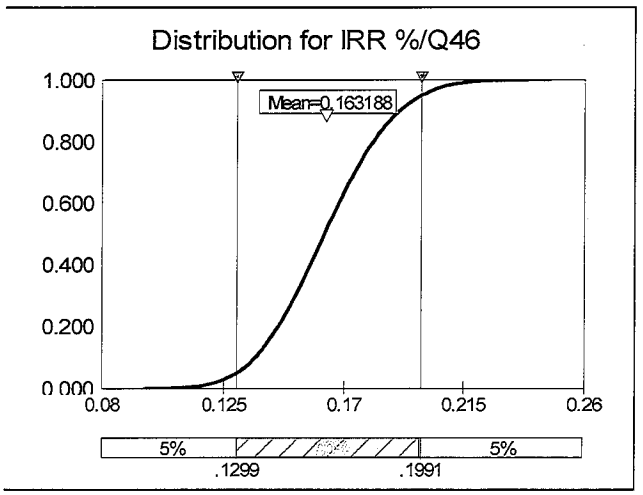
29. The results of the risk analysis give a more realistic assessment of the robustness of the overall EIRR for Project 1, than the standard sensitivity tests reported in paragraph 23, as it considers the combined effects of likely fluctuations in key parameters. This analysis showed that there was only a 1% probability of the EIRR falling below 12% viability threshold value. The economic viability of Project 1 is considered reasonable, given the low traffic flows on the secondary and tertiary roads.

Figure M-1

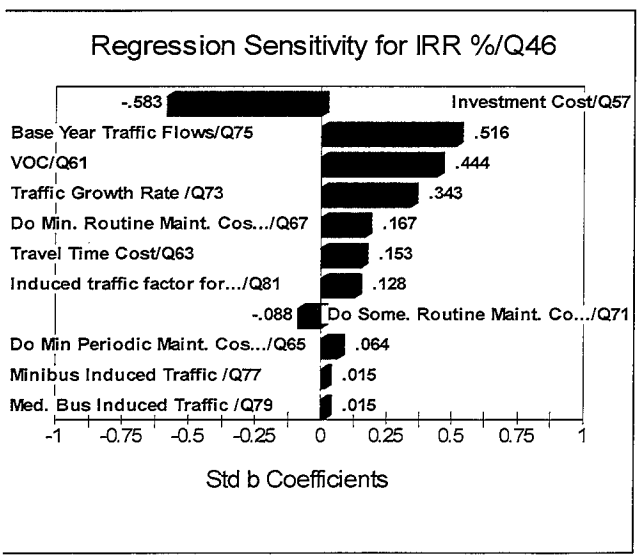
Simulation Results for EIRR%



Summary Information	
Workbook Name	Economics_Year1_All.xls
Number of Simulations	1
Number of Iterations	20000
Number of Inputs	12
Number of Outputs	2
Sampling Type	Latin Hypercube
Simulation Start Time	04/07/2006 03:11
Simulation Stop Time	04/07/2006 04:00
Simulation Duration	00:49:10
Random Seed	1242835192



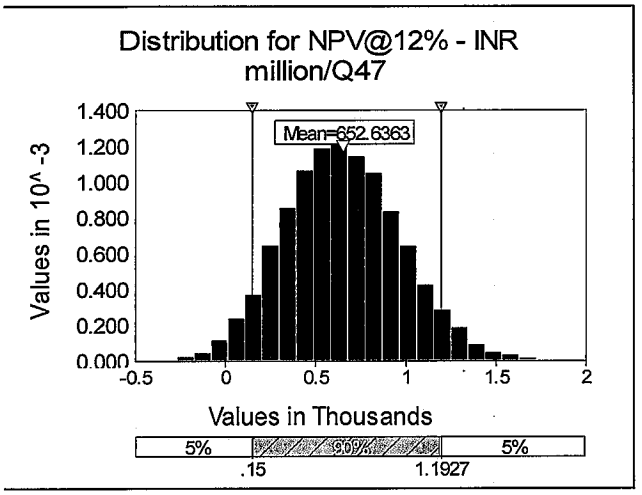
Summary Statistics			
Statistic	Value	%tile	Value
Minimum	9.6%	5%	13.0%
Maximum	24.7%	10%	13.7%
Mean	16.3%	15%	14.1%
Std Dev	2.1%	20%	14.5%
Variance	0.000441345	25%	14.9%
Skewness	0.17196112	30%	15.2%
Kurtosis	2.928112516	35%	15.4%
Median	16.3%	40%	15.7%
Mode	13.7%	45%	16.0%
Left X	13.0%	50%	16.3%
Left P	5%	55%	16.5%
Right X	19.9%	60%	16.8%
Right P	95%	65%	17.1%
Diff X	6.9%	70%	17.4%
Diff P	90%	75%	17.7%
#Errors	0	80%	18.1%
Filter Min		85%	18.5%
Filter Max		90%	19.1%
#Filtered	0	95%	19.9%

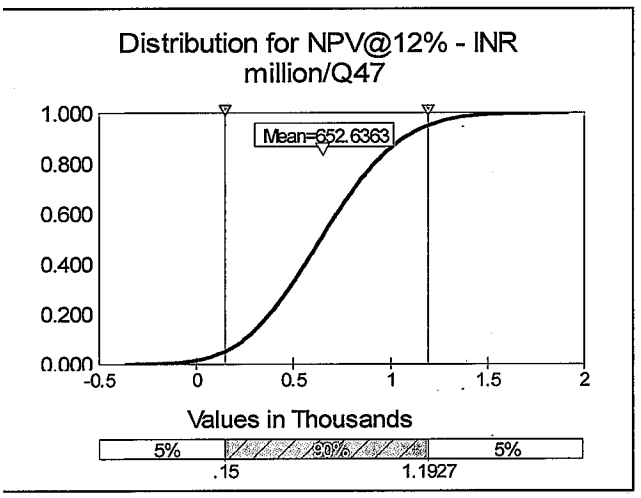


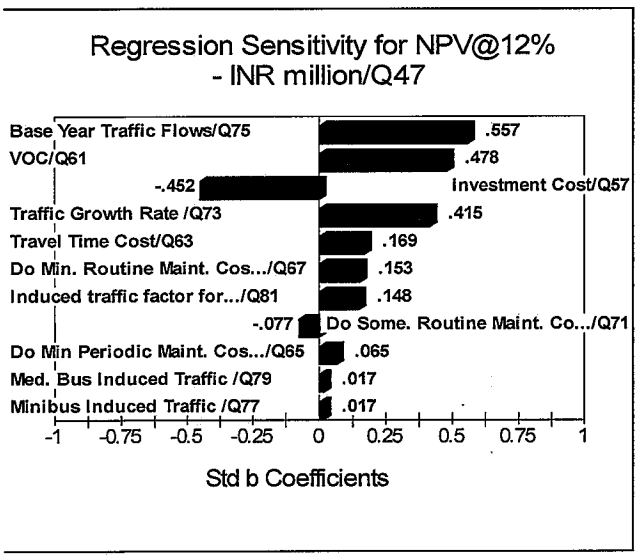
Sensitivity			
Rank	Name	Regr.	Corr
#1	Investment Cos	-0.583	-0.566
#2	Base Year Traff	0.516	0.499
#3	VOC / Q61	0.444	0.434
#4	Traffic Growth R	0.343	0.326
#5	Do Min. Routine	0.167	0.159
#6	Travel Time Cos	0.153	0.150
#7	Induced traffic fa	0.128	0.145
#8	Do Some. Routi	-0.088	-0.080
#9	Do Min Periodic	0.064	0.064
#10	Minibus Induced	0.015	0.013
#11	Med. Bus Induc	0.015	0.014
#12	Do Some. Perio	0.000	0.001
#13			
#14			
#15			
#16			

Figure M-2

Simulation Results for NPV @ 12% (INR million)







Summary Information	
Workbook Name	Economics_Year1_All.xls
Number of Simulations	1
Number of Iterations	20000
Number of Inputs	12
Number of Outputs	2
Sampling Type	Latin Hypercube
Simulation Start Time	04/07/2006 03:11
Simulation Stop Time	04/07/2006 04:00
Simulation Duration	00:49:10
Random Seed	1242835192

Summary Statistics			
Statistic	Value	%tile	Value
Minimum	-360.195	5%	149.991
Maximum	1915.121	10%	251.686
Mean	652.636	15%	321.321
Std Dev	317.018	20%	380.508
Variance	100500.3741	25%	430.348
Skewness	0.168132442	30%	478.049
Kurtosis	2.929451678	35%	521.695
Median	643.920	40%	563.930
Mode	406.356	45%	603.568
Left X	149.991	50%	643.920
Left P	5%	55%	681.815
Right X	1192.658	60%	724.005
Right P	95%	65%	768.630
Diff X	1042.667	70%	813.908
Diff P	90%	75%	862.888
#Errors	0	80%	917.788
Filter Min		85%	983.860
Filter Max		90%	1066.360
#Filtered	0	95%	1192.658

Sensitivity			
Rank	Name	Regr	Corr
#1	Base Year Traff	0.557	0.541
#2	VOC / Q61	0.478	0.467
#3	Investment Cost	-0.452	-0.437
#4	Traffic Growth R	0.415	0.397
#5	Travel Time Cos	0.169	0.166
#6	Do Min. Routine	0.153	0.146
#7	Induced traffic fa	0.148	0.162
#8	Do Some. Routi	-0.077	-0.071
#9	Do Min Periodic	0.065	0.062
#10	Med. Bus Induc	0.017	0.014
#11	Minibus Induced	0.017	0.015
#12	Do Some. Perio	0.000	0.001
#13			
#14			
#15			
#16			

H. Benefit Distribution Analysis and Poverty Impact Ratio

30. The total discounted benefits of the project amount to Rs 2,180.9 million. Of these benefits, Rs 1,851.3 million (85%) result from savings in vehicle operating costs and Rs 329.6 million (15%) result from savings in travel time. Tables M-13 and M-14 show the distribution of total project benefits across the various vehicle categories.

Table M-13 Distribution of Project Benefits

Type of Benefit	Discounted Project Benefits (Rs million)				
	Cars and Light Vehicles	Motorcycles	Buses	Trucks	Total
VOC savings	715.7	147.2	293.6	694.8	1,851.3
Travel time savings	157.8	32.3	88.5	51.0	329.6
Total Benefits	873.5	179.5	382.1	745.8	2,180.9

Source: TA Consultants' evaluation

Table M-14 Percentage Distribution of Project Benefits

Type of Benefit	% of Discounted Project Benefits				
	Cars and Light Vehicles	Motorcycles	Buses	Trucks	Total
VOC savings	32.8	6.7	13.5	31.9	84.9
Travel time savings	7.2	1.5	4.1	2.3	15.1
Total Benefits	40.0	8.2	17.6	34.2	100.0

Source: TA Consultants' evaluation

31. In normal terrain, time saving benefits of road rehabilitation projects commonly account for around 20% to 25% of total traffic benefits. In this Project, however, Table M-14 shows that the time saving benefits account for only 15% of total traffic benefits. This distribution of benefits is considered to be in order for the Project as vehicle speeds on the single lane hill are influenced as much by the frequent sharp bends, which are not affected by the road improvement works, as the pavement roughness, which is reduced by the road improvement works.

32. The poverty impact ratio (PIR) for Project 1 has been calculated to be 0.30, following the methodology generally adopted by ADB[49]. This represents the proportion of the benefits going to people below the poverty line. Details of this calculation are shown overleaf in Table M-15.

[49] Re. ADB's *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of Projects*, July 2001.

Table M-15 Calculation of Poverty Impact Ratio (PIR)

Description	Financial Value	Economic Value	Difference	% of Benefits to passengers & end users	Passenger / Freight End User Benefits	Transport Operator / Owner Benefits	Local Labour Employ.	Government / Economy	Total
Benefits:									
VOC savings for car passengers and owners		715.681	715.681	50%	357.841	357.841			715.681
VOC savings for m/c passengers and owners		147.171	147.171	0%	0.000	147.171			147.171
VOC savings for bus passengers and operators		293.558	293.558	50%	146.779	146.779			293.558
VOC savings for freight end-users and operators		694.760	694.760	50%	347.380	347.380			694.760
Time savings for car passengers and owners		157.820	157.820	100%	157.820	0.000			157.820
Time savings for m/c passengers and owners		32.342	32.342	0%	0.000	32.342			32.342
Time savings for bus passengers and operators		88.453	88.453	100%	88.453	0.000			88.453
Time savings for freight end-users and operators		51.041	51.041	50%	25.521	25.521			51.041
Employment benefits for previously un-employed		111.377	111.377				111.377		111.377
Total Benefits		**2,292.203**	**2,292.203**		1,123.793	1,057.033	111.377		2,292.203
Costs:									
Capital	1,683.957	1,515.561	-168.960					-168.396	-168.396
Maintenance	-104.430	-93.987	10.443					10.443	10.443
Labour	123.752	111.377	-12.375					-12.375	-12.375
Taxes	63.181		-63.181					-63.181	-63.181
Total Costs	1,766.460	1,532.951	-233.509					-233.509	-233.509
Net Benefits									
Gains and Losses	**-1,766.40**	**759.252**	**2,525.712**		1,123.793	1,057.033	111.377	233.509	2,525.712
Proportion to Poor:									
- car passengers / owners					0.70	0.00			
- m/c passengers / owners					0.00	0.00			
- bus passengers / operators					0.70	0.00			
- freight end users / operators					0.30	0.00			
- other							0.76	0.10	
Benefit to Poor									
- car passengers / owners					360.962	0.000			
- m/c passengers / owners									
- bus passengers / operators					164.662	0.000			
- freight end users / operators					111.870	0.000			
- other					0.000	0.000	84.647	23.351	
Total Benefit to Poor					637.495	0.000	84.647	23.351	745.492
								Poverty Impact Ratio (PIR)	**0.30**

Source: TA Consultants' evaluation

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

A. Linkages to the Country Poverty Analysis

Is the sector identified as a national priority in country poverty analysis?	☒ Yes ☐ No	**Is the sector identified as a national priority in country poverty partnership agreement?**	☒ Yes ☐ No

Contribution of the sector or sub sector to reduce poverty in India:

The proposed Uttaranchal State Road Investment is a part of State's Infrastructure vision which covers improvement of the existing road network and providing all weather accessibility to rural areas. The Project will assist Uttaranchal Public Works Department (PWD) to develop and maintain their road network and contribute to effective and efficient management of the road assets. About 10800 kilometers of project roads including state highways, major district roads, other district roads and village roads were selected because they offer the best opportunities to improve the road network connectivity within the states, and providing a connection between the lesser roads and the national highway network. The proposed project will be implemented in 7 separate Projects. For the Project 1, 573 kilometers of roads have been identified and the remaining will be selected in the subsequent phases during loan implementation. The Project will directly benefit the poor living in the region, as road transport is the primary, and often the only form of transport. Thus an efficient road network linking villages, towns and cities will provide stronger linkages between remote and poor regions and more developed markets. Infrastructure development encourages other development initiatives, which together considerably stimulate economic growth. Thus, it is expected that the investment will significantly improve the socioeconomic situation and enhance poverty reduction.

B. Poverty Analysis — General Intervention

The project roads are spread across all the thirteen districts of Uttaranchal. The planning commission estimates reveal that more than 35% population of the state live below the poverty line. The sample socio-economic survey carried out along the roads in Project 1 indicates that nearly 3 -6% of the households lived below the poverty line. However, it is expected that the levels of poverty are much higher in the interior villages of the districts. Being a new state, not much data is available on the extent of poverty in the 13 hill districts but estimates show that the people are surviving by depending on remittances (Rs. 320 crores/ U$72.7m) coming yearly from migrant workers all over India. The population in the project road catchment areas consists largely of rural people (75%), the majority of who are farmers and unskilled laborers. During social assessment along the road sections it was identified that nearly 4 – 11% were involved in businesses while 19 – 35% of the households were engaged in agricultural activities. On an average the women spent 4 hours for household and 5 hours in agricultural activities and had to travel a distance of at least 10-12 km a day. The average distance the households had to travel to access the nearest health facilities ranged from 3 to 6 km. In most of the districts, the survey reported that people had to travel nearly 6 – 7 km to the nearest bus stop to avail the local transport. The frequency of local transport was very poor, in most cases only one government bus service was available for the whole day and the people had to resort to other forms of informal local transport services. In cases of emergency, people depended on these private transport services (tempo, Jeep) for which they had to pay higher transportation charges.

The project will directly benefit approximately 3.5 million people living in the villages falling along the project roads. Vehicle ownership amongst the adjoining residents is low, and generally limited to two wheelers. As a result it is unlikely that significant operating cost savings will be passed on to the local road users. Users will, however benefit from time savings. There is a heavy government interest in the operation of public transport services, with the state governments effectively setting fares. In the hill areas, there is a thriving informal passenger transport service that is provided by light vehicle owners, which is largely unregulated. This informal but heavy used passenger service is much more competitive than the bus services and it is expected that the more of the transport cost savings would be passed on to the passengers through them. Freight services are more competitive, with a high proportion of these benefits likely to be passed on to the community through lower transport cost. As the project will improve road conditions, widen roads, and replace bridges, this will result in shorter travel distances, improved travel times and lower transport costs. With improved roads and better connectivity, farmers will be able to sell agricultural products and perishables to the neighboring markets with greater ease. The project will enable reliable access to social services, particularly health care services and education facilities. It will also benefit those who use the project roads to access district town centers, and the national highway network. People will benefit from lower transport costs leading to reduced consumer prices and induced economic and social development. The project will also generate significant employment opportunities for skilled and unskilled labor during the construction period. Unskilled labor (males and females) will be employed directly in road construction and indirectly by providing materials and services to the construction and maintenance activities. The Phase-1 project will generate employment opportunities of about 912600 person- days of work for unskilled workers and the whole project will generate 8.4 million person days. The poverty impact ratio (PIR) of Project 1 is 0.30.

Improved road networks will also provide improved linkages between the village communities and urban centers, which provides wider marketing facilities for agricultural and other indigenous products. People will have wider options in buying and selling their commodities. Small and petty village traders may tap the bigger markets, transport the produce fast and get more profit margins instead of solely depending on local markets and the middleman. Road networks not only link the village communities to better markets, but also open up wider work opportunities in distant places. People can shuttle to distant work sites and towns and engage in construction, factories, business as well as domestic works. If the transportation is efficient, people get regular work with higher wages without migrating permanently or seasonally. Improved road networks will also encourage urban entrepreneurs to invest in far and remote areas in commercial farming and industrial activities. Villagers may create new business partnerships that, in turn, develop their entrepreneurship skills. With more money flowing to the villages, there will be generation of more work opportunities through multiplier effect and backward-forward linkages in the economy. People get opportunities to open up tea stalls, hotels, garage and rest house and so on which in turn generate additional employment in terms of helping hands. With the improved networking and cash management, the villagers can tap new institutional credit and financial services. There will also be an increased scope for better management of public schemes which will help people to gain new knowledge on improved farming, land development, development and maintenance of natural resources through the formation of various economic and social development committees. The direct (access to social services, market, credit facilities, new technology etc) and indirect benefits (employment) of the Project thus will help to reduce the poverty and improve quality of life of people.

C. Participation Process

Is there a stakeholder analysis? ☒ Yes ☐ No
Is there a participation strategy? ☒ Yes ☐ No

As part of the project preparation, consultations were held at the level of primary and secondary stakeholders including directly affected people, executing agency and local administration departments of the project districts and NGOs. Issues related to the proposed project development and various activities involved in the planning and implementation was discussed. At the field level, 37 focused group discussions were held in all subprojects in Project 1, which comprised various groups including, village Panchayats, village administrative officers, men, women, farmers, business communities, concerned government departments and disadvantaged groups to ensure a comprehensive perspective on the project and its impacts. The main objective of these discussions was to ascertain community response to the project, their needs and demands from the projects, an estimate of losses that they would suffer, and steps to mitigate those losses. The directly affected populations were consulted in order to understand their concerns regarding the road construction and gather suggestions on the types of mitigation measures that should be considered to address the envisaged impacts.

D. Gender Development

Strategy to maximize impacts on women:
Women in the region are largely involved in household work, cultivation and other agricultural activities and spend at least 12-17 hours per day to carry out all these activities. Their use of roads, range from day to day household activities to economic activities such as agriculture and marketing for which they travel up to 10-12 kms per day. The improvement in road conditions and improved connectivity of village roads to the main network will encourage better transport services thus providing improved and better access for women and children, to social services, markets, work place, higher levels of schooling and better health facilities. Apart from improvement in transport services, the travel time savings due to improved road conditions will allow them more time to make frequent visits to health clinics, access marketing and credit facilities and seek better employment opportunities. The project design also includes provision of bus-stops, rest shed with drinking water facilities and public toilets which will also benefit women. During the construction period, women will have the opportunity to gain employment in construction and other associated activities. Along the road corridor, women are normally involved in road side activities such as running small eateries, tea stalls and pan shops etc thus with the coming up of colonies for construction workers and contractors petty businesses like tea/food stalls, grocery etc will flourish benefiting the women in improving their income earning capacities. In Project 1, no women headed households will be adversely affected, however adequate provision is included in the resettlement framework to mitigate such risks and reduce the hardship of women in subsequent phase roads. During the project implementation, women will receive preferential treatment for employment in the civil works and will receive equal wages like men for work of equal value with proper safeguards for the safety of their health.

