



# Report and Recommendation of the President to the Board of Directors

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Project Number: 42145  
September 2009

## Proposed Multitranche Financing Facility and Administration of Cofinancing Republic of Armenia: North–South Road Corridor Investment Program

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 4 September 2009)

Currency Unit – dram (AMD)

AMD1.00 = \$0.0027

\$1.00 = AMD377.00

## ABBREVIATIONS

ADB	–	Asian Development Bank
ARD	–	Armenian Roads Directorate
CAREC	–	Central Asia Regional Economic Cooperation
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
EU	–	European Union
FFA	–	framework financing agreement
GDP	–	gross domestic product
HDM-4	–	Highway Design and Maintenance Model
IEE	–	initial environmental examination
IMF	–	International Monetary Fund
IRI	–	international roughness index
JICA	–	Japan International Cooperation Agency
LAR	–	land acquisition and resettlement
LARF	–	land acquisition and resettlement framework
LARP	–	land acquisition and resettlement plan
LARU	–	land acquisition and resettlement unit
LIBOR	–	London interbank offered rate
MFF	–	multitranches financing facility
MOTC	–	Ministry of Transport and Communication
NRSC	–	National Road Safety Council
OCR	–	ordinary capital resources
PCA	–	Partnership and Cooperation Agreement
PFR	–	periodic financing request
PGC	–	Project Governing Council
PMU	–	program management unit
PRSP	–	Poverty Reduction Strategy Paper
UNDP	–	United Nations Development Programme

## NOTES

- (i) The fiscal year of Armenia ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

<b>Vice-President</b>	X. Zhao, Operations 1
<b>Director General</b>	J. Miranda, Central and West Asia Department (CWRD)
<b>Director</b>	H. Wang, Transport and Communications Division, CWRD
<b>Team leader</b>	R. Ishenaliyev, Transport Specialist, CWRD
<b>Team members</b>	A. Barseghyan, Senior Country Coordination Officer, CWRD
	L. Blanchetti-Revelli, Senior Social Development Specialist (Resettlement), CWRD
	H. Koide, Principal Infrastructure Finance Specialist, CWRD
	B. Konysbayev, Counsel, Office of the General Counsel
	M. Kunzer, Environment Specialist, CWRD
	G. Mousaelyan, Project Implementation Officer, CWRD
	D. Pyo, Principal Financial Analysis Specialist, CWRD

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## FACILITY AND INVESTMENT PROGRAM SUMMARY

<b>Borrower</b>	Republic of Armenia
<b>Classification</b>	<p>Targeting classification: General intervention Sector (subsectors): Transport, and information and communication technology (road transport, transport management and policies) Themes (subthemes): <b>Regional cooperation</b> (cross-border infrastructure, trade and investments), economic growth (promoting economic efficiency and enabling business environment, widening access to markets and economic opportunities), private sector development (public private partnerships), capacity development (institutional development) Location impact: Regional (high), national (high), urban (medium), rural (medium) Partnership: Japan International Cooperation Agency</p>
<b>Sector Investment Program Description</b>	<p>The Caucasus subregion acts as a landbridge between the Black and Caspian seas. It connects Central Asia to Europe, the Russian Federation, and Turkey. The subregion, once part of the historic Silk Road, is becoming a transit route for crude oil exports. It has the potential to become an established business, logistics, and transit hub. But to tap this potential, it first needs to expand and improve its transport network, including roads, railways, and ports.</p> <p>The Agarak–Kapan–Yerevan–Bavra road crosses Armenia from south to north, and then connects to Georgia's southern road corridor, reaching the ports of Poti and Batumi in the Black Sea in the west, and Tbilisi in the east. This corridor complements the east–west highway being reconstructed between Azerbaijan and Georgia.</p> <p>Armenia and Georgia have requested the Asian Development Bank (ADB) and other development partners to cofinance the reconstruction of the corridor. ADB proposes to support the reconstruction of this corridor through separate multitranche financing facilities (MFFs). ADB is also financing investments in the Azerbaijan section of the Azerbaijan to Georgia corridor. Cross-border and trade facilitation work is being developed under the Central Asia Regional Economic Cooperation program. The implementation of the physical infrastructure will be accompanied by technical assistance to be separately prepared for this purpose.</p> <p>The North–South Road Corridor Investment Program (the Investment Program) in Armenia combines physical and nonphysical investments. The physical component involves improvement of various sections along the route. The nonphysical component targets institutional effectiveness, including better</p>

planning, maintenance, project management, safeguards compliance, monitoring, reporting, evaluation, and results measurement.

Tranche 1 Project will (i) reconstruct an 18.4 kilometer (km) four-lane section of the corridor between Yerevan and Ashtarak, (ii) improve road safety for the Yerevan–Ararat road, (iii) prepare design and bidding documents for tranche 2 and 3, and (iv) help implement the road subsector plan under the Transport Sector Strategy.

### **Multitranche Financing Facility Proposal**

The Government requests ADB to help finance the Investment Program through an MFF up to the equivalent of \$500 million. The financing will be in the form of ADB’s ordinary capital resources (OCR) and Special Funds resources. The MFF will be structured around multiple loans, subject to the submission of related periodic financing requests (PFRs) by the Government and execution of related loan agreements and other warranties and representations.

The Government will enter into a framework financing agreement (FFA) with ADB. The first tranche amounts to \$60 million to be financed from the Special Funds resources. The first PFR is presented to the Board together with this report and the FFA.

The MFF is considered a suitable modality in this case on account of the following:

- (i) The size of the Investment Program is large and needs a financing scheme that offers greater flexibility, predictability and continuity. The MFF offers these elements better than stand-alone or program loan lending modalities of ADB.
- (ii) The MFF demands sound platform for a long term partnership in the sector that combines project