E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	☐ Significant ☒ Not significant ☐ None	Project 1 the program involves the reconstruction and rehabilitation of about 573km of existing roads (23 road sections) that will be mostly improved within the existing ROW. The subproject roads pass mostly through hilly terrain and rural areas where settlements lying along the road are thinly populated. Out of the 23 road sections only 4 will have resettlement impacts. A detailed census was conducted in the 4 road sections and short resettlement plans have been prepared for each road section. Overall, there will be no private land acquisition, however 17 (87 APs) encroacher and squatter households will suffer partial impacts on their residential and commercial structures. Out of the total 18 structures that will be affected, 6 are residential, commercial and residential cum commercial structures. Majority (11) of the affected structures include boundary walls of private residences, schools, kitchens and vacant structures. Only 1 religious structure will be partially affected. A resettlement framework (Appendix P) has been prepared for the remaining phases. In accordance to resettlement framework, a resettlement plan for each subproject will be prepared during loan implementation.	☐ Full ☒ Short ☐ None Four short resettlement plans have been prepared for the roads in Project 1. A Resettlement Framework has also been prepared for the subsequent phases.
Affordability	☐ Significant ☐ Not significant ☒ None	The development of the roads will reduce transport costs and increase the mobility of the local population in the project areas.	☐ Yes ☒ No
Labor	☐ Significant ☐ Not significant ☒ None	The project will provide construction job opportunity with better wages. Men and women will be paid equally for equal job. The project will generate an estimated 912600 person-days employment for labor.	☐ Yes ☒ No
Indigenous Peoples	☐ Significant ☒ Not significant ☐ None	In the state of Uttaranchal, the scheduled tribe population constitutes only 3% of the total population. No scheduled tribe (ST) households will be adversely affected in Project 1. The tribal population in Uttaranchal and sub-project affected areas is not distinctive in the sense that they are inherently integrated with the modern and dominant population of the state. Tribal groups in the sub-project area freely interact and share their sources of water, folklore, food, infrastructure and other belongings with the mainstream population and outside community. Moreover, these groups have nuclear families and are open to new ideas like family planning and formal education. Therefore, the socio-economic impacts due to sub-projects will not be comparatively different for these people when compared with mainstream population. Keeping in view the above facts, no separate Indigenous People Development Plan (IPDP) has been attempted for Project 1 roads. An Indigenous People Development Framework (IPDF) has been prepared in case issues related to IP are found in the subsequent phases of the project.	☒ Yes ☐ No IPDF prepared for the subsequent phases.

Other Risks and/or Vulnerabilities	☐ Significant ☒ Not significant ☐ None	Road safety measures have been integrated into the project design, particularly in densely populated areas. Uttaranchal is regarded as a low prevalence state with regard HIV/AIDS transmission. It is revealed from the study that project is likely to bring in some risks related to HIV/AIDS transmission as a result of improved mobility of the people and influx of labor at the time of the construction. In order to mitigate such risks, PWD will collaborate with the State AIDS Control Society (SACS) to undertake information campaigns, awareness programs and other measures to counter the spread of sexually transmitted diseases in the project area.	☒ Yes ☐ No

INDIGENOUS PEOPLES DEVELOPMENT FRAMEWORK

A. Background

1. The State Government of Uttaranchal (SGOU) has embarked on an ambitious 10 year road improvement program, the Uttaranchal State Roads Improvement Program (USRIP), to support the State's 'Infrastructure Vision'. Under Asian Development Bank's (ADB) loan financing, around 10,800 km of roads will be improved under the Uttaranchal State Road Investment Program. The Investment Program will have two major components i.e. improvement of existing road network of around 10,800 km in separate projects and institutional strengthening of state level road sector institutions. The road improvement will focus on improving the condition of the existing road network by carrying out rehabilitation and reconstruction works that are mostly confined within the existing right-of-way (RoW). Uttaranchal's Public Works Department (PWD) will be the executing agency for the Investment Program.

2. Following the Strategic Option Study (SOS) and the Pre feasibility Study (PFS), PWD has identified and prioritized around 5000 kilometer of roads. Out of the prioritized roads detailed project reports (DPRs) based on detailed design have been prepared for 572.58 kilometers of roads (23 road sections) which has been appraised by ADB and proposed for the first Project funded through the multi-trance financing facility (MFF). The scope of proposed Investment Program includes strengthening and reconstruction of selected sections of State Highways (SH), Major District Roads (MDR) and Other District Roads (ODR). In general, the existing single lane carriageway (3.5m) will be retained with some standardization. Upgrading to intermediate (5m) and two lane carriageway (7m) in relatively few cases, may be warranted, where it is justified on technical / traffic / safety grounds. All improvement work will be mostly limited within the existing RoW. Final selection of road sections and DPRs for subsequent phases will be prepared during loan implementation.

3. This Indigenous People's Development Framework (IPDF) has been formulated to guide the preparation of Indigenous People's Development Plans (IPDPs) for the sub-projects in the subsequent Projects 2 to 7 of the MFF. The IPDF identifies the broad scope of the Project and outlines the policy, procedures and institutional requirements for preparation and implementation of IPDPs. The Project Management Unit (PMU) of Uttaranchal PWD through Project Implementation Units (PIUs) will be responsible for conducting the social screening and assessment and formulating IPDPs for sub-projects, as per procedure outlined in this IPDF. The draft IPDPs will be submitted to ADB for review and approval and the same will be endorsed by the EA prior to contract award.

B. Indigenous Groups

4. Indigenous peoples (IP) are defined as those having a distinct social, cultural, economic, and political traditions and institutions compared with the mainstream or dominant society.[50] The Indian Constitution (Article 342) defines Scheduled Tribes (STs) according to characteristics such as (i) primitive traits, (ii) distinctive culture, (iii) shyness with the public at large, (iv) geographical isolation, (v) social and economic backwardness. Of the 698 STs a further 75 are classified as Primitive Tribal Groups—considered more backward compared with STs. Constitutional protection and programs for tribal development have brought significant changes since 1947.

[50] ADB uses the following characteristics to define indigenous people: (i) descent from population groups present in a given area before territories were defined; (ii) maintenance of cultural and social identities separate from dominant societies and cultures; (iii) self identification and identification by others are being part of a distinct cultural group; (iv) linguistic identity different from that of dominant society; (v) social, cultural, economic and political traditions and institutions distinct from dominant culture; (vi) economic systems oriented more toward traditional production systems rather than mainstream; and (vii) unique ties and attachments to traditional habitats and ancestral territories.

5. Nationwide, 8.2% of the total population is classified under STs. In comparison 256,129 in Uttaranchal[51] or only 3.02% are classified under STs. There are five major tribal groups (Bhotia, Buska, Jannsari, Raji, and Tharu) in Uttaranchal. These are hill tribes observed to interact closely with mainstream society. None of Uttaranchal's STs are primitive tribal groups. STs are concentrated mostly in Udham Singh Nagar district and Dehradun **(Table 1)**.

Table 1: ST Population in Uttaranchal

District	Population	% of Tribal Population to the National Tribal Population	% of Tribal Population to the State Tribal Population
India	**84,326,240**	**100**	**NA**
Uttaranchal	**256,129**	**0.30**	**100.00**
Uttarkashi	2,685	0.003	1.05
Chamoli	10,484	0.01	4.09
Rudraprayag	186	0.0002	0.07
Tehri Garhwal	691	0.001	0.27
Dehradun	99,329	0.12	38.78
Garhwal	1,594	.002	0.62
Pithoragarh	19,279	0.02	7.53
Bageshwar	1,943	0.002	0.76
Almora	878	0.001	0.34
Champawat	740	0.001	0.29
Nainital	4,961	0.01	1.94
Udham Singh Nagar	110,220	0.13	43.03
Hardiwar	3,139	0.004	1.23

Source: Census of India 2001

6. The tribal population of Uttaranchal is not distinctive rather integrated with the other modern dominant population of the state. The tribal groups of the sub-project area have free social interaction with mainstream population. The tribes share their source of water, folklore, food, infrastructure and other belongings with the outside community. Moreover, these groups are also open to new ideas like family planning and formal education. The sub-project impact will not be different for these people and will not severely affect their present socio-economic status.

7. Uttaranchal tribal people have fixed assets such as houses and land, and derive their income mainly from agriculture and small business. STs are largely involved in farming, service and other small commercial activities. During project preparation, extensive consultations were undertaken and analysis with reference to IPs shows that number of ST population in the sample sub-project is insignificant and none will adversely affected.

C. The Indigenous Peoples Development Framework

8. This Indigenous Peoples Development Framework is intended to guide selection and preparation of sub-projects under the Project to ensure better distribution of project benefits and promote development of IPs in the sub-project area. In cases where significant impacts on IPs are identified, this framework will be applied if necessary during subproject preparation, in accordance with requirements for sector loans and ADB's *Indigenous Peoples Policy* (1998).

A full Indigenous Peoples Development Plan (IPDP) is required if there exists:

[51] Uttaranchal total population is 8,489,349 (Census 2001).

(i) adverse impacts on customary rights of use and access to land and natural resources;

(ii) negative effects on socioeconomic and cultural integrity;

(iii) effects on health, education, livelihood, and social security status; and/or

(iv) other impacts that may alter or undermine indigenous knowledge and customary institutions.

9. If impacts are insignificant, specific actions in favor of IPs can be incorporated within the Resettlement Plan (RP) for the additional sub-projects. This would ensure appropriate mitigation and benefits for indigenous people.

10. The IPDP policy framework is based on the overall local and national development strategies and ADB's *Policy on Indigenous Peoples* (1998). The principal objectives are to:

(i) ensure IPs affected by any additional sub-project will benefit from the Project;

(ii) ensure IPs inclusion in the entire process of preparation, implementation, and monitoring of Project activities;

(iii) ensure benefits of the additional sub-projects are available to IPs more than or at least equal to other affected groups; this may require giving preference to IPs as vulnerable groups over others on certain benefits under the Project; and

(iv) provide a base for IPs in the area to receive adequate development attention.

D. Procedures for IPDP Preparation

11. This framework seeks to ensure that IPs are informed, consulted, and mobilized to participate in the additional sub-projects. Their participation can either provide them benefits with more certainty, or protect them from any potential adverse impacts of the additional sub-project. The main features of the IPDP will be a preliminary screening process, a social impact assessment to determine the degree and nature of impact of each additional sub-project, and an action plan developed if needed. Consultations with and participation of IP communities, their leaders, and local government representatives will be an integral part of the overall IPDP.[52]

1. Preliminary Screening

12. The PIUs will visit all IP communities and villages near additional sub-project sites or areas being affected and influenced by sites. The PIUs will arrange public meetings in selected communities to provide information on the Project and the additional sub-project. During the visits, community leaders and other participants will present their views with regard to the Project and additional sub-project.

13. At this visit, the PIU will undertake a screening for IP populations with the help of IP community leaders and local leaders. The screening will check for the following:

(i) Name(s) of IP community group(s) in the area;

(ii) Total number of IP community groups in the area;

(iii) Percentage of IP community population to that of area population; and

(iv) Number and percentage of IP households to be affected by the additional sub-project site.

14. The PIU will also accomplish an IP assessment checklist. The results of the preliminary screening will be provided to the PMU for review as part of the pre-feasibility assessment of the additional sub-project. If the results show that there are IP households in the zone of influence of the proposed Project, a social impact assessment (SIA) will be planned for those areas.

[52] The IPDPs components are: preliminary screening, social impact assessment, mitigation measures, development assistance, and project monitoring.

2. Social Impact Assessment

15. The PIU will undertake an SIA as part of the detailed technical feasibility reports. The SIA will gather relevant information on demographic data; social, cultural, and economic situation; and both positive and negative social, cultural and economic impacts.

16. Information will be gathered through separate group meetings within the IP community, including IP leaders; group of IP men and women, especially those who live in the zone of influence of the proposed work under the additional sub-project. Discussions will focus on positive and negative impacts of the additional project as well as recommendations on the design of the additional sub-project and Project. The PIU will be responsible for analyzing the SIA and for leading the development of an action plan with the IP community leaders. If the SIA indicates that the potential impact of the proposed additional sub-project will be significantly adverse-threatening the cultural practices and IP sources of livelihood, or that the IP community rejects the Project works-the PIU in consultation with the PMU will consider other design options to minimize such adverse impacts. If IP communities support the additional sub-project, implementation of an IPDP will be developed.

3. Indigenous Peoples Development Plan

17. The action plan will consist of a number of activities and will include mitigation measures of potentially negative impacts, modification of project design, and development assistance. Where there is land acquisition in IP communities, the Project will ensure their rights will not be violated and that they be compensated for the use of any part of their land in a manner that is culturally acceptable to the affected IPs.[53] The IPDP will include:

(i) Baseline data,

(ii) Land tenure information,

(iii) Local participation,

(iv) Technical identification of development or mitigation activities,

(v) Institutional arrangement,

(vi) Implementation schedule,

(vii) Monitoring and evaluation, and

(viii) Cost estimate and financing plan.

18. Where warranted, the IPDP will be developed by the PIU and the IPDP will form part of the final project report for the additional subprojects. PMU will then review and approve the IPDP and provide the approved IPDP to ADB for review and approval. The IPDP policy and measures must comply with ADB's *Policy on Indigenous Peoples* (1998).

E. Consultation and Information Disclosure

19. The IPDP will be prepared in consultation with the affected IP groups. The mitigation measures and strategies will be presented to them by the PIU in community level workshops. Inputs from the community level workshops will be considered in additional sub-project design and the final IPDP. The IPDP will be translated into local IP language(s) prior to implementation. Non-Governmental Organizations (NGOs) will be involved in implementing the IPDP and resolution of any dispute arising out of the implementation process. The PMU will further ensure that adequate budget will be available to implement the IPDP.

[53] The compensation will follow the Resettlement Policy Framework of the Project.

F. Institutional Framework

20. In the preparation of additional sub-project IPDPs, PMU will have overall coordination and financing responsibilities. The PMU through the relevant PIUs will prepare, implement, and monitor the IPDP. Since IP issues are sensitive, the PMU will ensure that a consultant with knowledge and experience of working among IP groups is available for assisting in the planning and implementation of IPDPs for the Project. This task can also be simultaneously handled by the Resettlement Officer in the PMU, if the Resettlement Officer has adequate experience on IP issues. The PMU will ensure that the consultant hired to assist the PIU in planning and implementation of IPDPs for additional sub-projects is familiar with ADB policy and requirements for IPDPs otherwise provisions will be made to train the specialist on the IP issues.

G. IPDP Budget

21. The PMU will provide sufficient resources to formulate IPDPs in additional sub-projects which will have impacts on IPs. It will implement the IPDP through PIUs. A detailed budget will be prepared by the PIU taking into account all activities associated with the formulation and implementation of IPDPs. Each IPDP will have its own budget. Such budgets will be an integral part of the project cost, and will be made available during project implementation.

H. Monitoring and Evaluation

22. Implementation of the IPDP will be monitored regularly. This will be monitored along with the RP monitoring activities. A set of monitoring indicators will be determined during IPDP implementation. The PIU will also prepare appropriate monitoring formats for effective internal and external monitoring and reporting requirements. Independent monitoring will also be undertaken through agency engaged by the PMU for resettlement monitoring. Monitoring will be carried out twice a year during project implementation. These reports will be submitted to PMU and ADB for review. The PMU will be responsible for determining if any follow-up actions are necessary and ensuring any necessary actions are taken regarding the implementation of IPDPs.

RESETTLEMENT FRAMEWORK

A. Introduction

1. The State Government of Uttaranchal (SGOU) has embarked on an ambitious 10 year road improvement program, the Uttaranchal State Roads Improvement Program (USRIP), to support the State's 'Infrastructure Vision'. Under Asian Development Bank's (ADB) loan financing, around 10,800 km of roads will be improved under the Investment Program. This Investment Program will have two major components i.e. improvement of existing road network of around 10,800 km in seven separate Projects and institutional strengthening of state level road sector institutions. The road improvement will focus on improving the condition of the existing road network by carrying out rehabilitation and reconstruction works that are mostly confined within the existing right-of-way (RoW). Uttaranchal's Public Works Department (PWD) will be the executing agency for the Investment Program.

2. Following the Strategic Option Study (SOS) and the Pre feasibility Study (PFS), PWD has identified and prioritized around 5000 kilometer of roads. Out of the prioritized roads detailed project reports (DPRs) based on detailed design have been prepared for 573 kilometers of roads (23 road sections) which has been appraised by ADB and proposed for the first Project funded through the multi-tranche financing facility (MFF). The scope of proposed project includes strengthening and reconstruction of selected sections of State Highways (SH), Major District Roads (MDR) and Other District Roads (ODR). In general, the existing single lane carriageway (3.5m) will be retained with some standardization. Upgradating to intermediate (5m) and two lane carriageway (7m) in relatively few cases, may be warranted, where it is justified on technical / traffic / safety grounds. All improvement work will be mostly limited within the existing RoW. Final selection of road sections and DPRs for subsequent Projects funded by the MFF will be prepared during loan implementation.

3. This Resettlement Framework (RF) has been formulated to guide the preparation of subproject RPs for the subsequent phases during loan implementation. The RF identifies the broad scope of the Project and outlines the policy, procedures and institutional requirements for preparation and implementation of subproject RPs. The Project Management Unit (PMU) of Uttaranchal Public Works Department (PWD) through Project Implementation Units (PIU) will be responsible for conducting the social assessment and formulating RPs for subsequent sub-projects, as per procedure outlined in this RF. The draft RPs will be disclosed to the affected persons in local language and submitted to ADB for review and approval prior to award of civil works contract. Compensation and other assistances will have to be paid to APs prior to commencement of construction activities.

B. Review of Government Policy and ADB Requirements

4. In India, compensation for land acquisition (LA) and resettlement assistance for project-affected people is governed by the Land Acquisition Act (1894), which has been amended from time to time. The State Government, at present does not have any policy on Resettlement and Rehabilitation. Under the Land Acquisition Act of 1894, compensation is paid only to the legal titleholders and does not provide any compensation package to the non title holders like encroachers, squatters etc. However, a National Policy on Resettlement and Rehabilitation of project Affected Families, 2004 known as NPRR-2004 has been adopted by the GoI to address development-induced resettlement. The policy essentially addresses the need to provide succor to the asset less rural poor, support the rehabilitation efforts of the resource poor sections, namely, small and marginal farmers, SCs/ STs and women who have been displaced.

5. The National Policy on the Resettlement and Rehabilitation of Project Affected Families as a broad guideline and executive instructions for guidance of all concerned, is applicable only to Projects displacing 500 families or more en-masse in plain areas and 250 families en-masse in hilly areas, Desert Development Program (DDP) blocks, areas mentioned in Schedule V and Schedule VI of the Constitution of India. It is expected that the appropriate Government and Administrator for R&R shall implement this Policy in letter and spirit in order to ensure that the benefits envisaged under the Policy reaches the Project Affected Families, especially resource poor sections including SCs and STs. The main objectives of the Policy are:

- To minimize displacement and to identify non-displacing or least-displacing alternatives;
- To plan the resettlement and rehabilitation of Project Affected Families (PAFs) including special needs of tribals and vulnerable sections;
- To provide better standard of living to PAFs; and
- To facilitate harmonious relationship between the Requiring Body and PAFs through mutual cooperation.

6. For acquisition of strips of land for railway lines, highways, transmission lines and pipelines, only an ex-gratia payment of Rs 10,000/= per family is to be paid under NPRR. This policy does not recognize squatters and encroachers and there is no provision of resettlement assistance and transitional allowances etc. However, despite these provisions, the policy does not define that the compensation of lost assets must be on the basis of replacement cost. The Asian Development Bank's (ADB) Policy of *Involuntary Resettlement* (1995) on the other hand, recognize & address the R&R impacts of all the affected persons irrespective of their titles and requires for the preparation of RP in every instance where involuntary resettlement occurs. The ADB policy requirements are:

- avoid or minimize impacts where possible;
- consultation with the affected people in project planning and implementation;
- payments of compensation for acquired assets at the replacement value;
- resettlement assistance to affected persons, including non-titled persons; and
- Special attention to vulnerable people/groups.

C. Resettlement Principles for the Project

7. Based on the above analysis of government provisions and ADB policy the broad resettlement principle for this project shall be the following:

- The negative impact on persons affected by the project would be avoided or minimized as much as possible;
- Where the negative impacts are unavoidable, the persons affected by the project and vulnerable groups will be identified and assisted in improving or regaining their standard of living.
- Information related to the preparation and implementation of resettlement plan will be disclosed to all stakeholders and people's participation will be ensured in planning and implementation;
- Land acquisition for the project would be done as per the Land Acquisition Act, 1894. The Act specifies payment of adequate compensation for the properties to be acquired. Additional support would be extended for meeting the replacement value of the property. The affected persons who does not own land or other properties, but have economic interests or loose their livelihoods will be assisted as per the broad principles described in this document.
- Widening and strengthening work will take place mostly on the existing alignment

except at locations where the existing alignment may require shifting to accommodate bridges reconstructed in new locations adjacent to existing structures;

- Before taking possession of the acquired lands and properties, compensation and R&R assistance will be paid in accordance with the provision described in this document;
- An entitlement matrix for different categories of people affected by the project has been prepared and provisions will be kept in the budget for those who were not present at the time of census survey. However, people moving in the project area after the cut-off date will not be entitled to any assistance. In case of land acquisition the date of notification for acquisition will be treated as cut-off date. For non-titleholders such as squatters and encroachers the date of project census survey or a similar designated date declared by the executing agency will be considered as cut-off date.
- Appropriate grievance redressal mechanism will be established at the district level to ensure speedy resolution of disputes.
- All activities related to resettlement planning, implementation, and monitoring would ensure the involvement of women and other vulnerable groups.
- Consultations with the APs will continue during the implementation of resettlement and rehabilitation works.

8. In accordance with the resettlement and rehabilitation (R&R) measures suggested for the project, all affected households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights on lost assets and scope of the impacts including socio-economic vulnerability of the affected persons. The affected persons will be entitled to the following five types of compensation and assistance packages (i) compensation for the loss of land, crops/ trees at their replacement value; (ii) compensation for structures (residential/ commercial) and other immovable assets at their replacement value; (iii) assistance in lieu of the loss of business/ wage income; (iv) assistance for shifting, and (v) rebuilding and/ or restoration of community resources/facilities.

D. Valuation of Affected Assets

9. Land surveys for determining the payment of compensation would be conducted on the basis of updated official records and ground facts. The land records containing information like legal title, and classification of land will be updated expeditiously for ensuring adequate cost compensation and allotment of land to the entitled displaced persons. Records as they are on the cut-off date will be taken into consideration while determining the current use of land. The uneconomic residual land remaining after land acquisition will be acquired as per the provisions of Land Acquisition Act. The owner of such land/property will have the right to seek acquisition of his entire contiguous holding/ property provided the residual land is less than the average land holding of the district.

10. For land acquisition the District Collector (DC) will decide the compensation for acquired land as per the legal provisions. The EA will determine the replacement cost of land and assets to be acquired based on market value through an independent valuer preferably hired from land and revenue department. If the compensation amount is less than the replacement value of the land, the DC/competent authority will award the compensation and the difference between the award rate and the replacement rate will be paid by the EA as 'assistance'.

11. The value of houses, buildings and other immovable properties will be determined on the basis of relevant Basic Schedule of Rates (BSR.) as on date without depreciation. While considering the BSR rate, the EA will ensure that it uses the latest BSR for the residential

and commercial structures in the urban and rural areas of the region. Compensation for properties belonging to the community or common places of worship will be provided to enable construction of the same at new places through the local self-governing bodies / appropriate authority in accordance with the modalities determined by such bodies / authority to ensure correct use of the amount of compensation. Compensation for trees will be based on their market value. Loss of timber bearing trees will be compensated at their replacement cost while the compensation for the loss of fruit bearing trees will be decided by the EA as per prevailing rate of forest department. All compensation and other assistances will be paid to all APs before taking possession of the land/properties.

12. The independent valuer hired by the PIU will determine the replacement value of land, structure and other assets. In determining *the replacement value of land* the independent valuer will (i) appraise recent sales and transfer of title deeds and registration certificates for land in urban and rural areas of the district and (ii) determine whether the rates established for the project are sufficient to purchase the same quality and quantity of land based on compilation of appraised rates. The valuation of *crops and trees* will be based on (i) survey of market prices in the district and adjacent districts for different types of crops to establish an average market price and an assessment to know whether the compensation is less or greater than that price; (ii) income loss will be calculated as annual produce value for at least 3 seasons depending on the nature of crops/trees. For *structures* consultation will be carried out with the owners to determine (i) sources and cost of materials, whether the materials are locally available; (ii) type of shops (private or state-owned); (iii) distance to be traveled to procure materials; (iv) obtaining cost estimates through consultation with three contractors/suppliers in order to identify cost of materials and labor; (v) identifying the cost of different types of houses of different categories and compare the same with district level prices.

13. After payment of compensation, APs would be allowed to take away the materials salvaged from their dismantled houses and shops and no charges will be levied upon them for the same. A notice to that effect will be issued intimating that APs can take away the materials. APs receiving compensation for trees will be allowed to take away timber of their acquired trees for their domestic use. Trees standing on the land owned by the government will be disposed off through open auction by the concerned Revenue Department/ Forest Department. APs will be provided with an advance notice of three months prior to relocation. Further, all compensation and assistance will be paid to all APs prior to commencement of civil works and displacement or dispossession of assets. The subsequent sections under each contract package will be handed over to the contractor after payment of compensation/assistance to the APs is completed for each section.

E. Entitlement Matrix

14. Compensation for the lost assets to all APs will be paid on the basis of replacement value. Resettlement assistance for lost income and livelihoods will be provided to both title holders and non-title holders such as people with traditional or customary land rights, roadside residences/ SBE owners with permits from Panchayat (local government body) and other local agencies to which they are paying annual tax for the same. The "Vulnerable Group" comprises of APs living below poverty line (BPL), SC, ST, women headed households and the elderly and disabled. An Entitlement Matrix **(Table 1)** has been developed, which recognizes and lists various types of losses resulting out of the project and provides for compensation and resettlement packages.

Table: 1 Entitlement Matrix

	Type of Loss	Unit of Entitlement	Entitlement	Details
A. LOSS OF LAND & ASSETS				
1	Loss of Agricultural land and assets	a) Titleholder b) APs with customary land right c) Permit from local authority	▪ Compensation at replacement value ▪ Resettlement Assistance ▪ Transitional allowance ▪ Special provision for vulnerable group	a) Compensation will be paid as per the LA act. b) If the compensation determined by the Competent Authority/DC as per LAA is less than the replacement value", then the difference is to be paid by the EA as assistance. c) If the residual plot(s) is (are) not viable, i.e., the AP becomes a marginal farmer, any of the following three options are to be given to the AP, subject to his acceptance: • The AP remains on the plot, and the compensation and assistance paid to the tune of required amount of land to be acquired. • Compensation and assistance are to be provided for the entire plot including residual part, if the owner of such land wishes that his residual plot should also be acquired by the EA, the EA will acquire the residual plot and pay the compensation for it. • If AP is from vulnerable group, compensation for the entire land by means of land for land will be provided if AP wishes so, provided that the land of equal or more productive value is available. d) Transitional allowance of Rs. 3000/- per month for 6 months if the residual land is not viable or for 3 months when the residual land is viable. This will be calculated by prevalent daily wage rate. e) All fees, stamp duties, taxes and other charges, as applicable under the relevant laws, incurred in the relocation and rehabilitation process, are to be borne by the EA.
2	Loss of non-agricultural land (i.e.- homestead and residential structures)	a) Titleholder/ Owner (Residential land and structure) b) APs with customary land rights c) Permits from local authority	▪ Compensation at replacement value ▪ Resettlement Assistance ▪ Transitional allowance ▪ Shifting assistance	a) Compensation for land and structure will be paid as per LA act. b) If replacement cost for land and structure is more than the compensation determined by the Competent Authority/DC, then difference is to be paid by the EA in the form of "assistance". c) Replacement value for residential structure (part or full), which will be calculated as per the prevailing basic schedule of rates (BSR) without depreciation, subject to relevant "quality standards" of BSR as maintained by Govt. /Local Body. d) Transitional assistance of Rs. 3000/- per month in the form of grant to cover a maximum nine months rental accommodation. e) A lump sum shifting allowance of Rs. 1500 to 2500/- depending on the type of structure and extent of impact. f) Right to salvage material from demolished structure and frontage etc. g) Project assisted relocation option will be provided to those whose residential structures becomes non-livable as a result of Project impacts and a relocation site will be developed in consultation with these affected households (subject to availability of land)

	Type of Loss	Unit of Entitlement	Entitlement	Details
3	Loss of non-agricultural land (i.e.-loss of Commercial land and structures)	a) Titleholder/ Owner (Commercial land and structure) b) APs with Customary land right c) Permits from Local Authority	▪ Compensation at Market rate or Replacement value ▪ Resettlement Assistance ▪ Transitional allowance ▪ Shifting assistance	a) Compensation for the loss of land and structure will be paid at the replacement value. b) If replacement cost for land and structure is more than the compensation determined by the Competent Authority, then difference is to be paid by the EA in the form of "assistance". c) AP will be provided replacement cost of the commercial structure (part or full), which will be calculated as per the prevailing basic schedule of rates (BSR) without depreciation, subject to relevant "quality standards" of BSR as maintained by Govt. /Local Bodies. d) Transitional assistance of Rs. 3000/- per month in the form of grant for maximum period of nine months. e) A lump sum shifting allowance of Rs. 1500 to 2500/- depending on the type of structure and extent of impact. f) Right to salvage material from demolished structure and frontage etc. g) Training would be provided for upgradation of skills. h) Project assisted relocation option will be provided to those commercial structures can no longer be used as a commercial enterprise as a result of the Project and a relocation site will be developed in consultation with these affected households (subject to availability of land)
4	Loss of Residential Tenancy	Residential Tenants	▪ Relocation Assistance ▪ Compensation ▪ Shifting assistance	a) The amount of deposit or advance payment paid by the tenant to the landlord or the remaining amount at the time of expropriation. (This will be deducted from the payment to the landlord). b) A sum equal to 3 Months rental or Rs 3000/- per month, whichever is lesser in consideration of the disruption caused. c) Compensation for any structure that tenant has erected on the property. (This will be deducted from the payment to the landlord). d) A lump sum shifting allowance of Rs. 1500 to 2500/- depending on the type of structure and extent of impact.
5	Loss of Commercial Tenancy	Commercial Tenants	▪ Relocation Assistance ▪ Compensation ▪ Shifting assistance	a) The amount of deposit or advance payment paid by the tenant to the landlord or the remaining amount at the time of expropriation. (This will be deducted from the payment to the landlord). b) A sum equal to 3 Months rental or Rs 3000/- per month, whichever is lesser in consideration of the disruption caused. c) Compensation for any structure the tenant has erected on the property. (This will be deducted from the payment to the landlord). d) A lump sum shifting allowance of Rs. 1500 to 2500/- depending on the type of structure and the extent of impact.
B. LOSS OF LIVELIHOOD OF TITLEHOLDERS				
6	Loss of wage earnings	a) employ in SBEs b) agricultural laborer/share-croppers	Assistance	a) This is valid for persons indirectly affected due to their employer being displaced. Assistance is to be paid on a case by case basis, as per the prevailing local wage rates for100 days. b) Employment opportunity for APs in the road construction work if desired so by them.
7	Income from non-perennial crops and trees	Household	▪ Notice to harvest standing crops ▪ Compensation of standing crops	a) Advance notice to APs to harvest their crops; b) In case of standing crops, cash compensation at current market value. c) Grant for replacement of seeds for the next season's harvest towards loss of crops before harvest due to forced relocation. d) Trees will be compensated as per prevailing rate of Forest Department.
8	Perennial crops such as fruit trees	Household	Compensation at "market value"	a) Advance notice to APs to harvest their crops and fruits b) Compensation for perennial crops and trees calculated as annual produce value for at least 3 seasons. c) Grant for replacement of seeds for the next season's harvest towards loss of crops before harvest due to forced relocation. d) Trees will be compensated as per prevailing rate of Forest Department

	Type of Loss	Unit of Entitlement	Entitlement	Details
C. LOSSES OF NON-TITLEHOLDERS				
9	Loss of agricultural land, residential and commercial structure by encroachers	Households who have illegally extended their legally owned land/ property onto public or other private land	▪ No compensation for land ▪ Compensation for structures to only vulnerable household ▪ Shifting assistance for vulnerable encroachers ▪ R&R Assistance only to vulnerable households ▪ Right to salvage materials	a) Encroachers will be notified and given a time in which they will be required to remove their assets and harvest their crops. b) Compensation for structures at replacement cost to the vulnerable households. c) Training would be provided for upgradation of skills to the APs belonging to vulnerable groups and loosing their commercial structures. d) Shifting allowance of Rs. 1500 to 2500/- lump sum for shifting depending on the type of structure and extent of impact. e) Right to salvage materials from the demolished structure.
10	Loss of residential and commercial structure by Squatters/ Informal settlers	Households living /earning their livelihood by illegally occupying public or private land.	▪ No compensation for land ▪ Compensation for structures. ▪ Shifting assistance ▪ R&R Assistance ▪ Right to salvage materials	a) Compensation for loss of structure at replacement cost. b) A lump sum shifting amount of Rs. 1500 to Rs. 2500 depending on the type of structure. c) Squatters/informal settlers will be notified and given a time in which they will be required to remove their assets. d) Transitional allowance of Rs. 3000 for a period of 3 to a maximum of 6 months depending on the extent of impact. e) Training would be provided for upgradation of skills to the APs loosing their commercial structures. f) Right to salvage material from the demolished structure. g) Project assisted relocation option will be provided to those whose residential / commercial structures become non-livable as a result of project impacts and relocation site will be developed in consultation with these affected households (subject to availability of land)
11.	Shifting Business – Mobile Vendors	Household	Not eligible for compensation or "assistance"	Ambulatory vendors who have been granted license for operating will be considered as kiosk.
12.	Kiosks	Household	"Assistance" for business disruption	Vendors who have been granted license for operating from a fixed location will be considered as kiosk. Assistance will be paid as one time lump sum amount of Rs. 3000.
D. ADDITIONAL SUPPORT TO VULNERABLE GROUP				
13.	Primary source of income	Vulnerable households including BPL, SC, ST, WHH, disabled and elderly	Additional assistance to vulnerable groups	One time lump sum assistance of Rs. 5000/ to vulnerable households. This will be paid above and over the other assistance(s) as per this framework.
E. LOSS OF COMMUNITY INFRASTRUCTURE/COMMON PROPERTY RESOURCES				
14.	Common Property Resources	Community	Compensatory replacement	Cash compensation or reconstruction of the community structure in consultation with the community.
15.	Temporary impact during construction include disruption of normal traffic, increased noise levels, and damage to adjacent parcel of land / assets due to movement of heavy machinery	Community / Individual	Compensation	• The contractor shall bear the cost of any impact on structure or land due to movement of machinery during construction • All temporary use of lands outside proposed RoW to be through written approval of the landowner and contractor. • Location of Construction camps by contractors in consultation with PWD.

	Type of Loss	Unit of Entitlement	Entitlement	Details
F. ANY OTHER IMPACT				
16.	Unforeseen impacts if any	Unforeseen impacts will be assessed on case by case basis and suitable compensation/ assistance will be paid as deemed fit by the Executive Agency/ State government.		

15. The above Entitlement Matrix has been developed from the social assessment study carried out for the roads in Project 1. If additional impacts are identified during implementation of this and subsequent Projects, the entitlement matrix will be updated by including provision of compensation and assistance for the additional impacts.

F. Procedure for RP Preparation

16. Resettlement Plans for each sub-projects will be prepared in the following manner:

(i) the PIU with guidance from PMU will undertake census and social impact assessment surveys for each identified sub-project through consultant engaged for the detailed technical design;

(ii) if impacts are found to be significant[54], full RPs will be prepared for each sub-projects;

(iii) if impacts are not significant, short RPs will be required for each sub-project preparation, and

(iv) RP will include measures to ensure that socio-economic conditions, needs, and priorities of women are identified and that the process of land acquisition and resettlement does not disadvantage women.

17. The PMU, and consultants for sub-project preparation and implementation will include social development specialists familiar with ADB policy and procedures for the preparation of RPs. RPs will comply with national / state resettlement policies and the principles outlined in this agreed RF and ADB's policy on *Involuntary Resettlement* (1995). Approval of RPs for each sub-project by ADB will be a condition for the contract of civil works, including compensation payments prior to displacement. In case of land acquisition the date of notification for acquisition under LAA will be treated as cut-off date. For non-titleholders such as squatters and encroachers the date of project census survey or a similar designated date declared by the EA will be considered as cut-off date. The PMU through the PIUs will ensure that this RF is closely followed when any RP is formulated for sub-project. The PMU will further ensure that adequate resettlement budgets are delivered on time to PIUs, and involve NGOs for timely implementation of RP.

G. Institutional Arrangements

18. The existing Public Works Department of Uttaranchal has already set up a Project Management Unit (PMU) in Dehradun. This office will be functional for the whole Project duration. For resettlement activities, PMU will do the overall coordination, planning, implementation, and financing. The PMU will create a Resettlement Cell (RC) with appointment of a Resettlement Officer (RO) (in the rank of an executive engineer) and required support staff for the duration of the Project to ensure timely and effective implementation of RPs. The RO will be assisted by the consultant appointed by PWD for preparation of RPs for the Project 2 roads. A social development / resettlement specialist will be included in each the Design Consultant's team for the remaining Projects. These specialists will be responsible for preparation of the RPs for the remaining Projects.

[54] Resettlement is significant when 200 or more people experience major impacts. Major impacts are defined as involving affected people being physically displaced from housing and/or having 10% or more of their productive, income generating assets lost.

19. Project Implementation Unit (PIU) will be established at PWD Circle level for the implementation of sub-projects. The PMU will coordinate with PIUs for sub-project level RP related activities, and each PIU will additionally designate one senior staff (not below the rank of an Executive Engineer) to co-ordinate the resettlement activities. The PIU, if required depending on the workload will also appoint an assistant resettlement officer (ARO) in rank of assistant engineer who will either be deputed to the PIU or engaged on contractual basis having adequate land acquisition implementation expertise. The staffs at the PIU level will be provided with the training by the social/resettlement specialist of the supervision consultant for implementation of the RP. The PIU will maintain all databases, work closely with APs and other stakeholders and monitor the day today resettlement activities.

20. Involuntary resettlement is a sensitive issue and strong experience in R&R matters along with community related skills will be required by the PIU in order to build a good rapport with the affected community and facilitate satisfactory R&R of the APs. To overcome this deficiency, experienced and well-qualified NGO in this field will be engaged to assist the PIUs in the implementation of the RP. Keeping in view the minimal resettlement impacts in Project 1, only one NGO will be hired for this Project. The NGO would play the role of a facilitator and will work as a link between the PIU and the affected community.

21. A Grievance Redress Committee (GRC) at PIU level will be formed to deal with the disputes and AP's grievance and facilitate timely implementation of the Project. The GRC will be headed by the DC or a representative from the collector's office. The GRC will have from the PIU office, representatives of APs, particularly of vulnerable APs, local government representatives, NGOs and other interest groups. The GRC will meet as and when grievances are referred to it for redress. Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, and other assistance.

22. The institutional arrangement for resettlement planning and implementation is presented in the **Figure: 1** and the roles and responsibilities of various agencies are summarized in **Table: 2**.

Figure: 1 Institutional Arrangement for Resettlement Planning and Implementation

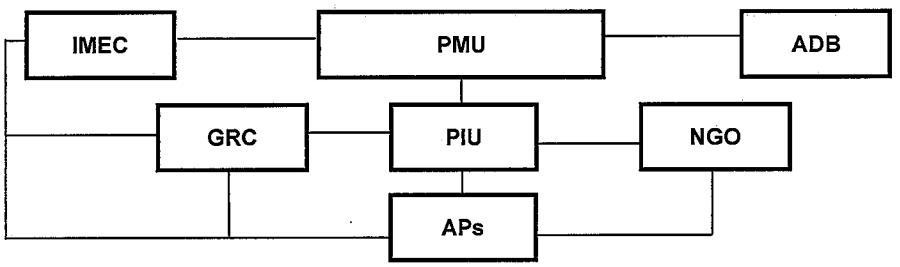


Table: 2 Agencies Responsible for Resettlement Implementation

Activity	Agency Responsible
Establishment of Resettlement Units in PMU and appointment of Resettlement officer (RO)/ARO	PMU
Organizing resettlement training workshop	PMU
Social Assessment and Preparation of land acquisition plan, Resettlement Plan (RP)	PMU through PIU/Design Consultant
Hiring of (Non Government Organization) NGOs	PMU
Public consultation and disclosure of RP	PIU/ Design Consultant/NGO
Co-ordination with district administration for land acquisition	PIU/ Design Consultant
Declaration of cut-off date	PMU/PIU

Review and obtaining of approval of resettlement plan from ADB	PMU
Submission of land acquisition proposals to District Commissioner	PIU
Compensation award and payment of compensation	District Commissioner
Payment of replacement value allowance	PIU
Taking possession of acquired land and structures	PIU
Handing over the acquired land to contractors for construction	PIU
Notify the date of commencement of construction to APs	PIU/NGO
Assistance in relocation, particularly for vulnerable groups	PIU/ NGO
Internal monitoring of overall RP Implementation	PIU/NGO
External Monitoring and Evaluation (M&E)	(IMEC)

H. Public Consultation and Disclosure of RP

23. Project information will be disseminated by PMU and PIU through public consultation and provision of project information. Each sub-project RP will be prepared and implemented in close consultation with the stakeholders, particularly APs, through focus group discussions and stakeholder consultation meetings. Women's participation will be ensured by involving them in public consultation at various level and stages of project preparation. A resettlement information leaflet containing information on compensation and resettlement options will be made available in local language(s) and distributed to APs. Each AP will be provided information regarding specific entitlements. The RPs will be disclosed to affected persons and on the PWD/PMU website and their respective local offices. The summary RP will be disclosed in ADB website also.

I. Monitoring and Evaluation

24. Internal project monitoring and evaluation will be carried out by PMU/PIU and the NGO. An Independent Monitoring and Evaluation Consultant (IMEC) will be hired for the external monitoring and evaluation of the project. Looking at the minimum impacts expected from the project, the external monitoring and evaluation shall be done by engaging individual consultant with an intermittent input for the project period. Internal monitoring will be the responsibility of the PMU/PIU and NGO. The internal monitoring by PMU/PIU will include:

(i) **administrative monitoring**: daily planning, implementation, feed back and trouble shooting, individual AP database maintenance, and progress reports;

(ii) **socio-economic monitoring**: case studies, using baseline information for comparing AP socio-economic conditions, evacuation, demolition, salvaging materials, morbidity and mortality, community relationships, dates for consultations, and number of appeals placed; and

(iii) **impact evaluation monitoring**: Income standards restored/improved, and socioeconomic conditions of the affected persons. Monitoring and evaluation reports documenting progress on resettlement implementation and RP completion reports will be provided by the PIU to PMU for review and approval from ADB.

25. For external project monitoring and evaluation, the PMU will engage an individual Independent Monitoring and Evaluation Consultant (IMEC). The person, with previous experience in resettlement activities and familiarity with Government and ADB resettlement policy, will be engaged with ADB concurrence within three months of the loan effectiveness. The IMEC will monitor and verify RP implementation to determine whether resettlement goals have been achieved, livelihood and living standards have been restored, and provide recommendations for improvement. Monitoring will also ensure recording of AP's views on

resettlement issues such as; AP's understanding of entitlement policies, options, and alternatives; site conditions; compensation valuation and disbursement; grievance redress procedures; and staff competencies. The IMEC will also evaluate the performance of the PIU and NGOs. The IMEC will also evaluate the performance of the PIU and NGOs. PMU will submit quarterly progress reports and the IMEC will report its findings simultaneously to the EA and to ADB twice a year. Financial provisions will be made under the project budget for above suggested institutional arrangement such as establishing RC, appointment of RO, hiring of NGO and hiring of IMEC etc.

J. Implementation Schedule

26. The period for implementation of subsequent RPs for Projects 2 to 7, will commence in the fourth quarter of 2006 and will extend up to the last quarter of 2013. In this program, the RP implementation process would be considerably shortened in most of the cases because it is expected that there would be no land acquisition. Monitoring and evaluation would continue beyond the period of implementation.

K. Resettlement Budget

27. Detailed budget estimates for each RP will be prepared by the PMU/PIU which will be included in the overall project estimate. The budgets shall include: (i) detailed costs of land acquisition, relocation, and livelihood and income restoration and improvement; (ii) source of funding; (iii) arrangement for approval, and the flow of funds and contingency arrangements. All land acquisition, compensation, relocation and rehabilitation of income and livelihood will be considered as an integral component of project costs. All land acquisition and resettlement costs will be borne by the government and ensure timely disbursement of funds for RP implementation.

SUMMARY RESETTLEMENT PLAN

A. Project Description

1. The State Government of Uttaranchal (SGOU) has embarked on an ambitious 10 year road improvement program, the Uttaranchal State Roads Improvement Program (USRIP), to support the State's 'Infrastructure Vision'. Under Asian Development Bank's (ADB) loan financing, the Investment Program will have two major components i.e. improvement of existing road network of around 10,800 km and institutional strengthening of state level road sector institutions. The road improvement will focus on improving the condition of the existing road network by carrying out rehabilitation and reconstruction works that are mostly confined within the existing right-of-way (RoW). Uttaranchal's Public Works Department (PWD) will be the executing agency for the URDP.

2. Following the Strategic Option Study (SOS) and the Pre feasibility Study (PFS), PWD has identified and prioritized around 5000 kilometer of roads. Out of the prioritized roads detailed project reports (DPRs) based on detailed design have been prepared for 573 kilometers of roads (23 road sections) which has been appraised by ADB and proposed for the first Project funded under the multi-tranche financing facility (MFF). The scope of proposed project includes strengthening and reconstruction of selected sections of State Highways (SH), Major District Roads (MDR) and Other District Roads (ODR). In general, the existing single lane carriageway (3.5m) will be retained with some standardization. Upgrading to intermediate (5m) and two lane carriageway (7m) in relatively few cases, may be warranted, where it is justified on technical / traffic / safety grounds. All improvement work will be mostly limited within the existing RoW. Final selection of road sections and DPRs for subsequent Projects will be prepared during loan implementation. In Project 1, the resettlement impacts are confined to only four sub-projects out of 23. Four short resettlement plans have been prepared for each subproject. This summary resettlement plan is prepared for 4 sub-projects namely (i) Dhakia Gulabo Pagia Mukundpur (ii) Almora – Bageshwar (iii) Raniket - Mohan and (iv) Kakrali – Thuligarh. There will be no land acquisition required for any of the sub-project; hence there will be no legal title holders who will be affected. However, there are some encroachers and squatters who will be losing portion of their structures and sources of livelihood.

B. Scope and Objectives of the RP

3. The aim of the Short Resettlement Plans (SRPs) are to mitigate all unavoidable negative social and resettlement specific impacts caused due to the up gradation/rehabilitation of the sub-project roads. The plans have been prepared on the basis of survey findings and consultation with various stakeholders in compliance with ADB's policy on *Involuntary Resettlement (1995) and Indigenous Peoples (1999)* to protect the rights of affected persons and communities. The issues identified and addressed in the RP are (i) type and extent of loss of land and non-land assets, loss of livelihood or income opportunities and collective losses such as common property resources and social infrastructure; (ii) impacts on Indigenous people, vulnerable groups specifically women; (iii) consultation with stakeholders and scope of peoples participation in the project; (iv) existing legal and administrative framework and formulation of resettlement framework for the project; (v) entitlement matrix with provisions for relocation assistance and restoration of businesses/income; (vi) estimation of cost for implementation of R&R activities; (vii) institutional framework for the implementation of plan including monitoring and evaluation mechanism.

C. Resettlement Impacts

4. The proposed work for all the road sections includes strengthening of existing single/intermediate lane carriageway and widening of existing single lane carriageway to intermediate lane. The required formation width varies from 5 meters to 7.5 meters in single lane and intermediate lane carriageway respectively. The four sub-project roads pass mostly through hilly terrain and as per the PWD records, the available Right of Way (RoW) varies from 9 meters to 15 meters. Minimization of resettlement was achieved mainly by reducing the corridor of

impact. Based on the availability of RoW and likely improvement strategy, it was agreed in consultation with affected persons and PWD to reduce the corridor of impact to the minimum required construction width. This helped in bringing down the resettlement impact considerably in majority of the road sections and in some cases by 100 per cent. As indicated earlier, out of 23 road sections in 19 road sections the resettlement impact was minimized to nil. The minimization of resettlement impacts for the four road sections are summarized in the **Table: 1**.

Table: 1 Minimization of Resettlement Impact

Sub-project Road Section	No. of affected family		No. of family Saved
	Before Mitigation	After Mitigation	
Dhakia-Gulabo-Pagia-Mukundpur	52	14	38
Raniket – Mohan	413	2	411
Almora – Bageshwar	1422	1	1421
Kakrali – Thuligarh	39	1	38
Total	**1926**	**18**	**1908**

5. After minimizing the impacts by adopting suitable engineering option, only 18 structures will get affected. Type and use of various structures with number of households and APs as enumerated during the census survey are summarized in the **Table: 2**.

Table: 2 Types and Uses of Structures to be Affected

Types of Structures	No. of Structure	No. of Households	No. of APs
Residential Structures	1	1	4
Residential and Commercial Structures	4	4	24
Commercial Structures	1	1	9
Other Private Structures*	11	11	50
Religious Structures	1	0	0
Total	**18**	**17**	**87**

* The other private structures include boundary walls, private school, kitchens and vacant room.

6. Out of the 18 private structures likely to be affected 14 belong to encroachers and 3 are squatters, there are no titleholders. All the residential cum commercial structures (4) being affected are encroachers, 6 APs will also lose the boundary walls of their residences and 1 AP will lose a portion of the kitchen, who are also encroachers. Apart from this, 2 private schools will also lose the boundary walls and they are also encroaching on government ROW. The 3 squatter households will suffer partial impact on commercial structure, kitchen and a vacant room respectively. The boundary walls of residential structures will be affected by more than 50% and two residential and commercial structures will also suffer up to 30% loss. The rest of the structures will be losing only 10% of their total structures. Out of the affected structures 12 are permanent, 1 is semi permanent and the rest 5 are temporary in nature.

D. Socio-Economic Profile of the APs

7. People living along the sub-project roads are of various socio-economic standards. Out of the total 17 affected households about 10 households live below the poverty line (BPL) and 2 households are from scheduled castes. There are no scheduled tribe, women headed and physically handicapped households. In one of the affected household, the number of family member is more than 10 and the average household size of affected household works out to be 6.2. In general the economy of the area is agrarian one. Most of the road side settlers are into petty road side business and about 5 of the affected households are also employed in government sector. The annual income of affected

households varies between less than Rs. 20000 to Rs. 50000. About 12 households have annual income of less than Rs. 20000 and remaining have an annual income of about Rs. 50000.

E. Relocation and Compensation

8. No relocation of households is envisaged in any of the sub-project road section as there is no total loss of any residential or commercial structures. Most of the structures are encroached one and losing around 10% of their total area. The APs have indicated of rebuilding their structures within their available existing land and for that they needed advance notification and some assistance from the EA.

F. Issues Related with Indigenous People

9. In the state of Uttaranchal, the scheduled tribe population constitutes only 3% of the total population. No scheduled tribe (ST) households will be adversely affected in Project 1. The tribal population in Uttaranchal and sub-project affected areas is not distinctive in the sense that they are inherently integrated with the modern and dominant population of the state. Tribal groups in the sub-project area freely interact and share their sources of water, folklore, food, infrastructure and other belongings with the mainstream population and outside community. Moreover, these groups have nuclear families and are open to new ideas like family planning and formal education. Therefore, the socio-economic impacts due to sub-projects will not be comparatively different for these people when compared with mainstream population. Keeping in view the above facts, no separate Indigenous People Development Plan (IPDP) has been attempted for any sub-project.

G. Gender Issues in the Project

10. Women in the region are largely involved in household work, cultivation and other agricultural activities. They use the road for their routine household activities and economic activities such as agriculture and marketing etc. Availability of all weather roads with safe connectivity with better transport services will benefit the women folk of the area. Their mobility will be augmented both in terms of access to social services, higher levels of schooling and better health facility etc. No women headed household will be adversely affected by Project 1.

H. Review of Government Policy and Resettlement Principles for the Project

11. In India, compensation for land acquisition (LA) and resettlement assistance for project-affected people is governed by the Land Acquisition Act (1894), which has been amended from time to time. The State Government, at present does not have any policy on Resettlement and Rehabilitation. Under the Land Acquisition Act of 1894, compensation is paid only to the legal titleholders and does not provide any compensation package to the non title holders like encroachers, squatters etc. However, a National Policy on Resettlement and Rehabilitation of project Affected Families, 2004 known as NPRR-2004 has been adopted by the GoI to address development-induced resettlement. The policy essentially addresses the need to provide succor to the asset less rural poor, support the rehabilitation efforts of the resource poor sections, namely, small and marginal farmers, SCs / STs and women who have been displaced. For acquisition of strips of land for railway lines, highways, transmission lines and pipelines, only an ex-gratia payment of Rs 10,000 per family is to be paid under NPRR. This policy does not recognize squatters and encroachers and there is no provision of resettlement assistance and transitional allowances etc. However, despite these provisions, the policy does not define that the compensation of lost assets must be on the basis of replacement cost. Based on the above analysis of

government provisions and ADB's policy on *Involuntary Resettlement,* project specific resettlement and rehabilitation (R&R) measures have been formulated.

12. In accordance with the resettlement and rehabilitation (R&R) measures suggested for the project, all affected households and persons will be entitled to a combination of compensation packages and resettlement assistance depending on the nature of ownership rights of lost assets and scope of the impacts including socio-economic vulnerability of the affected persons. The affected persons will be entitled to the following five types of compensation and assistance packages (i) compensation for the loss of land, crops/ trees at their replacement value; (ii) compensation for structures (residential/ commercial) and other immovable assets at their replacement value; (iii) assistance in lieu of the loss of business/ wage income; (iv) assistance for shifting, and (v) rebuilding and/ or restoration of community resources/facilities.

13. Compensation for the lost assets to all APs will be paid on the basis of replacement value. Resettlement assistance for lost income and livelihoods will be provided to both title holders and non-title holders such as people with traditional or customary land rights, roadside residences/ SBE owners with permits from Panchayat (local government body) and other local agencies to which they are paying annual tax for the same. The "Vulnerable Group" comprises of APs living below poverty line (BPL), SC, ST, women headed households and the elderly and disabled. An entitlement matrix **(Table 3)** has been developed, which recognizes and lists various types of losses resulting out of the project and provides for compensation and resettlement packages. Further, all compensation and assistance will be paid to all APs in the first section of each contract package prior to commencement of civil works in first section and displacement or dispossession of assets. The subsequent sections under each contract package will be handed over to the contractor only after payment of compensation/assistance to the APs is completed for each of the sections.

Table 3: Entitlement Matrix

	Type of Loss	Unit of Entitlement	Entitlement	Details
1	Loss of residential and commercial structure by encroachers	Households who have illegally extended their legally owned land/ property onto public or other private land	▪ No compensation for land ▪ Compensation for structures to only vulnerable household ▪ Shifting assistance for vulnerable encroachers ▪ R&R Assistance only to vulnerable households ▪ Right to salvage materials	i. Encroachers will be notified and given a time in which they will be required to remove their assets and harvest their crops. ii. Compensation for structures at replacement cost to the vulnerable households. ii. Training would be provided for upgradation of skills to the APs belonging to vulnerable groups and loosing their commercial structures. ▪ Shifting allowance of Rs. 1500 to 2500/- lump sum for shifting depending on the type of structure and extent of impact. ▪ Right to salvage materials from the demolished structure.
2	Loss of residential and commercial structure by Squatters/ Informal settlers	Households living /earning their livelihood by illegally occupying public or private land.	a. No compensation for land b. Compensation for structures. c. Shifting assistance d. R&R Assistance e. Right to salvage materials	a. Compensation for loss of structure at replacement cost. b. A lump sum shifting amount of Rs. 1500 to Rs. 2500 depending on the type of structure. c. Squatters/informal settlers will be notified and given a time in which they will be required to remove their assets. d. Transitional allowance of Rs. 3000 for a period of 3 to a maximum of 6 months depending on the extent of impact. e. Training would be provided for upgradation of skills to the APs loosing their commercial structures. f. Right to salvage material from the demolished structure. g. Project assisted relocation option will be provided to those whose residential / commercial structures become non-livable as a result of project impacts and relocation site will be developed in consultation with these affected households (subject to availability of land)
3	Common Property Resources	Community	Compensatory replacement	Cash compensation or reconstruction of the community structure in consultation with the community.

	Type of Loss	Unit of Entitlement	Entitlement	Details
4	Temporary impact during construction include disruption of normal traffic, increased noise levels, and damage to adjacent parcel of land / assets due to movement of heavy machinery	Community / Individual	Compensation	a. The contractor shall bear the cost of any impact on structure or land due to movement of machinery during construction. b. All temporary use of lands outside proposed RoW to be through written approval of the landowner and contractor. c. Location of Construction camps by contractors in consultation with PWD.
5	Unforeseen impacts if any	Individual/ Community	Unforeseen impacts will be assessed on case by case basis and suitable compensation/ assistance will be paid as deemed fit by the Executive Agency.	

14. The above Entitlement Matrix has been developed on the basis of social assessment studies carried out in Project 1. If additional impacts are identified during Project 1 and subsequent Projects, the entitlement matrix will be updated by including provision of compensation and assistance for the additional impacts in the short resettlement plans.

I. Consultation and Public Participation

15. All relevant aspects of project planning and development were discussed with both primary and secondary stakeholders including directly affected people, executing agency, and various other local administrative agencies and departments. Directly affected population were consulted to understand their concerns and suggestions on the types of mitigation measures that should be considered to address their concerns. At the field level 37 focused group discussions were held in all 23 sub-projects which comprised various groups including, village panchayats, village administrative officers, men, women, farmers, business communities, concerned government departments and disadvantaged groups to ensure a comprehensive perspective on the project and its impacts. Further, the consultations and discussions with the project affected people will be a continuing activity throughout the implementation of the Investment Program and the PIUs will be assisted by local NGO for it. The NGO involved in the resettlement implementation activities will keep the affected people informed about the impacts, the compensation and assistances proposed for them and facilitate addressing any grievances. The summary of the short resettlement plans and the entitlement matrix will be translated into the local language and will be disclosed to the affected persons and made available at offices of PWD, PMU and the ADB website.

J. Institutional Arrangements

16. The existing PWD of Uttaranchal has already set up a Project Management Unit (PMU) in Dehradun. This office will be functional for the whole duration of the Investment Program. For resettlement activities, the PMU will do the overall coordination, planning, implementation, and financing. The PMU will create a Resettlement Cell (RC) with appointment of a Resettlement Officer (RO) (in the rank of an executive engineer) and required support staff for the duration of the project to ensure timely and effective implementation of RPs. The RO will be assisted by the consultant appointed by PWD for preparation of RPs for Project 2. A social development / resettlement specialist will be included in each design consultant's team for the remaining Projects and will be responsible for implementation of the RPs. Project Implementation Units (PIU) will be established at PWD Circle level for the implementation of sub-projects. The PMU will coordinate with PIUs for sub-project level RP related activities, and each PIU will additionally designate one senior staff (not below the rank of an Executive Engineer) to co-ordinate the resettlement activities. The PIU, if required depending on the workload will also appoint an assistant resettlement

officer (ARO) in rank of assistant engineer who will either be deputed from PWD to the PIU or engaged on contractual basis having adequate land acquisition implementation expertise. The staffs at the PIU level will be provided with training by the social/resettlement specialist of the supervision consultant for implementation of the RP. The PIU will maintain all databases, work closely with APs and other stakeholders and monitor the day today resettlement activities. Apart from this, experienced and well-qualified NGO in this field will be engaged to assist the PIUs in the implementation of the RP. Keeping in view the minimal resettlement impacts occurred from the project only one NGO will be hired for Project 1. The NGO would play the role of a facilitator and will work as a link between the PIU and the affected community.

17. A Grievance Redress Committee (GRC) at PIU level will be formed to deal with the disputes and AP's grievance and facilitate timely implementation of the Project. The GRC will be headed by the District Collector or a representative from the collector's office. The GRC will have representatives from the PIU office, representatives of APs, particularly of vulnerable APs, local government representatives, NGOs and other interest groups. The GRC will meet as and when grievances are referred to it for redress. Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, and other assistance.

K. Monitoring and Evaluation

18. Internal project monitoring and evaluation will be carried out by PMU/PIU and the implementing NGO. An Independent Monitoring and Evaluation Consultant (IMEC) will be hired for the external monitoring and evaluation of the project. Looking at the minimum impacts expected from the project, the external monitoring and evaluation shall be done by engaging individual consultant with an intermittent input for the project period. Internal monitoring will be the responsibility of the PMU/PIU and NGO. The internal monitoring by PMU/PIU will include: (i) **administrative monitoring**: daily planning, implementation, feed back and trouble shooting, individual AP database maintenance, and progress reports; (ii) **socio-economic monitoring**: case studies, using baseline information for comparing AP socio-economic conditions, evacuation, demolition, salvaging materials, morbidity and mortality, community relationships, dates for consultations, and number of appeals placed; and (iii) **impact evaluation monitoring**: income standards restored/improved, and socioeconomic conditions of the affected persons. Monitoring and evaluation reports documenting progress on resettlement implementation and RP completion reports will be provided by the PIU to PMU for review and approval from ADB.

19. For external project monitoring and evaluation, the PMU will engage an individual Independent Monitoring and Evaluation Consultant (IMEC). The person, with previous experience in resettlement activities and familiarity with Government and ADB resettlement policy, will be engaged with ADB concurrence within three months of the loan effectiveness. The IMEC will monitor and verify RP implementation to determine whether resettlement goals have been achieved, livelihood and living standards have been restored, and provide recommendations for improvement. Monitoring will also ensure recording of AP's views on resettlement issues such as; AP's understanding of entitlement policies, options, and alternatives; site conditions; compensation valuation and disbursement; grievance redress procedures; and staff competencies. The IMEC will also evaluate the performance of the PIU and NGOs. The IMEC will also evaluate the performance of the PIU and NGOs. PMU will submit quarterly progress reports and the IMEC will report its findings simultaneously to the EA and to ADB twice a year. Financial provisions will be made under the project budget for above suggested institutional arrangement such as establishing the RC, appointment of the RO, hiring of the NGO and hiring of the IMEC etc.

L. R&R Cost Estimate

20. The period for implementation for the Project 1 RPs will be from the third quarter of 2006 to the first quarter of 2007. The R&R cost estimate for all sub-projects includes all eligible compensation and resettlement assistance, establishment of RU, staffing, training, transportation, monitoring and evaluation, involvement of NGO in project implementation and other administrative expenses. The cost of structure that has been used in the cost estimates has been derived through rapid field appraisal and consultation with affected households and relevant local authorities. This will be updated during the implementation and to cover up such updated cost estimates additional provision has been made with 15% contingency. The total estimated R&R cost including implementation cost of the Phase 1 sub-projects is Rs. 29,23014 (US $ 66432).

SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT

I. INTRODUCTION

This summary environmental impact assessment (SEIA) is based on: (i) two environmental assessment reports prepared for the proposed Investment Program; (i) the initial environmental examinations (IEE) of the proposed Project 1 roads (23 roads covering 572 km in length); and (iii) the environmental impact assessment (EIA) of the proposed Almora – Bageshwar Road sub-project (72.3 km long section of State Highway SH-37) and the Barechhina-Seraghat Road sub-project (42.9 km long section of SH-6). The SEIA takes into account the engineering design reports for the road improvement works in Project 1 and the findings of the ecological assessment carried out in the nearby areas of Binsar Wildlife Sanctuary.

The Investment Program and individual sub-projects for Project 1 are classified according to ADB *Environmental Assessment Guidelines*, 2003. The Project was initially categorized as category 'B', however, the findings of the IEE revealed that approximately 11.5 km of the Almora-Bageshwar Road partly borders and partly passes through Binsar Wildlife Sanctuary (BWS). Similarly, about 2.75 km of the Barechhina-Seraghat road passes through the BWS. The proposed improvement work on these two sub-project roads was therefore reclassified as category 'A' projects and this EIA was prepared.

The environmental assessment studies were carried between July 2005 and April 2006. Initial reports on individual sub-projects were prepared by detailed design consultants appointed by the Public Works Department (PWD). Thereafter, the Program level IEE and EIA was prepared by the TA consultants, in consultation with PWD's consultants.

The studies were prepared in accordance with relevant laws and regulations of the Government of India; and with the ADB *Environmental Policy*, 2002, and the ADB *Environmental Assessment Guidelines*, 2003.

The PWD is seeking necessary clearances from forestry department and pollution control board. When these have been obtained, PWD will seek environmental clearance from National Board for Wildlife, Government of India, and the civil works will begin only when this clearance has been received.

II. DESCRIPTION OF THE PROJECT

A. Proposed Project and Location of the Components

The proposed Investment Program will involve the improvement of existing rural roads, generally within their existing rights-of-ways (RoWs). Project 1 of the Program covers 23 roads having a total length of 572 km spread across 11 districts of Uttaranchal State. The EIA has been carried out for two roads 115 km in length and Table 1 overleaf gives summary details of the proposed road pavement improvement works.

Table 1 Summary of Proposed Road Pavement Improvement Works

Sl. No.	Project Road	Length (km)	District	Improvement Proposal
1.	Almora – Bageshwar section of SH-37	72.9	Almora Bageshwar	Pavement Overlay Sections : 25mm thick semi-dense bituminous carpet (SDBC) and 50mm thick bituminous macadam (BM);
2.	Barechhina – Seraghat section of SH-6	42.3	Almora	Pavement Reconstruction sections: 25mm thick SDBC + 50mm thick BM +150mm thick water bound macadam (WBM) + 100mm granular sub-base (GSB).

B. Proposed Investment Program Activities

The proposed Investment Program would rehabilitate and improve up to 10,800 km of Uttaranchal's secondary and tertiary road networks that covers state highways, major district roads, other district roads and village roads. These roads are the primary means of the movement of people and goods in this hill state. The improvement work mostly includes strengthening of existing roads on existing formation width with minor widening and improvement of shoulders. The broad components include provision of: 3.75m wide single-lane carriageways and 5.5m wide intermediate lane carriageways, with 0.5 mm wide shoulders in hilly terrain and 1.0m wide shoulders in plain terrain.

C. Implementation Schedule

The proposed Uttaranchal State Road Investment Program will be implemented through seven separate Projects over a period of 7 years. The environmental assessment studies for the first Project were carried out concurrently with the detailed engineering design and draft reports were submitted in December 2005. Award of the civil works contracts is planned for early in 2007.

III. DESCRIPTION OF THE ENVIRONMENT

This description covers the areas affected by the sub-project roads, which generally extend to around 100 m to 150 m, either side of the roads.

A. Physical Resources

1. Atmosphere and Climate

The climate of the state is moderate and tropical characterized by a hot and dry summer, a humid monsoon or rainy season, and a cool dry winter. The climate of the area is conditioned by the proximity of the Himalayan mountains to the north.

The climate in the mountainous region depends on elevation, slope, and type of land cover. Average temperature during summer is between 13°C to 19°C, whereas during winter it is generally between 3°C to 12°C. In the region, rainfall peaks during the month of July, with an average rainfall of 16 mm, followed in August by an average rainfall of 14 mm. High humidity occurs during the monsoon period of July and August when the maximum relative humidity is around 96% to 99%. During the monsoon, mist, fog and dew frequently occurs at the higher areas. High velocity winds are also created due to high pressure waves formed in the deep and steep valleys.

2. Air Quality

Because of the pristine environment and sparse population, most parts of the State have very good air quality. Air pollution is caused mainly in the larger urban and industrial areas such as Dehradun, Roorkee, and Almora. The main sources of air pollution are vehicle exhausts and industries.

Ambient air quality was monitored along sample sub-projects, which showed the following concentration ranges:

(i) suspended particulate matter (SPM) ranging from 77 μg/m³ at Kafli Gair to 189 μg/m³ at Bageshwar;

(ii) respirable suspended particulate matter (RSPM) ranging from 23 μg/m³ at Kafli Gair to 62 μg/m³ at Bageshwar;

(iii) sulphur dioxide (SO_2) ranging from 12 μg/m³ at Basauli to 24 μg/m³ at Bageshwar; and

(iv) nitrogen oxides (NOx) ranging from 20 μg/m³ at Kafli Gair to 45 μg/m³ at Bageshwar.

The ambient air quality along all the sub-project roads conforms to National Ambient Air Quality Standards (NAAQS). All the parameters monitored were found within permissible limits. Improvements in the road surface condition will further reduce the concentration in atmosphere.

3. Noise Levels

Ambient noise level monitoring was carried out along the sub-project roads and it was observed that the day time and night time levels were slightly in excess of the Noise Level Standards set by the Central Pollution Control Board.

The sub-project roads mostly run through forests, agricultural land, and wasteland where the noise environment is generally quiet. There are no industrial or mineral enterprises in the project areas. The main noise sources are from vehicles travelling on existing roads and human activity.

Day time equivalent noise levels in the study area vary between 50.8 to 67.6 dB(A) and night time equivalent noise levels range from 38.4 to 46.6 dB(A). A maximum instantaneous noise level of 70.2 dB(A) was recorded at Dhaul Chinna on the Barechhina-Seraghat road in the day time and a minimum of level of 37.1 dB(A) was recorded at Basauli on the Almora-Seraghat Road at night time.

4. Topography, Geology and Soil

Uttaranchal's hilly regions occupy about 90 percent of the State's geographical area, and the terrain is broadly divided into the following classifications: (i) terai region (below an elevation of 300m); lower hilly region (300m to 600m in elevation); upper hilly region (600 to 2400m in elevation); high altitude region (2400 to 4500m in elevation), and upper high altitude region (above 4500m). Udham Singh Nagar and Haridwar are the only plain districts in the State.

The State is divided into two main geophysical zones, namely: (i) the nonmontane zone, which consists of plains, where the soil is fertile and has good water retention capacity; and the montane zone which consists of the sub, mid, and greater Himalayas. The greater Himalayas are virtually covered with snow year-round.

The Himalayan tract of Kumaon-Garhwal region exposes a wide variety of rocks ranging in age from Himalayan Pre-Cambrian to Quaternary. Schists, schistose phyllites, granulites, migmatites, limestone, quartzite etc. are the major rocks in region. Seismically the area is classified as high seismic zone V.

Pedagogically the region is least resistant to soil erosion, and severe soil erosion is a common occurrence. Soils of the Uttaranchal Himalayas, are generally quite shallow, gravely and are impregnated with un-weathered fragments of parent rocks.

Two kinds of landslides are commonly found along the roads, which are termed "*debris slides*" and "*rock falls*". The first is a movement of surface debris material down the slopes through gravity and surface water run-off, while the latter is a movement of rock strata due to instability of the highly jointed nature of the rocks.

5. Surface and Ground Water

The state is well drained by a long network of perennial and seasonal streams.

The Ganges system drains the major part of the region covers most of the Garhwal Zone. The Nayar, which drains more than half the area of the Garhwal Zone, is an important tributary of the Ganga and the Yamuna -Tons system is also located in the Garhwal region.

The Yamuna river rises at Yamunotri and is joined by important Giri and Tons tributaries. The River Yamuna flows out of the hill areas through the Doon valley and the Shivaliks, into Haridwar district.

The drainage of the majority of the Kumaon Zone is via the Kali River system. Glaciers, lakes, innumerable streams and rivulets and springs constitute other the important water resources in the region.

Surface water quality monitoring was carried out along sample sub-project roads and samples collected from Saryu and Binsar rivers revealed that conductivity varies between 467-613 µmhos/cm with total dissolved solids (TDS) ranging between 301-391 mg/l. Such medium values of conductivity and TDS indicate that the water is appreciably mineralized.

TSS varies between 20-22 mg/l, while turbidity ranged between 6-8 NTU. Low values of turbidity and TSS indicates very low sediment load in the river implying negligible soil erosion in the river bed and catchment area during the monitoring period.

Satisfactory levels of dissolved oxygen were observed in all the samples, varying between 7.1-7.4 mg/l, which are above the permissible limit of 4 mg/l for fish. Natural regeneration / re-oxygenation could be main reason of such levels of DO and pH. BOD varies between 4-5

mg/l indicating the absence of strong oxidisable loads. COD ranged between 9.5-12.4 mg/l. No oil or grease was detected in any of the samples.

Total alkalinity varies between 110-112 mg/l and total hardness values were observed to vary in the range of 140-162 mg/l, which are all below the prescribed limit of 300 mg/l for drinking water. Chloride and sulphate contents were 50-76 mg/l and 30-36 mg/l respectively. While sodium content varies between 26-30 mg/l, potassium ranged between 18.4-22 mg/l. Levels of calcium and magnesium were 36.1-41 mg/l and 12.1-14.5 mg/l respectively.

The water of the rivers studied was in a healthy and clean state in the monitored section and was not significantly affected by extraneous pollution as evidenced from the observed value of pH (8.1-8.3), DO (7.1-7.4 mg/l), BOD (4-5mg/l) and oil & grease (below detection limit). Such consistent levels of pH, DO, BOD, nitrogen and oil & grease clearly demonstrate the absence of significant pollution.

B. Ecological Resources

1. Aquatic Ecology

The state has good potential for fisheries. Golden mahseer (*Tor putitora*) is one of the main game and food fish in the central Himalayan region, but its stocks have decreased significantly. The fish migrate considerable distances upstream in the search of suitable spawning grounds. Stocks of the Himalayan mahseer are also depleted and it is now considered an endangered species.

2. Flora

The mountains, meadows, lakes, and dense forests support exotic wildlife and plant life. Sixty four percent of States' land area is covered by forests classified into reserved forests, protected forests and un-classed forests. Forest officials in the Khalsi region have confirmed that the forest cover of the State is changing rapidly due to clearing of hills for agricultural activities by local communities. An area of around 19,000 sq.km. (77%) is classified as dense forests[55], but the actual forest cover of dense canopy is only 34%.

The vegetation of Himalayan region is broadly divided on the basis of topography as Forests and Bugyal (meadows). The latter refers to high altitude grasslands or meadows situated above the level of trees and shrubs. The vegetation of the state is characterised with varying altitudinal zones as:

i) The Sub-tropical Forest Zone which extends up to elevations of 1200m, with Sal (*Shorea Robust*) being the dominant species. They are found up to elevations of 750m on the southern slopes and up to elevations of 1,200m on the northern slopes.

ii) The Temperate Forest Zone extends between elevations of 1,050m and 1,900m on the southern slopes and between 900m and 1,800m on the northern slopes. The Chir (*pinus longifolia*) is the dominant species of this zone. Above the Chir forests, mixed vegetation of broad-leaved species such as oak are found, and Birch, Silver Fir and Burans follow at the upper limits of oak forests.

[55] State of Forest Report, 2001 statistics published by Forest Survey of India. This area is notified area under dense forest, however, during discussion with forests officials in Khalsi region it is noted that the forest cover of the state is changing rapidly due to clearing of hills for agricultural activities by local communities.

iii) The Sub-alpine and Alpine forest zone extends above the 2120 m range and hosts varieties of conifers such as Silver Fir, Blue Pine, Spruce, Cypress, Deodhar, Birch, amid a dense undergrowth of shrubs.

iv) Alpine Bush land and Meadows follow the third zone and are found up to elevations of 4200m. Birch and Juniper, are major species in this zone.

A considerable length of the Amlora- Bageshwar and Barechhina-Seraghat roads pass through the reserve forests and civil swam forests of Almora division. The forest flora of the study area comprises chiefly of oak (*Quercus leucotrichophora*), and Pine trees (*Pinus roxburghii, Pinus wallichiana)*. Other species found in this region are Tilonj (*Quercus dilitata*), Kharsu (*Quercus semecarpifolia*), Utis (*Alnus nepalensis*) and Deodar (*Cedrus polycarpos*), which belong to sub alpine and alpine zones. There are at least a dozen varieties of the rhododendrons blooming in Kumaon. A sample analysis along the project roads found that the average tree density varies from 40,000 to 80,000 trees per km^2. Oak, Chir *(Pinus roxburghii)*, Banj (*Quercus semicarpifolia)*, Kafal (*Myrica sapida)* are the dominating species in these sections.

3. Fauna

Uttaranchal State is rich in biodiversity and is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks[56]. The State is home to more than 200 species of mammals and over 400 species of avifauna. The cat family is abundant in these mountains and species include the Tiger, Panther, Civet cat, Leopard cat and Jungle cat. Relatives of the domesticated dog include the Himalayan Silver Fox and the Jackal. Various species of deer including the Musk Deer and the Barking Deer roam in the forest. Sambhar and Gural as well as the Bear and the Porcupine can also be seen. The flying mammal, the Bat is also common in this region, along with the Chipmunk, the Rhesus Monkey and the Flying Squirrel.

Over 400 varieties of birds have been recorded in the Himalayan region. The forest areas host, the Jewel Thrush, Black headed Oriole, Black Headed Yellow Bulbul, Rosy Minivet, Laughing Thrush, Golden Backed Wood Pecker and the Blue Fly Catcher. Wintering waterfowl include the Goosander, Brahminy Duck and Green Shank. Grey headed Fishing Eagles may also be seen by the river edges. At elevations above 1,500 m, the Woodpecker, Thrush & Warbler become more common, and between elevations of 2,000m to 3,000m, Grosbeak, Rock Thrush, Crested Black Tit & red headed Laughing Thrush are abundant.

Along the Almora-Bageshwar and Barechhina-Seraghat sub-project roads, species of Leopard (*Panthera pardus fusca*), Ghural (*Memorhaedus goral),* Kakar (*Muntiacus muntjak),* Jangli Suar (*Sus-scrofa cristatus),* Langur (*Presbyits entellus),* Bandar (*Macaques mulatto)* are reported as important species.

4. Protected Areas

The State has established an extensive network of national parks, sanctuaries and bio-reserve zones. About 18.7 percent[57] of the total area under Uttaranchal's Forest Department has been earmarked for biodiversity conservation by the creation and management of six National Parks, six Wildlife Sanctuaries and a Biosphere Reserve.

The Almora-Bageshwar Road bordering / passes through the Binsar Wildlife Sanctuary (BWS) for a length of 11.5 km (between Garial Bend and Churali Bend and again between

[56] Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal; Envis Bulletin, 2002.
[57] Wildlife and Protected Areas, ENVIS, 2002, Ministry of Environment and Forests publication

Bageshwar check post and Kafligair). Similarly, a 2.75 km length of the Barechhina-Seraghat road passes through the BWL (from Dhaul china check post onwards). In the BWS Management Plan, these areas would fall under a new tourist zone classification.

The Binsar Wildlife Sanctuary was established in 1988 vide notification No. 153/14-3-148/86 dated 25-03-1988 under Wildlife Conservation Act, 1972 in Almora District, and the total area of the sanctuary is about 4,700 hectares. The Sanctuary consists mainly of Chir Pine (*Pinus roxbourghii*) forest and Ban Oak and Moru Oak are also found at upper portion.

Details of the importance and status of the protected species in the forests of the Program region have been obtained from the Wildlife Warden at Almora as well as from the Range Office of the Binsar Wildlife Sanctuary. These officers have confirmed that the main wildlife species found in the BWS are Black Bear, Kakar (*Muntiacus muntjak*), Ghoral (*Nemorhoedus goral*), Wild Boar (*Susserofa cnstatus*), Panther (*Panthera pardus*) and wild cat (*Felis chaus*). Species of birds include the Chir pheasant, Kaleej pheasant and Kokal pheasant.

A rapid wildlife movement assessment found that there are no designated wildlife movement corridors along these roads and also that frequency of wildlife sighting along the sections of the sub-project roads in the BWS was very low.

C. Socio-economic Resources

As per census 2001, total population of State is 8.48 million, with a sex ratio of 962 compared to National figure of 927. The schedule caste and schedule tribe population in the State is significant, averaging 17.9 percent and 3 percent respectively. The average population density in the State is 159 persons per sq.km, which is considerably lower than the national average of 324 persons per sq.km. The rural population constitutes about 74 percent of the total population of the State. About 70 percent of the State population lives below the poverty line as against the national average of 46 percent.

The State domestic product at current prices increased from Rs. 50,048 millions to Rs. 113,612 millions in 2001-02 registering a compound annual growth of 10.3 percent, whereas the all India National State Domestic Product registered a compound annual growth of 13.16 percent over the same period. The per capita income at constant prices registered a compound annual growth of 2.04 percent.

Agriculture is generally confined to lower areas, which are underlain by weak rock formations such as schists, phyllites, weathered gneisses and crushed quartzite. The cultivated land covers 11.5 percent of the State's total geographical area and the net irrigated area stands at 3.42 lakh hectares, which is about 43 percent of the net sown area.

During the year 2005-06, the contribution of agriculture to Net State Domestic Product (NSDP) of the State was about 20 percent and this sector engaged about 58 percent of the total workforce.

The road network of State constitutes of 1,327 km of national highways, 437 km of state highway, 1,369 km of major district roads, 6,910 km of other district roads, 5,631 km of village roads and 2,633 km of light vehicle roads. The road density per 100 sq.km of area in Garhwal zone is 30 km where as in Kumaon zone, it is 37 km.

In the year 2003-04, there were 178 large and medium scale industries registered in the State, with the total investment of Rs. 5,00,700 lakhs, which provided employment to 44,000 employees. Small scale industries are another important sector in Uttaranchal, with a total workforce of around 130,000 employees.

Tourism is one of the strong pillars of the State economy. The State has high growth potential for nature, wildlife, adventure or pilgrimage tourism. The State received 10.5 million domestic tourists in the year 2000-01, 11.6 million in the year 2001-02 and 12.9 in the year 2002-03, registering an average annual growth of 10.7 percent over this period.

Uttaranchal has an estimated hydro power potential of approximately 20,200 MW, however at present, only 1,130 MW has been tapped. In addition, 4,170 MW projects are under implementation and 3,800 MW projects have been allotted to Central, State and private sectors.

IV. ALTERNATIVE ASSESSMENT

A. No Project

Without the project, road pavements would continue to deteriorate, erosion from surface water run-off would increase, due to the worsening condition of drainage structures, and the occurrence of landslides at existing and new locations would lead to increased deposition of sediments in streams and rivers. Roads that were not designed to carry heavy traffic would be subject to particularly high rates of deterioration as traffic increases and loads get heavier. Without the Project, the ambient concentrations of gaseous pollutants and noise will rise gradually in step with increases in the population and vehicles in the area and travel time would increase.

No capital costs would be incurred and no project-specific institutional strengthening would be available. However, high maintenance costs would continue.

B. Alternative Modes of Transport

Road transport is the only available mode of transport within the State. Rail services connect the plain areas of Uttaranchal with the neighbouring State of Uttar Pradesh and New Delhi and an infrequent air services is also available between Dehradun and New Delhi.

In rural and remote areas walking or riding mules/horse on the footpaths or roads is the only alternative mode of transport. Therefore, improving the road conditions is the only available option.

C. Alternative Alignments

No separate alternative alignment were considered for the sub-project roads as it is the general policy of the Investment Program to carry out road improvement works within the existing available formation width. This ensures that environmental impacts are minimized.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Impact Due to Siting of the Project and Project Design

The project will rehabilitate existing roads and no new road alignments will be constructed. For the most part, the sub-project roads pass through forest areas, which range from degraded forests to reserve forests and protected forests. Since the proposed sub-project roads will be improved within their existing formation widths, there will not be any land clearing and cutting of trees. Hydro-ecological impacts such as reductions in infiltration are

therefore not expected. Potential impacts such as soil erosion may occur however in particular areas.

To avoid loss of vegetation coverage, the following mitigation measures would be carried out.

- The detailed engineering design study has selected the improvement option that minimizes the cutting down of trees.
- The detailed engineering design has identified areas prone to erosion and includes land stabilization works as part of the design.
- The detailed engineering design study has enforced the strict conditions of the Ministry of Environment and Forests (MoEF) environmental clearance, particularly in the selection of improvement options for road sections located in protected areas.
- The construction work will use environmentally-friendly road construction (EFRC) and use bioengineering measures for slope protection, where appropriate.

Sections of the Almora-Bageshwar road (SH-37) and the Barechhina-Seraghat road (SH-6) pass through the Binsar Wildlife Sanctuary for a total length of around 15 km. No significant impacts would result from the road improvement works located in the wildlife sanctuary as there would be no road widening or disturbance to the adjacent forest. Although construction work will have some relatively minor short-term environmental impacts, no major impacts on wildlife are expected, as no significant wildlife populations are present alongside the roads.

Currently traffic on the sub-project roads is low. As a result of road improvement, traffic would be expected to increase slightly, but given the current low traffic and modest traffic growth forecast, the Investment Program project is unlikely to significantly contribute directly, or indirectly, to deforestation, forest degradation, or depletion.

There are no major cultural / historical sites along the sub-project roads, which would be affecting by the proposed improvement works. However, few small temples/shrines exist within the corridor of impact. These structures would not be disturbed by the improvement works, and precautions should be taken to ensure that they are not damaged by the construction activities.

B. Construction Phase

The majority of the environmental impacts associated with the proposed road improvement works would occur during the construction phase. These impacts are temporary and reversible and they would include those described below:

(i) loss of vegetation cover because of land clearing and cutting of trees along the three of the sub-project roads in Project 1, where widening to intermediate standard is proposed on traffic capacity grounds. These roads are the Dhakia – Gulao – Mukundpur road, the Jaitpur - Dhatoli - Kharmesha road and the Zafarpur - Gularbhoj road, all in Udham Singh Nagar district. This road widening would require the cutting of about 7,415 trees. PWD has started the process to obtain permission for felling these trees, and the loss of trees would be compensated by replacement planting as per the requirements of the Forest Department;

(ii) excavation and removal of sections of the existing bituminous wearing course and base course would be required in selected areas where the road pavement requires re-construction. It is proposed that the spoiled material will be reused as much as possible, however, any excess spoiled material would need to be disposed of. In the forest and sanctuary areas, it would be necessary to consult the forest /sanctuaries

management to find suitable locations where the spoiled bituminous material could be safely disposed of. The Wildlife Warden of the Binsar Wildlife Sanctuary (BWS) would be consulted regarding any disposal of bituminous materials that might be required for the Almora-Bageshwar and Barechhina-Seraghat roads;

(iii) Earthwork operations to replace the granular pavement layers and resurfacing works would create dust, noise, and contaminated air. These impacts would be significant where roads run through villages and settlements. There also would be a temporary reduction in quality of water in nearby streams while construction works are in progress;

(iv) possible erosion and landslides;

(v) land degradation caused by borrow pits;

(vi) wildlife poaching particularly in protected areas and forest areas; and

(vii) other environmental impacts related to disposal of excess soil, placement of construction worker camps, and placement or storage of construction materials.

To minimize these impacts, construction work would be carried by in environmentally sound manner by: (i) balancing cut and fill, wherever feasible; (ii) using log and boulder barriers to control slipping of excavated materials in hill sections; (iv) using bioengineering techniques for slope stabilization, wherever feasible; (v) having stringent inspection controls to avoid illegal firewood collection from the surrounding forests by construction workers, as well as requiring the contractors provide kerosene or gas for cooking; and (vi) ensuring that strict controls and penalties for wildlife poaching are imposed on the contractors' workforce.

Excavated materials would not be disposed of near water bodies or streams, in forests, or on agriculture land. To reduce dust, the contractor will be required to sprinkle water regularly when earth work is carried out adjacent to inhabited areas. Construction worker camps would be required to have adequate drinking water and sanitation facilities. Detailed mitigation measures to be implemented by each contractor would be clearly described in the contract specifications. Each contractor would be required to submit a site environmental management plan which describes how the contractor would implement mitigation measures, where the borrow areas are required, and how excess excavation materials would be disposed off. Construction camps and borrow areas should be located at least 500 m away from the habituated areas and forests areas.

Wherever sub-project roads pass through forests and other protected areas, mitigation measures would be included in the civil works contracts to ensure that the contractors would: (i) not dispose of construction waste material in the forest area, (ii) only obtain fuel wood from legal suppliers, and (iii) only clear trees located in the formation width. These requirements would be monitored and enforced by the construction supervision consultants.

During construction, labourers and workers would be hired from local communities where possible, to avoid any social conflicts. If there are insufficient local workers and it is necessary to engage workers from outside the local area, the contractors would be required to provide workers' camps with an adequate supply of water, toilet facilities, and self management of solid waste, thereby, minimizing resource conflicts.

During the construction work in the BWS, the contractor would be required to co-ordinate with the Sanctuary staff and schedule the construction work so as to minimize the impact on wildlife movement.

C. Operational and Maintenance Phase

During the operation and maintenance phase of the project, the significant environmental impacts could result from improper disposal of spoiled materials, failure to provide slope stabilization in erosion and landslide-prone areas, failure to maintain bioengineering and tree planting along the road alignments and failure to rehabilitate borrow and quarry areas. Therefore, regular monitoring procedures should be adopted to ensure that all required mitigation measures are implemented. No adverse impacts on air and water quality are expected during the operation of the project roads as the number of vehicles will not increase significantly. As well as improved access, a reduction in dust because of resurfacing would be a positive impact.

VI. ECONOMIC ASSESSMENT

A. Benefits

Project 1 would have an economic rate of return (EIRR) of 16.3 percent, and the EIRR values for Almora-Bageshwar and Barechhina-Seraghat road sub-projects would be 21.4 percent and 17.5 percent, respectively. The benefit-cost ratio for these two sub-projects would be 1.78 and 1.41 respectively.

The key long-term environmental and social benefits from improving the sub-project roads would arise from: (i) savings in travel times; (ii) reduced vehicle operating costs (because of improved riding quality of the road surfaces), (iii) lower road maintenance costs; and (iv) a reduction in road closures or lengthy road deviations because of landslides. The other non-quantifiable benefits would be: (i) increased potential for eco-tourism; (ii) new businesses serving the increased passing trade; (iii) less soil erosion and sedimentation due to the landslide control measures; and (iv) improved cross drainage.

B. Cost of Mitigation Measures

The total cost of the Almora-Bageshwar and Barechhina-Seraghat road improvement sub-projects would be Rs 366 million and Rs 224 million, respectively. Included in these costs are the cost of the environmental mitigation measures, estimated to be around Rs 1.0 million and the environmental monitoring cost estimated to be around Rs 0.3 million.

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan and Responsible Authorities

The environmental management plan (EMP) and monitoring plan for Project 1 are shown in Tables 2 and 3, respectively. These plans would serve as guidelines for ensuring that all necessary measures would be carried out by the PWD, the PMU, design consultants and construction supervision consultants to mitigate possible environmental impacts resulting from the sub-projects. The EMP and the monitoring plan would need to be updated during the implementation when required, for instance to define locations and frequency of monitoring.

The PWD, through the PMU project director, would be responsible for ensuring that: (i) the design consultants incorporate all necessary mitigation measures into the detailed designs; (ii) the bidding document for contractors contain all required mitigation measures to be implemented during the construction period and that the contractors' obligations to implement the EMP during construction are clearly defined; (iii) the environmental clearances are obtained before any civil work contract is awarded; (iv) the construction supervision consultants monitor regularly and report on the implementation of the EMP; (v) other parties and government agencies implement the EMP at all stages of the Project; (vi) remedial actions are undertaken in response to unpredicted environmental impacts; and (vii) additional environmental assessment is undertaken if any change in alignment or project design takes place.

B. Institutional Capacity to Address Environmental Concerns

At present, the Executive Engineers in the PWD Divisional Offices have been assigned to process environmental related clearances for all projects within the PWD. The overall monitoring of execution of PWD's projects is carried out by the Chief Engineer at the Department level and by the Division Office at District level. However, there are no specific guidelines or instructions on managing environmental impacts associated with PWD's construction and maintenance activities. Therefore, there is a need for PWD need to institutionalize the environmental and social aspects of its operations in order align itself with ADB's general policy to mainstream environmental and social concerns in its development program.

To implement this Investment Program, the Project Management Unit (PMU) at the Department level has been established with staff seconded from the PWD. This PMU will be supported by environmental and social development experts who will also assist the Project Implementation Units (PIUs), which would be responsible for managing the implementation of the sub-projects. Day to day monitoring of the implementation of the EMP in the field would be carried out by the construction supervision consultants, under the overall direction of the Executive Engineers at the PIU. Training on environmental management would be given to these Executive Engineers by the environmental and social development experts. It is expected that nine separate PIUs would be established.

C. Environmental Assessment and Review Procedures

An environmental assessment of each sub-project in Project 1 has been carried out and IEEs and EIAs have been prepared, as appropriate. For future Projects, similar environmental assessments will be undertaken. The scale and characteristics of potential environmental impacts of the remaining subprojects are expected to be similar to those already assessed in this SEIA.

1. Environmental Selection Criteria for Subprojects

Sub-projects for future Projects of the Investment Program shall be selected from the prioritized district road lists contained in the Road Development Master Plan and they shall have minimal, if any, lengths running designated wild-life sanctuaries, national parks or areas of international significance (e.g. protected wetland designated by the Wetland Convention or cultural heritage sites designated by UNESCO).

According to the Government of India (GoI) environmental regulations and ADB's *Environmental Policy* 2002, the following environmental assessments would be carried out by PWD during the preparation stage for future sub-projects:

(i) an initial rapid environmental assessment of each subproject would be prepared in-order that the individual sub-projects can be classified in accordance with the GoI regulations and ADB's environmental assessment guidelines;

(ii) an Environmental Impact Assessment (EIA) and an Environmental Management and Monitoring Plan (EMP) would be prepared for each subproject that falls into category "A";

(iii) an Initial Environmental Examination (IEE) and an EMP would be prepared for other sub-projects that fall into category "B". For village roads and light vehicle roads, the IEE will be carried out using an IEE checklist and the standard EMP that have been adopted previously on ADB funded PMGSY projects.

A sub-project would be categorized as "A" if:

(a) in-depth assessment of the impacts and detailed studies was needed to prepare mitigation measures;

(b) the alignment passes through or falls within 100 meters of ecologically sensitive areas, such as designated wild-life sanctuaries, national parks, other sanctuaries, botanical garden or areas that have internationally significance (e.g. protected wetland designated by the Wetland Convention or any cultural heritage site designated by UNESCO); and

(c) a by-pass or re-alignment would be required to avoid ecologically sensitive areas.

2. Responsibilities and Authorities

PWD's Responsibilities

(i) Prepare environmental screening checklist and classify sub-projects in consultation with Forest Department and/or Wildlife Conservation Department;
(ii) Based on the environmental classification of the subprojects, prepare terms of reference (ToRs) to conduct IEEs or EIAs;
(iii) Engage environmental specialists to prepare the necessary IEE or EIA reports including EMPs and SEIAs for public disclosure;
(iv) Undertake initial review of the IEE and EMP or EIAs, SEIA and EMP reports to ensure compliance with the Government's and ADB's requirement
(v) Obtain necessary permits (e.g. environmental clearance, forest clearance, and water board clearance) from relevant Government Agencies before commencing any civil works on the sub-projects;
(vi) Submit to ADB the IEE or EIA and SEIA including EMP reports and all clearance certificates and conditionalities from the relevant Government Agencies for ADB's approval before commencing sub-project implementation;
(vii) Ensure that the EMPs, which include mitigation measures required during construction, are included in the bidding documents;
(viii) Ensure that contractors have access to the EIA or IEE and EMP reports of the sub-projects;

(ix) Ensure that contractors understand their responsibilities to mitigate environmental problems associated with their construction activities;
(x) Ensure that the EMP and the accompanying Environmental Monitoring Plan are properly implemented;
(xi) In case unpredicted environmental impacts occur during project implementation, prepare and implement an environmental emergency program in consultation with relevant Government Agency and ADB if necessary;
(xii) In case, during Program implementation, a sub project needs to be realigned, review the environmental classification, revise accordingly, and identify whether supplementary IEE or EIA study is required. If required, prepare a TOR for undertaking supplementary IEE or EIA and require an environment specialist to carry out the study;
(xiii) Submit annual reports on performance of EMPs and details of environmental emergency programs (if any) to the State Pollution Board, MoEF, and ADB.

ADB's Responsibilities:

(i) Review IEE and/or EIA reports, which will be the basis for subproject approvals;
(ii) Review SEIA reports and disclose SEIA report through ADB's website;
(iii) Review the performance of the EMP implementation and conduct due diligence analyses as part of future program review missions;
(iv) If required, provide assistance to the PWD in carrying out its responsibilities to implement this Investment Program.

3. Environmental Due Diligence and Public Disclosure to Ensure Compliance with ADB's Environment Policy

ADB should be given access to undertake environmental due diligence for all sub-projects, if needed. However, the PWD has the main responsibility for undertaking environmental due diligence and monitoring of the implementation of environmental mitigation measures for all sub-projects.

4. Staffing Requirements and Budget

The environmental management capacities at all levels in PWD are weak. Adequate technical and financial support would be provided to ensure compliance with all environmental assessment procedures, mitigation measures and monitoring procedures.

The Investment Program incorporates the budget and resources needed to (i) implement the environmental assessment and review procedure; (ii) conduct a survey to complete the environmental checklists, and conduct an IEE or EIA for sub-projects; and (iii) monitor the implementation of the mitigation measures.

VIII. PUBLIC INVOLVEMENT AND DISCLOSURE

As part of the ADB's Public Consultation requirements, extensive consultations were carried out from the outset of the environmental assessment studies for Project 1. A two stage consultation was carried out during the EIA process for the Almora-Bageshwar road and

Barechhina-Seraghat road sub-projects to fulfil ADB's requirements for category 'A' projects. The process of consultation and findings are described herewith.

In preparing the IEE's for Project 1, consultations with local communities were carried out along all the roads during July and August 2005. Most of the communities that would be affected by the project were pleased with the proposed improvement of project roads and no negative concerns were raised. A total of more than 100 people, including local community members, government officials, representatives of NGOs and relevant professionals were consulted during the preparation of the IEEs.

In preparing the EIA report for the Almora-Bageshwar and Barechhina-Seraghat sub-projects, public consultations with a total of over 104 representatives of the local communities, officials from concerned government organizations and NGOs, and professionals from the private sector were carried out from January 2006 to March 2006. Consultations were held with local communities through formal and informal discussions during the field work. The table below summarizes these brief of public consultations.

Sl. No.	Sub-project Road section	Venue & Date	No. of Participants
1.	Almora – Bageshwar (Almora district)	Basoli village on 19th July 2005	20
		Bhetuli village on 21st August 2005	10
		Kaparkahan village on 21st August 2005	08
2.	Almora – Bageshwar (Bageshwar district)	Hiraguni village on 19th July 2005	06
		Bilona-shera village on 20th August 2005	15
3.	Barechhina – Seraghat (Almora district)	Dhoulchhina village on 17th July 2005	09
		Jamradi village on 25th August 2005	10
4.	Almora – Bageshwar (Almora district)	Village Basoli on 22nd March 2006	27
		Village Kafli Gair on 22nd March 2006	33
5.	Barechhina – Seraghat (Almora district)	Village Dhaul Chinna on 23rd March 2006	44
6.		Office of Wildlife Warden, Almora on 22nd March 2006	5

Details of issues raised and responses of project authorities, along with the list of officials consulted are appended in EIA report.

The key concern expressed by the local communities was the stress on local resources and infrastructure in nearby communities from the construction camps and the possibility of friction between residents and migrant workers. Provision for addressing this concern has been incorporated into the management plan.

Discussions with representatives from concerned government agencies were carried out through officials meetings. These discussion focused on: (i) procedures and formalities for processing relevant clearances from Wildlife Board, DoF, MoEF, local administration offices; (ii) identifying responsible parties for the implementation and monitoring of various components of project activities, particularly environmental impacts; (iii) appropriate engineering designs and road construction methods as well as concepts and methods for EFRC; and (iv) possible environmental impacts and mitigation measures.

The Wildlife Conservator Office for the Forest Department, as well as the Binsar Wildlife office and Sanctuary staff, felt that the project would not have any serious implications for the Sanctuary. The two sub-project roads had been operating in the sanctuary areas for many years. Their concerns were mostly on how to avoid or minimize environmental impacts of construction. It was suggested by the wildlife warden that the selection of sites for the construction camps, storage of construction materials and machinery, and for disposing of spoiled materials, should be done in close consultation with the Sanctuary officials. Follow-up consultations would therefore need to be carried out during the implementation stages.

For any category "A" subprojects, the SEIA needs to be disclosed to the public through the ADB website for 120 days, before approval of the sub-projects can be given.

IX. CONCLUSION AND RECOMMENDATIONS

Almost all predicted adverse impacts of the proposed Investment Program would occur during the construction phase. The characteristics of the impacts are significant, but they are short-term and reversible. These impacts are manageable and they can be minimized through engineering solutions easily incorporated into the project design. However, the EMP and monitoring plan must be well implemented.

Continuous monitoring will be needed to examine whether remedial action is required to respond to unexpected impacts. In addition, the EIAs, IEEs and EMPs would need to be updated during the implementation if required. If at implementation stage, the engineering design leads to changes to the existing project plan, revised EIAs, IEEs, and EMPs would need to be submitted to relevant Government agencies and ADB for approval.

Table 2: Environmental Management Plan

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
1. Location						
1.1 Location of construction camps and contractor facilities	Inappropriate location such as close to local communities, drinking water source, temple/shrines. Unfriendly use of community resources such as non-timber forestry products by workers.	Location of construction camps at least 500m away from community areas, and away from drinking water sources. Inclusion of information on activities not allowed by construction workers in contract documents.	Construction camp sites	Discussions with community group, local PWD staff.	PMU / Consultants	PMU
1.2 Location of quarry sites	Location in unstable areas or areas not approved by Department of Forests (DoF) and Department of Geology and Mines (DoGM)	Only stable areas and existing or new government approved sites may be considered.	Quarry sites (Haldwani, Lalkuan, Gola river, Tanakpur, Rampur, sand from river banks)	Approval from Forest /Geology and Mines Department. Co-ordination with PWD for use of existing quarry sites. If relevant, discussion with relevant Sanctuary officials.	PMU / Consultants	PMU / DoF, DoGM
1.3 Location of borrow pits	Location in unstable areas or close to village	Location in area with stable soil and away from villages.	Borrow sites (Almora-Bageshwar: km 219+000, km 240+000; Barechhina-Seraghat: km 179+100, km 66+000, km 281+500, km	Discussion with local PWD office	PMU / Consultants	PMU

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
			60+000)			
1.4 Obtaining appropriate clearances/permits for sections of the road through forest areas, Sanctuary areas, location of quarry & blasting sites.	Delays in processing clearances causing delays in initiation of construction	Processing of clearances/ permits on a timely basis and keeping in mind the time requirements for these clearances.	11.5 km section of Almora-Bageshwar section and 2.75 km section of Barechhina-Seraghat section located in vicinity of Binsar Wildlife Sanctuary)	Coordination with DoF, SPCB, DoGM, relevant local Administrations	PMU / Consultants	SGOU
2. Planning/Project Design						
2.1 Pavement	Water leakage/seepage through pavement and damage of road due to poor quality design. Excessive production of smoke or gaseous emissions due to heating bitumen using firewood or diesel fuelled asphalt mixing plants	Quality designs - re layer thicknesses and material content. Use of bitumen emulsion wherever possible.	All parts of project road		PMU / Consultants	PMU
2.2 Walls	Improper placement of gabion or masonry retaining breast/check/toe walls leading to unnecessarily continued issues of erosion, landslides and poor drainage.	Correct placement of gabion retaining breast/check/toe walls in wet, marshy and unstable areas and similar masonry walls in drier areas.	All parts of project road		PMU / Consultants	PMU

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
2.3 Determination of RoW width	Unnecessary widening leading to unnecessary geometric cuts, soil erosion and the destruction of plant and water resources.	Widths to be supported by traffic analyses and economic justification.	All parts of project road		PMU / Consultants	PMU
2.4 Drainage structures	Poor drainage due to poorly designed/specified drainage structures. Damage to cross drainage structures due to inadequacy to support water flows and leading to damage to road. Unnecessarily increased sedimentation and waste.	Drains lined with cement mortar only in sensitive areas. Drainage structures designed according with anticipated levels of water flows.	All parts of project road		PMU / Consultants	PMU
2.5 Geometric cuts	Excessive excavation leading to unnecessarily large volumes of earth-works, generation of excessive dust and sediments deposited in nearby water bodies.	Designs to be based wherever possible on "full cut" method – these requiring one-fourth the volume of material removal associated with "box-cut" methods.	Sharp curves where geometric adjustment required.		PMU / Consultants	PMU
2.6 Road safety measures	Inadequate safety measures causing accidents in future.	In detail design provide site specific safety measures which also taken into cost and likely economic benefits.	All parts of project road		PMU / Consultants	PMU
2.7 Mechanisation	Poor quality construction due to lack of proper equipment and machinery causing early and untimely damage to the road surface	During detailed design, specify mechanical construction methods. Select contractors based on their ability to supply/use	All parts of project road		PMU / Consultants	PMU

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
	and road furniture leading to poor riding surfaces, poor drainage, unnecessary erosion landslides, accidents, and sedimentation in water bodies.	machinery required for EFRC construction.				
2.8 Bio-engineering	Use of unsuitable bio-engineering methods at various sites.	In detailed design specify various bio-engineering options and follow the *"MoRT&H code for road design"*. Also specify the need for monitoring of the implementation of bio-engineering.	All parts of project road		PMU / Consultants	PMU
3. Construction						
3.1 Establishment and shifting of construction camps	Deforestation and poaching by labourers. Improper waste disposal. Loss of aesthetic beauty. Negative impacts on public health. Disturbance to nearby settlements. Unfriendly use of community resources such as non-timber forestry products by construction workers. Leaving dirty and waste material after shifting from one camp site to another.	Provision of cooking gas to contractors' staff. References to the illegality of cutting trees, hunting and fishing and other prohibited activities in community areas to be included in contract documents. Provision of proper waste disposal facilities and health facilities. Health screening of imported workers. Prior information to nearby communities and Sanctuary warden posts of camp establishment. Ensure clean area left behind when	All parts of project road		Contractors / PWD	PIU

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
		shifting camp.				
3.2 Removal of vegetation and uprooting of trees	Negative changes in micro level wildlife habitat/ environment. Soil erosion. Scarring of landscape.	Removal of only necessary vegetation. Suitable bio-engineering and re-vegetation of the road shoulders. Compensatory tree plantation.	All parts of project road		Contractors, DoF	PIU, DoF
3.3 Cutting of hill slope and earth removal from borrow areas	Soil erosion and landslides. Scarring of landscape due to improper disposal of debris. Dust pollution. Disruption of local drainage. Siltation in nearby water bodies and hence negative effects on aquatic ecology. Noise and disturbance to wildlife and nearby communities.	Confine cutting activities to dry season. Use "full cut" method. Disposal of debris at proper sites or re-use material for construction. Use of appropriate bio-engineering techniques immediately after cutting to maintain stability of slope above and below RoW. Proper restoration of borrow areas. Provision of appropriate drainage structures/facilities. Confine construction activities to day times.	Location of curves, cut & fill locations, landslide prone locations (km 202+200, km 205+100, km 207 to km 208, km 212+500, km 212+800, km 217+300, km 219+300 of Almora-Bageshwar road	Inform nearby community area before beginning cutting work.	Contractor	PIU
3.4 Quarrying	Landslides (rockslides/falls), scarring of landscape. Disturbance to wildlife and nearby communities from blasting.	Use of controlled blasting and other environmental friendly techniques for quarrying. Inform nearby community areas before any blasting activities. Blasting only during the day time.	Quarry sites (Haldwani, Lalkuan, Gola river, Tanakpur, Rampur, sand from river banks)		Contractors	PIU in PWD /DoGM

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
3.5 Crushing of stone and transport of stone/ materials.	Dust pollution affecting construction labourers and local vegetation. Air pollution from machinery and vehicle exhausts. Noise pollution and disturbance to nearby wildlife and communities.	Water sprinkling of stone crushing site. Proper covers for vehicles transporting stone and materials. Regular maintenance of machinery and vehicles. Confine stone crushing and transportation activities to day times.	Stone crushing sites and all parts of project road		Contractors	PIU in PWD
3.6 Road surfacing activities	Air pollution from smoke and gaseous emissions affecting health of workers. Traffic delays.	Use of bitumen emulsion wherever possible, use diesel fuelled asphalt mixing plants when bitumen heating is required. Inform travellers of schedule of works via television, radio and local newspapers.	All parts of project road		Contractors	PIU
3.7 Construction of line and cross drainage structures and bridges.	Inadequate capacity. Collapse of drainage structures due to poor quality construction. Disruption of local stream/river courses and aquatic hydrology. Increased sediments in rivers or streams.	Quality construction. Construction confined to dry season. Provision of appropriate drainage facilities and river/stream diversion structures.	All parts of project road		Contractors, PWD	PIU
3.8 Construction of retention walls	Collapse of walls due to inappropriate quality of work, location of wall and type.	Quality construction and appropriate locations for each type of wall.	All parts of project road		Contractors, PWD	PIU
3.9 Operation of machinery and	Spillage/leakage of chemicals and oil and	Proper storage and handling of chemicals and oil.	All parts of project road		Contractors, PWD	PIU

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
equipment and general activities of labourers	contamination of soil and water resources. Injury to workers/others. Respiratory problems from dust and machinery emissions. Hearing problems due to high level of noise.	Provision of workers with construction hats, face masks, ear plugs, gloves etc. Provision of well equipped first aid kits and health facilities.				
3.10 Water supply	Mis-use of community water resources	Independent arrangements to be made for water requirements so that supplies to nearby communities remain unaffected	Construction camps	Discuss with local communities and village group in regard to the water resources suitable for construction and construction camp use.	Contractors, PWD field offices.	PIU
4. Operation						
4.1 Movement of vehicles	Air pollution, noise and vibrations from increased number of vehicles and disturbance to wildlife.	Planting of appropriate species surrounding the road to absorb air pollution and to block noise and disturbance during and immediately after construction.	All parts of project road		Contractors, PWD	PIU
	Increased waste along highway from increased numbers of travellers.	Placing garbage bins and anti-waste signs at appropriate locations.	All parts of project road		Contractors, PWD	PIU
	Increased chances of illegal hunting, fishing and felling of trees in government forests and Sanctuary.	Increased patrolling and monitoring by forestry and Sanctuary officials.	All parts of project road		Local Sanctuary and forestry officials.	Sanctuary Managemen t and Forestry Department s

Project Stage/Activity	Potentially Negative Impacts	Mitigation Measures	Location	Public Participation and Co-ordination	Responsible Party	
					Implementation	Monitoring
	Increased accidents and injuries.	Installing crash-barriers at black-spots, road safety signs at other appropriate locations and speed breakers in community areas during construction.	All parts of project road		Contractors, PWD	PIU, Local traffic police
General functioning of road	Damage to riding surface and structure of road - formation of potholes, seepage of water and poor drainage.	Quality construction and maintenance.	All parts of project road		Contractors, PWD	PIU
	Excessive landslides, erosion due to improper maintenance of bio-engineering works, wall construction.	Quality construction and maintenance.	All parts of project road		Contractors, PWD	PIU
	Damage of drainage structures and hence disruptions to traffic, failure to enable proper drainage and increased sedimentation.	Quality construction and maintenance.	All parts of project road		Contractors, PWD	PIU

Table 3: Environmental Monitoring Plan

Environmental Features	Aspect to be Monitored	Time and Frequency of Monitoring	Location	Financial Requirements	Responsible party
1. Construction stage					
A. Physical Environment					
i) Air and noise	Level of SPM, RSPM CO, SO_2 and NO_x Noise levels on dB (A) scale	Before starting of any construction activities. Once in every section while construction is ongoing. Once after completion of construction activities.	Seven sensitive location along the project roads (Almora, Kaparchan, Basoli, Kafligair, Bageshwar, Dhaul Chinna, and Seraghat	Environmental Monitoring cost - Refer table 6.1	PMU, PIU, PWD division office
ii) Topography and Soil	Number and scale of soil erosion and landslide sites.	Before starting of construction activities. Once a year during construction activities. Once after completion of construction activities thereafter once every year for at least next 5 years depending on budget availability.	Full length of project road where work will be undertaken	Costs for hiring consultant and/or Daily field allowances and vehicle charges for PWD staff	PMU, PIU, PWD division office
	Number of properly bioengineered sites.	Once every summer during construction activities. Once after completion of construction activities and thereafter once every year for at least next 5 years depending on budget availability.	Wherever bio-engineering technique have been done	Daily field allowances for PWD staff	PMU, PIU, PWD division office
iii) Water Bodies	Concentration of sediments and presence of construction debris.	Before starting of construction activities. During construction activities in the vicinity of each water body.	Saryu river at Seraghat, Binsar Gad and other perennial streams	Environmental Monitoring cost - Refer table 6.1	PMU, PIU, PWD division office

Environmental Features	Aspect to be Monitored	Time and Frequency of Monitoring	Location	Financial Requirements	Responsible party
		Once after completion of construction activities.	along the project roads		
	PH, BOD, COD, DO, TDS, MM, NO_3 and Coliform	Same as above.			
	Length of line drainage structures constructed and strengthened.	During construction activities in the vicinity of each water body.	Full length of project road where work will be undertaken	Locations of line drainage structures are provided in design report. Location will be further confirmed during construction works. Additional costs only for field allowances for PWD staff.	PMU, PIU, PWD division office
	Length of damaged or missing line drains.	Before starting of construction activities.	Full length of project road where work will be undertaken		PMU, PIU, PWD division office
		Once after completion of construction activities.			
	Total number, type and lengths of cross drainage structures including bridges constructed or strengthened	Before starting of construction activities.	Full length of project road where work will be undertaken		PMU, PIU, PWD division office
		Once a year during construction activities			
		Once after completion of all construction activities.			
	Number of weak cross drainage structures.	Before starting of construction activities.	Full length of project road where work will be undertaken		PMU, PIU, PWD division office
		Once after completion of construction activities.			
iv) Geology and Seismology	Number of rock slides.	Before starting of construction activities.	Full length of project road where work will be undertaken	Costs for consultant and /or field allowances and vehicle charges of PWD and Geology and Mines Department staff	PMU, PIU, PWD division office, Forest Department, Department of Geology and Mines
		Once a year during construction activities.			
		After completion of construction activities.			
B. Ecological Resources					

Environmental Features	Aspect to be Monitored	Time and Frequency of Monitoring	Location	Financial Requirements	Responsible party
i) Flora	Average tree density	Before starting of construction activities. During construction (once a year per section) Once after completion of construction activities and thereafter once every year for at least 5 depending on budget availability.	Full length of project road where work will be undertaken		PMU, PIU, PWD division office, Forest Department, Binsar Wildlife Staff
	Number of cases of illegal tree felling	Once a year during construction activities Once after completion of all construction activities.	Full length of project road where work will be undertaken	No costs, as it is part of the responsibilities of the local territorial forestry and Sanctuary staff.	PMU, PIU, PWD division office, Forest Department, Binsar Wildlife Staff
ii) Fauna					
The Leopards	Approximate number of Leopards seen, Number of times of seeing leopard troops. Months and time of sighting. Location of sighting	Before starting construction activities. During construction activities (through out the year). Once after completion of construction activities and thereafter once every three years.	Full length of project road. Sections of project roads passes through BWLS	Daily field allowances and vehicle for Sanctuary, forestry and PWD staff.	PMU, PIU, PWD division office, Forest Department, Binsar Wildlife Staff
Goral and Kakar	Approximate numbers seen or heard. Number of times seen. Months and time of sighting. Location of sighting.	Before starting construction activities. During construction activities (through out the year). Once after completion of construction activities and thereafter once every three years.	Full length of project road. Sections of project roads passes through BWLS		PMU, PIU, PWD division office, Forest Department, Binsar Wildlife Staff
Other wildlife (Langurs, Barking Deer etc.)	Name of species seen. Frequency of sighting. Months and time of sighting.	Before starting construction activities. During construction activities (through out the year).	Full length of project road. Sections of project roads passes		PMU, PIU, PWD division office, Forest Department, Binsar Wildlife Staff

Environmental Features	Aspect to be Monitored	Time and Frequency of Monitoring	Location	Financial Requirements	Responsible party
	Location of sighting.	Once after completion of construction activities and thereafter once every three years.	through BWS		
C. Social Environment					
i) Health	Number of accidents amongst construction workers.	During construction activities.	All construction sites along project road	Daily field allowances and vehicle charges of Local traffic police and PWD officials	PMU, PIU, Contractor, local health officials
	Number of accidents due to moving traffic amongst local community members	Before starting construction activities.	All villages along project road		PMU, PIU, Contractor, local health officials, local traffic police
		Once a year during construction activities.			
		Once every year after completion of construction activities.			
ii) Travel time	Time taken to travel within each road section.	Before starting construction activities.	Full length of project road where work will be undertaken	Costs for hiring consultant or Daily field allowances and vehicle charges for Local traffic police and PWD officials.	PMU, PIU, Contractor, local traffic police
		After construction activities and thereafter once every year for at least next 5 years depending on budget availability.			
	Number and extent of travel delays	During construction activities (throughout the year).	Full length of project road where work will be undertaken		PMU, PIU, Contractor, local traffic police

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES FOR DETAILED DESIGN AND CONSTRUCTION SUPERVISION

A. Introduction

1. The Uttaranchal State Road Investment Program will improve approximately 10,800 km of State Highways (SHs), Major District Roads (MDRs), Other District Roads (ODRs), Village Roads (VRs) and Light Vehicle Roads (LVRs) across the State. This Investment Program will be implemented by the Public Works Department (PWD) of the State Government of Uttaranchal (SGOU) in seven separate Projects, over a seven year period. A Project Management Unit (PMU) has been established in Dehradun to support the PWD in the implementation of the Investment Program. Project Implementation Units in the Districts will assist the PMU in the day to day management and administration of the civil works contract packages.

2. National consultants will be engaged by PWD to provide design and/or construction supervision consulting services for groups of sub-project roads associated with each Project. All national consultants will be engaged in accordance with the Asian Development Bank's (ADBs) *Guidelines on the Use of Consultants.*

3. The road improvement works will be designed to offer cost-effective solutions that: (i) are in accordance with PWD's general design strategy; (ii) minimize resettlement; and (iii) minimize environmental impacts. These works will include on-line road improvements to the road pavement, drainage structures, bridges, retaining structures, within the existing Right of Way (RoW). Widening of roads is only to be carried out where justified on traffic capacity grounds and the design of the road improvement works should generally avoid any realignments that involve cutting into unstable hill slopes.

4. Each design consultant will be required to establish a liaison office in Dehradun which would be staffed over the full period of each assignment. Construction supervision consultants would be required to establish site offices local to each sub-project road. PWD will second staff to the construction supervision teams. These staff are to work under the direction of the consultants and the consultants are to provide the seconded PWD staff with training in quality control procedures, contract management and other related matters.

B. Scope of Activities FOR DESIGN CONSULTANTS

5. The scope of activities for consultants engaged on design assignments includes, but is not limited to, the following:

a. Activity 1: Engineering Surveys and Investigations

i. conduct pavement visual condition and road inventory surveys;
ii. carry out Benkelman beam and dynamic cone penetrometer investigations to establish the bearing capacity of the existing pavements and where appropriate, its residual life;
iii. excavate trial pits to establish the composition of the existing pavements and carry out laboratory testing to establish the engineering properties of the existing pavement and subgrade materials;

iv. carry out surveys of the drainage condition surveys;
v. carry out topographical surveys along the full length of all roads;
vi. carry out hydraulic and hydrological surveys for all river, dry river and stream crossings;
vii. carry out a condition survey of all existing bridges, culverts and retaining structures;
viii. carry out geotechnical investigations and sub-soil explorations at sites where existing bridges are to be replaced or new bridges are to be provided;
ix. carry out classified traffic counts on each sub-project road;
x. carry out a materials investigation to establish sources for all earthwork materials, pavement materials, concrete materials required for the civil works. Laboratory testing is to be carried out to confirm that the quality of all materials proposed is in accordance with agreed standards.

b. Activity 2: Engineering Design

i. geometric design for highway alignments, where required, cross-section elements and junctions;
ii. design of road pavements in overlay and new construction sections;
iii. design of repair works, rehabilitation works and new bridge structures, drainage structures and retaining structures;
iv. design of traffic safety features, road markings and road furniture;
v. design of slope stability measures;
vi. carry out safety audit of completed design;
vii. identify all statutory and other clearances required before construction works can commence and assist the PWD in obtaining these clearances.

c. Activity 3: Environmental Examination

i. carry out field investigations and surveys to identify and quantify existing environmental conditions along each sub-project road;
ii. prepare Initial Environmental Examination (IEE) Report and Summary IEE Report for each sub-project road in accordance with ADB's *Environmental Policy* (2002) and *Environmental Assessment Guidelines* (2003). An Environmental Impact Assessment (EIA) and Summary EIA is also to be prepared for each sub-project road where required;
iii. carry out consultations with all relevant stakeholders, including government departments, affected people and local residents regarding the environmental impacts of the road improvement works on each sub-project road;
iv. identify all necessary measures to be taken to minimize and mitigate all adverse environmental impacts and ensure that provision for implementing these measures is incorporated in the engineering designs and civil works contract documents;
v. prepare a cost estimate for the environmental mitigation measures;
vi. prepare details and a cost estimate for independent environmental monitoring to be carried out.

d. Activity 4: Poverty and Social Analysis

i. carry out field surveys and consultations to establish: (i) socio-economic and poverty profiles; and (ii) the social and poverty impact of the proposed road improvement works in the impact area of each sub-project road ;

ii. prepare a Poverty and Social Analysis (PSA) Report for each sub-project road that includes a summary poverty reduction and social strategy (SPRSS), all in accordance with ADB's *Handbook on Poverty and Social Analysis* and *Handbook for Incorporation of Social Dimensions in Projects*. The PSA Report shall present the baseline data, analysis, and proposed measures/indicators for mitigation or enhancement;

iii. assess other social issues including gender, vulnerable groups, child labor, human trafficking, communicable diseases such as HIV/AIDS, etc. and recommend appropriate measures to address impacts and promote development opportunities during construction, operation and maintenance of the road;

iv. conduct screening of any resettlement effects (re. the Resettlement Screening Checklist in the ADB *Handbook on Poverty and Social Analysis*) and conduct screening of any significant or adverse impacts to indigenous/ethnic minority people (re. ADB's *Policy on Indigenous Peoples*). Any significant impacts would require the preparation of Resettlement Plans (short or full) and a separate Indigenous Peoples / Ethnic Minority Development Plan for each of the sub-projects, where necessary;

v. prepare a performance monitoring and evaluation system, including a reporting format and details of how indicators should be measured.

e. Activity 5: Resettlement

i. identify all land, properties and structures that are to be acquired for each sub-project road to permit the road improvement works to be constructed. Prepare schedules that show a location plan of each property or land plot, the type of land or property and details of owners, tenants and occupiers, as well as land acquisition plans showing full details of each affected land plot, property or structure;

ii. prepare a Resettlement Plan for each sub-project road where acquisition of land, property or structures is required. Each Resettlement Plan is to be prepared in accordance with the requirements given in the ADB *Policy on Involuntary Resettlement* (1995) and the ADB *Handbook on Resettlement* (1998). A full census and socio economic survey of the Affected Persons is to be conducted, based on the final road alignment, to collect relevant data for the preparation of each Resettlement Plan. Each Resettlement Plan also has to recognize and be consistent with PWD's agreed Resettlement Framework for the Investment Program. Full consultation is to be carried out with all Affected Persons and other stakeholders as per the requirement of the ADB Policy.

iii. A separate Indigenous People Development Plan is to be prepared as per the ADB Policy, wherever necessary. The agreed Indigenous People Development Framework for the Investment Program will be

followed in the preparation of all Indigenous People Development Plans.

f. Activity 6: Cost Estimates and Contract Packages

i. prepare construction quantities, bills of quantities and cost estimates for each sub-project for each improvement option. The cost estimates should recognize the needs of construction in mountainous and frost susceptible areas with unstable embankments and side slopes. Compute price contingences and interest and other charges during construction, taxes, and duties, and clearly indicate them as separate line items in the estimate.

ii. prepare indicative procurement packages.

g. Activity 7: Bidding Documents

i. prepare draft bidding documents for each agreed contract package that shall be based on the Standard Bidding Documents for "*Procurement of Works, Small Contracts*" issued by ADB, and shall incorporate the Particular Conditions of Contract and Works Specification developed by PWD for the Investment Program.

h. Activity 8: Project Monitoring

i. prepare a project performance monitoring system for benefit monitoring and evaluation (BME) on a road by road basis that shall include baseline data and targets / performance measures agreed with PWD. This BME shall provide descriptions and procedures for BME data to be collected before, during and after project implementation.

C. SCOPE OF ACTIVITIES FOR CONSTRUCTION SUPERVISION CONSULTANTS

a. Activity 1: Construction Supervision

The civil works will be executed based on the Conditions of Contract, as specified in the Bidding Documents. The designated PIU will undertake the duties required of the Employer and the Consultant will act as the Engineer for all civil works contract under the Project. The Consultant's Team Leader / Resident Engineer will be the Engineer's representative, and will monitor the execution of the civil work contracts.

The Consultant shall be required to administer the civil works contracts as the Engineer under the Conditions of Contract, subject to certain requirements for the Engineer to seek the approval of the Employer, prior to taking action under specified clauses of the Conditions of Contract. The Consultant shall be required to establish and follow detailed construction supervision procedures based on sound international practice to monitor the completion of the project within the agreed program and budget and to the quality standards and

environmental provisions stipulated in the contracts. The duties of the Consultant shall include, but not be limited to:

(i) ensuring that the Notices to Commence have been issued;

(ii) ensuring submission of the Contractor's insurance policies is made and providing general advice on these policies, in relation to the Contract requirements. (The Consultant is not required to be an insurance specialist and the PWD may take independent advice on the adequacy of the policies);

(iii) ensuring submission and advising on the adequacy of the Contractors' performance bonds and advance payment guarantees;

(iv) preparing construction supervision manuals and quality assurance manuals that set out procedures to be followed and duties of individual staff members;

(v) reviewing and agreeing with the Employer, the Contractors' work programs and subsequently monitoring the construction progress in accordance with contract requirements;

(vi) ensuring that the Contractors are granted Possession of Site in accordance with the agreed programs or otherwise providing advance notice to the Employer of possible delays due to lack of possession;

(vii) update contract drawings as required to suit site conditions and issue construction drawings;

(viii) issuing clarifications and supplementary drawings, where required, to avoid delays to the Works;

(ix) providing the Contractors with all necessary survey and reference data for setting out the works;

(x) liaising with the appropriate authorities to ensure that all affected utility services are promptly relocated;

(xi) carrying out checks on the Contractors' setting out and ensuring that the Works are carried out in accordance with the drawings and other design details;

(xii) monitoring the Contractors' laboratory testing and carrying out independent testing as required;

(xiii) checking the contractors' working and "as built" drawings;

(xiv) ensuring that the Works are executed in accordance with all provisions of the Contracts, including those relating to standards of workmanship, other safety requirements and environmental protection requirements;

(xv) monitoring contractors' traffic management arrangements and temporary traffic diversions to ensure safe passage of traffic through the site;

(xvi) measuring the Works, agreeing and certifying interim and final payment certificates for submission to the Employer, and assisting the Employer in preparing loan withdrawal documentation for submission to ADB;

(xvii) administering, assessing and, where appropriate, making recommendations on applications for extension of time, claims for additional payment and other contractual disputes;

(xviii) issuing site instructions, variation orders, provisional sum orders and dayworks orders, as appropriate;

(xix) maintaining regular estimates of the cost to completion and time to completion for the Contracts;

(xx) preparing monthly progress reports, in a form agreed with the Employer and ADB and submit these within 10 days of the end of the month to which they refer;

(xxi) preparing quarterly progress reports, in forms agreed with the Employer and ADB and submit these within 1 month of the end of the reporting periods. These reports are to cover physical progress, financial progress, loan withdrawals, compliance with the environmental mitigation requirements, results of the project performance monitoring system and results of other environmental monitoring;

(xxii) maintaining full and detailed permanent site records, which include site correspondence, survey data, quality acceptance data, site diaries, measurement and certification, minutes of meetings and records of all other contractually relevant matters;

(xxiii) administering the completion of the Contracts, including all activities related to the issue of the Taking Over Certificates and the Defects Liability Certificate;

(xxiv) throughout the services, consulting and maintaining close liaison with the PWD, other relevant agencies, including the police and other Government and regional authorities, and local stakeholders;

(xxv) prepare a final report for each of the Contracts, which will be a compilation and condensation of data presented in regular monthly progress reports, together with copies of as-built drawings within three months of the issue of each of the Defects Liability Certificates;

(xxvi) provide on-the-job training for the PWD's staff in carrying out construction supervision, including contract administration, quality control, monitoring and evaluation, and other relevant activities. The on-the-job training will also cover the operation of the environmental monitoring system and the project performance monitoring system;

(xxvii) monitor any land acquisition and resettlement activities being undertaken by the Government and the provincial authorities, and

include reports on these activities in the monthly progress reports. Assist the PWD and other authorities in the administration of any resettlement activities, including arranging consultations with local people, as well as affected people, preparation and serving of notices to affected people, liaising with affected people and ensuring that any communications and grievances raised by affected people are promptly passed onto the relevant authorities.

(xxviii) develop and operate a quantitative and qualitative project performance monitoring system (PPMS) to monitor and evaluate the performance of the project in relation to its goals, purposes and outputs, that is to be reviewed and approved by the EA and ADB. Base line values shall be established for (a) traffic volumes and journey times; (b) freight tariffs and bus fares, (c) environmental impact indicators, (d) socio-economic indictors and (e) social and poverty reduction impact indicators. Where relevant, social indicators shall be disaggregated by gender. Implementation and evaluation monitoring indicators would be measured at the necessary agreed frequency during the project. Measurements of these indicators, together with relevant comments would be included in the quarterly progress reports as well as the final completion report.

D. STAFFING INPUTS

6. The team composition and input will vary with each design and construction supervision package, depending on the number and of the sub-project roads in each package. Details of indicative minimum staffing inputs for typical design and construction packages covering a total length of around 300 km are given in Tables 1 and 2 below. .

Table 1 Minimum Staff Input Periods for Design Package of 300 km

Specialist	Person-months
Team Leader / Highway Engineer	8
Project Co-ordination Engineer	8
Pavement Engineer	8
Materials / Geotechnical Engineer	8
Bridge Engineer	8
Geologist	3
Traffic Engineer	3
Quantity Surveyor / Contracts Specialist .	8
Environmental Specialist	8
Social Development Specialist / Resettlement Specialist	8
Topographical Surveyor	12
Field Engineers	12
Design Engineers	24
Total	**118**

Table 2 Minimum Staff Input Periods for Construction Supervision Package of 300 km

Specialist	Person-months
Team Leader / Resident Engineer	18
Assistant Resident Engineers (3 x 16)	48
Highway Engineers (3 x 15)	45
Materials Engineers (3 x 15)	45
Structural / Drainage Engineers (3 x 12)	36
Senior Contracts Engineer	15
Quantity Surveyors / Measurement Engineers (3 x 15)	45
Environmental Specialist	15
Quality Control / Materials Testing Engineers (6 x 15)	90
Topographical Surveyors (3 x 12)	36
Inspectors (9 x 15)	135
Total	528

E. Facilities

7. Each design and construction supervision consultant will have to make its own arrangements for office, utilities, accommodation and transport and they should include cost of all these elements in their financial offers.

F. Reports

8. Each design and construction supervision consultant will submit the following reports timely and in the number of copies (also soft copies) indicated for each activity, as listed below.

Design Assignments

i. **Inception Report:** To be submitted within four (4) weeks of the commencement of services. The report will be based on work and staffing schedules agreed during contract negotiations, and it will include the consultants' detailed work program including Quality Assurance Plan (3 copies to the PWD);

ii. **Preliminary Project Report:** to be submitted in the required volumes within three (3) months of the commencement of services, and it will include the required Safeguarding Report (3 copies to PWD);

iii. **Draft Detailed Project Report:** To be submitted in the required volumes within seven (7) months of the commencement of services, one month in advance of the date on which final Detailed Project Reports are due.

iv. **Final Detailed Project Report:** To be submitted within two weeks of the receipt of comments on the Draft Detailed Project Report from the PWD (6 copies to the PWD);

v. **Draft Land Acquisition and Resettlement Plans :** To be prepared as required, and to be submitted for review and comments by the PWD;

vi. **Draft Bidding Document:** To be submitted within seven (7) months of the commencement of services. The document will include complete engineering drawings, bill of quantities, and cost estimates (3 copies);

vii. **Final Bidding Document:** To be submitted within two weeks of the receipt of comments on the Draft Bidding Documents from the PWD (6 copies to the PWD).

Construction Supervision Assignments

i. **Inception Report:** To be submitted within four (4) weeks of the commencement of services. The report will be based on work and staffing schedules agreed during contract negotiations, and will include the consultants' detailed work program including Quality Assurance Plan (3 copies to the PWD);.

ii. **Construction Supervision and Quality Assurance Manuals:** to be submitted within eight (8) weeks of the commencement of services;

iii. **Progress Report:** Monthly reports to be submitted by the tenth day of the following month, and quarterly report to be submitted by the 15th day of the following quarter (6 copies to the PWD). These progress reports will summarize the work performed during the reported period identifying the problems encountered, and indicating the corrective action taken or recommended. The reports will also include records of the meetings on contract administration, decisions taken, mobilization of resources (Consultant's and Contractor's), approval/changes in work program, delays anticipated, and action proposed, physical and financial progress achieved and the projected progress for the forthcoming period, in the format agreed with the PWD.;

iv. **Project Completion Report**: To be submitted upon completion of the services. (6 copies to the PWD).

OUTLINE TERMS OF REFERENCE FOR PROGRAM SUPPORT CONSULTING SERVICES

A. Introduction

1. The Uttaranchal State Road Investment Program will improve approximately 10,800 km of State Highways (SHs), Major District Roads (MDRs), Other District Roads (ODRs), Village Roads (VRs) and Light Vehicle Roads (LVRs) across the State. This Program will be implemented by the Public Works Department (PWD) of the State Government of Uttaranchal (SGOU) in seven separate projects, over an eight year period. A Project Management Unit (PMU) has been established in Dehradun to support the PWD in the implementation of the Program. Project Implementation Units (PIUs) in the Districts will assist the PMU in the day to day management and administration of the civil works contract packages. Loan finance for the Investment Program would be provided by the Asian Development Bank (ADB) under a multi-tranche financing facility (MFF).

2. An international consulting company will be engaged by PWD to provide specialist support services to the PMU, to assist it in all areas of its activities including planning, procurement, project management and monitoring. The consultant would be engaged in accordance with the Asian Development Bank's (ADBs) *Guidelines on the Use of Consultants*.

3. The majority of the consulting services would be carried out in the PMU office located in Dehradun and the consultant would work under the overall control of the PMU Project Director. The consultant would also be required to visit the PIUs in the Districts. On-the job-training would be given to PWD counterpart staff to ensure technology transfer.

B. Scope of Activities for Program Support Consultant

4. The scope of activities for the Program Support Consultant would include, but not be limited to, the following:

a. Activity 1: Provision of General Project Management, Technical and Procurement Support

(i) provide general project management, technical and procurement support to the PMU staff to assist them in the effective management and monitoring of all Investment Program activities;
(ii) assist the PMU in ensuring that the Investment Program is implemented and managed in accordance with all relevant requirements of ADB;
(iii) assist the PMU in the procurement of design and construction supervision consultants as well as civil works contractors;
(iv) assist the PMU and PIUs in the management of the design and construction supervision consultants, as well as monitoring their activities and review of deliverables;
(v) assist the PMU to prepare the quarterly progress reports to be submitted to ADB.

b. Activity 2: Updating of Roads Master Plan and Selection of Sub-projects for each Implementation Project

i. consult with the PWD Circle and Division offices on the prioritized sub-project lists in the Road Development Plan (RDP) and adjust the lists to reflect road improvement and periodic maintenance works either recently carried out by PWD or sanctioned for implementation in state level schemes;
ii. consult with the PWD Circle and Division offices and obtain details of any proposed new sub-project roads for possible implementation under the Investment Program;
iii. review the prioritization of sub-projects, using the scoring method set out in the Pre-Feasibility Study dated August 2005 to take into account: (a) any proposed new sub-projects roads; (b) sub-project roads removed or shortened due to other recent or sanctioned works; (c) the current road condition; and (d) any other changes that would affect the prioritization scoring;
iv. prepare revised district-wise prioritization lists of the sub-project roads;
v. review and update the estimated costs of the sub-project road improvement works, using current unit rates;
vi. reconcile the master plan sub-project improvement works cost estimates for previous implementation tranches to take account of updated cost estimates included in the detailed project reports (DPRs); tender costs and final account construction costs;
vii. assist PWD in preparing a list of sub-project roads to be implemented in the forthcoming implementation tranche, based on the planned output targets for that tranche and the available funding;
viii. prepare an update of the roads master plan to take into account the updated sub-project prioritization lists, updated costs and the agreed sub-project lists for the forthcoming implementation tranche.

c. Activity 3: Economic Appraisal of sub-projects in each Implementation Tranche

i. prepare an economic appraisal of the sub-projects to be implemented in the forthcoming implementation tranche that is based on: (a) an update of current vehicle operating costs and time costs; (b) the cost estimates prepared by PWD's design consultants; and (c) traffic forecasts prepared by the PWD's design consultants. This appraisal is to consider the individual sub-projects as well as the aggregated total of the sub-projects for the particular tranche;
ii. calculate the economic rates of return (EIRRs) and net present values (NPVs) for the individual sub-projects and the aggregated total of all ssub-projects in that particular implementation tranche according to the ADB's *Guidelines for Economic Analysis of Projects*. Sensitivity tests are to be carried out on the aggregated total of the sub-projects that examine of the effects of variations in cost, traffic, vehicle operating costs and time savings;
iii. carry out a distribution analysis of the aggregated total benefits of all sub-projects and calculate the poverty impact ratio (PIR) of the aggregated total of the sub-projects, in accordance with the ADB's *Handbook for Integrating Poverty Assessment in the Economic Analysis of Projects* ;

iv. carry out a quantitative risk analysis of the economic appraisal, using an agreed software package that examines the combined effects of imposing likely changes in key variables on the EIRR and NPV of the aggregated total of the sub-projects. This risk analysis is to be carried out in accordance with ADB's *Handbook for Integrating Risk Analysis in the Economic Analysis of Projects.*

v. prepare a report on the economic appraisal that details and substantiates all input parameters and key assumptions, and gives a full description of the methodology used in the appraisal.

d. Activity 4: Assist the PMU to prepare supporting Documentation for each MFF project loan

i. assist the PMU in preparing documentation to be submitted to ADB in connection with the application for each loan under the multi-tranche finance facility. This documentation would include details of the scope of the road improvement works, costs, economic appraisal, environmental examination, social impact and resettlement impacts.

e. Activity 5: Technical and Safeguarding Review of Sub-project Designs

i. Assist the PMU in carrying out a technical due-diligence review of the draft design preliminary and detailed project reports prepared by PWD's design consultants. This due-diligence review would include assessing: (a) compliance with the requirements of the design consultant's terms of reference; (b) the overall technical standard of the design work; compliance with the technical design standards; (c) cost effectiveness of designs and applicability to the sub-project road conditions;

ii. review the environmental examinations carried out on the sub-project road improvement works by PWD's design consultants to: (a) assess compliance with the terms of reference, ADB's environmental guidelines and GOI requirements; (b) ensure that environmental impact assessments have been prepared where required by the ADB and GOI requirements; (c) adequate and appropriate mitigation and monitoring measures have been included in the environmental management plans for individual sub-projects; (d) all appropriate measures have been included in the sub-project designs and contract documents for minimizing and mitigating environmental impacts; and (e) all necessary environmental clearances and permits have been identified.

iii. review the poverty and social impact assessments carried out on the sub-project road improvement works by PWD's design consultants to: (a) assess compliance with the terms of reference, ADB's environmental guidelines and GOI requirements; (b) ensure that adequate consultation has been carried out with local stakeholders in the influence area of each sub-project; and (c) all appropriate measures have been included in the sub-project design to minimize and mitigate any adverse social impacts.

iv. review the resettlement requirements for each sub-project road identified by PWD's design consultants and review any resettlement plans prepared by PWD's design consultants to: (a) assess compliance with the terms of reference, ADB and GOI requirements, and the agreed Resettlement Framework for the Investment Program;

v. prepare written comments on the technical and safeguarding reviews that identify any sub-standard aspects, correction required, omissions and other remedial measures to be carried out before approval can be granted by PWD. The Program Support Consultant would also be required to attend meetings with the design consultants to discuss the review comments.

f. Activity 6: Safeguard Monitoring

i. assist the PMU in ensuring that the environmental and resettlement safeguarding measures incorporated in the contract documents, environmental management plans and resettlement plans are being implemented by the PIUs, construction supervision consultants and contractors.

g. Activity 7: Performance Based Maintenance

(i) assist the PMU in finalizing the contract documentation required for the performance based maintenance that is to be incorporated in the road improvement contract packages. Particular attention should be paid to setting: (a) realistic quantitative performance indicators that apply to the different conditions in the hill and plain areas of the State; and (b) appropriate penalties to be applied in the event that the contractors fail to comply with the performance indicators;

(ii) provide initial training and on-going support to the PIUs in the management and supervision of performance based maintenance works.

C. Staffing Inputs

5. It is envisaged that the Program Support Consultant would be engaged for a 36 month period to provide support services for preparation and implementation of the first three Projects, covering the improvement of around 3,600 km of roads as well as implementation of an institutional development component. The indicative team composition and input periods are given below in Table 1. The team leader is required to be resident in Dehradun over the full 36 month period of the assignment, but the timings of the other inputs will be agreed with the PMU Project Director and will be dependent on general progress with implementing the Investment Program.

Table 1 Indicative Staff Input Periods

Specialist	Person-months
International Team Leader / Technical Support Consultant	36
Transportation Engineer / Transport Economist	10
Senior Highway Engineer / Pavement Engineer / Bridge Engineer	12
Environmental Specialist	10
Social Development Specialist / Resettlement Specialist	12
Road Maintenance Specialist	12
Total	**92**

6. The Program Support Consultant shall be required to provide other support staff as required by the PMU Project Director.

D. Facilities

7. Office accommodation will be provided to the support consultants in the PMU office in Dehradun. The support consultants would provide their own computers and transport.

E. Reports

7. The Program Support Consultant will submit the reports listed below:

(i) **Inception Report:** To be submitted within four weeks of the commencement of services. This report will be based on the work and staffing schedules agreed during contract negotiations and it will include the consultant's detailed work program (3 copies to PWD);

(ii) **Progress Reports:** Quarterly Progress Reports are to be prepared in a format agreed with the PMU Project Director that will be suitable for onward submission to ADB. These progress reports shall be submitted within 30 days of the end of the reporting period and they shall summarize activities carried out in the period, inputs provided, costs of inputs provided, inputs to be provided in the next period, estimated final costs of the assignments, problems encountered and corrective action taken estimated (6 copies to PWD);

(iii) **Specific Reports** for particular activities that are set out in Section C above (6 copies to PWD);

(iv) **Completion Report**: to be submitted upon completion of the assignment that describes activities carried out under the assignment, inputs, costs and technology transfer.

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES FOR INFRASTRUCTURE MANAGEMENT COMPONENT

A. OBJECTIVES

1. The main objective of the component is to maintain the momentum of the Uttaranchal State Road Investment Program and its Infrastructure Investment Component. For this purpose, consulting services are required to assist the Public Works Department of the State of Uttaranchal, (PWD) to transition to a modern organization and manage the road network applying international best practices. The consulting services will support ongoing initiatives by facilitating: (i) implementation of PWD's revised organizational structure designed to increase emphasis on policy, strategic planning and stakeholder involvement; (ii) identification of performance targets, allocating responsibility for their delivery, (iii) definition and documentation of operating procedures; (iv) development of a Human Resources Strategy to achieve these targets; and (v) delivery of a training program for PWD staff and contractors.

B. SCOPE OF SERVICES

2. To that end, consultants will undertake the following tasks:

Organizational Restructuring. The consultants will support PWD to carry out ongoing organizational restructuring activities, including:

(i) establishment of a separate unit at PWD headquarters, responsible for the development of policy directives and performance targets to ensure quality and consistency;

(ii) creation of two additional operational Zones to permit closer supervision of projects and increase accountability; and

(iii) establishment of a Road Stakeholder Board (RSB) to increase stakeholder participation and transparency of decision-making.

Performance Targets. The consultant will undertake the following activities to support the PWD in promoting accountability for results:

(iv) assist in defining performance targets and developing position descriptions;

(v) document operating procedures for efficient and timely delivery of performance targets.

Human Resources Strategy (HRS) The consultant will undertake the following activities for human resource capacity building:

(vi) conduct an assessment of staff requirements and skills-mix;

(vii) prepare a HRS including an assessment of training needs.

Training Program. The consultant will organize training for PWD staff as well as local contractors, that will include:

(viii) design of specific training programs for enhancing the skills of the categories of staff identified in HRS as well as private contractors engaged by or intending to seek work with the PWD;

(ix) establishment of a formal agreement on the part of the PWD with one or more recognized state educational institutions such as the Indian Institute of Technology at Roorkee to deliver the training programs and support successful completion of the courses by PWD and Contractor staff.

C. TERMS OF REFERENCE

3. The services to be provided will include, but not be limited to, the following:

1. Assssist the PWD with Organizational Restructuring

(i) Review the status of the plan to establish: (a) an Additional Engineer in Chief position at Headquarters level, (b) two new Zones (c) the RSB and (d) the CCRB.

(ii) Reconfirm implementation arrangements with PWD in accordance with the policy measures and reform actions as stated in the institutional strengthening matrix of the RRP.

(iii) Assist the PWD to develop terms of reference for the RSB including objectives, duties, responsibilities, composition and terms of service. It is expected that the Secretary PWD would be Chairperson, with participation of the Engineer in Chief and six to eight additional members representing private and public sector road transport freight and passenger service providers, consumer protection groups, traffic police, chamber of commerce, engineering societies and other state stakeholder agencies.

2. Support the PWD in Establishing and Meeting Performance Targets

(i) Assist the PWD to finalize the Draft Road Policy and in its dissemination;

(ii) Review existing guidelines for road sector development and planning, including guidelines for project selection, detailed project report (DPR) preparation, supervision and quality control of contractors and consultants, and define operating procedures to conform to Indian Road Congress standards and International good practices;

(iii) Review existing procedures for planning, programming contracting for road maintenance including the 5 year performance based maintenance contracting provision included in projects funded through the ADB loan and prepare recommendations for contracting maintenance for the remaining PWD network;

(iv) Review the existing financial accounting methodology and practice and the requirements of the Management Information and Project Management System (MIPM), and recommend areas for improvement, such as development of a financial accounting manual or additional training;

(v) Review current regulations and operating guidelines on social impact assessment and environmental management and identify operating procedures to improve compliance and support obtaining of required clearances;

(vi) Assist the PWD to define roles, performance targets and verifiable indicators for operating units and its respective Zones, Circles and Divisions. Performance targets will include specific indicators to measure achievement in areas such as staff training, construction and maintenance programs, quality of construction, and road condition. Performance targets should consider budgetary and other appropriate restrictions;

(vii) Update the PWD manual including preparing position descriptions for key personnel;

(viii) Develop operating manuals to document approved procedures and support the achievement of performance targets.

3. Assist the EA to Develop a HRS

(i) Based on the anticipated work program and service delivery strategies including the degree of outsourcing identify staffing categories and numbers of staff required. The PWD expects to outsource all of its construction and maintenance activities and move to more outsourcing of planning, design and construction supervision. Therefore the focus of the human resource strategy should be to equip staff with equipment and skills to successfully manage private sector service providers.

(ii) Prepare human resource development programs and recommend incentive structures in line with PWD operating conditions;

(iii) Conduct a training needs assessment defining types of training, training curriculum, and numbers to be trained.

(iv) The training curriculum should focus on practical applications including preparing (a) PWD staff for performing activities outlined in the operating manuals and (b) private contractors for such activities as bidding for performance based contracts, quality control, equipment and labour management, environmental and social safeguard compliance.

(v) Conduct a survey of existing institutions in Uttaranchal to determine availability of existing training courses that meet curriculum requirements, identify and enter into agreement with institutions to prepare the remaining course materials.

4. Assist the PWD to Implement the Training Program

(i) Prepare a training implementation plan in coordination with Zones and Districts;

(ii) Coordinate with operating units to identify candidates for training and communicate course schedules;

(iii) Maintain a register of staff trained and compliance with the training schedule by operating units.

4. The consultants in consultation with the PWD shall design an appropriate training study tour for up to 15 key PWD management staff to visit modern highway organizations in India or neighbouring countries to observe good practices including: (a) governance and sector management, (b) modern technology for construction and maintenance (c) innovations for involving the private sector in financing construction and maintenance, and (d) gaining an understanding of lessons learned through discussions with counterparts in these agencies. The consultants shall establish contacts with relevant highway agencies and prepare a comprehensive program, including training objectives, officials to be interviewed and sites to be visited. The proposal shall be supported by adequate cost estimates and shall be forwarded to the PWD and ADB for approval prior to the commencement of training.

5. The consultant shall design a series of seminars and workshops in each zone to disseminate findings and recommendations, support development of performance targets, describe proposed training and obtain input from operating units.

6. The consultant services will require about 14 person-months of international and 80 person-months of national consultant services with expertise in governance, policy, highway engineering, road maintenance, social and environmental management, human resources development and training. An indicative breakdown of staffing requirements is shown below:

Description	Person Months
International Team Leader/ Institutional Specialist	12
Other International Specialists	2
Local Human Resource Specialist(s)	8
Local Highway Engineers	24
Local Environmental and Social Specialists	3
Local Training Specialists	30
Technical Writers/ Other Specialists	10

7. Payment for training delivery for PWD staff and out of state study tours, including tuition, per diems and transportation outside of Uttaranchal will be made out of loan funds and should not be included in the consultants cost estimate.

D. Counterpart Services and Facilities

8 PWD, the Executing Agency (EA) for the consulting services, will be responsible for providing, free of charge, counterpart support and facilities necessary for the project implementation, including office accommodations, local transportation services and logistical services, information and materials.

E. Reporting

9. The consultants shall furnish ADB and the PWD quarterly progress reports on implementation progress including achievements and problems to be resolved, and conduct of the training programs. One month before completion of their services, the consultants shall prepare a draft final report covering all tasks required in the Terms of Reference as well as the planned and actual number of persons trained. . A final report shall be submitted 15 days after receiving comments from the PWD and ADB.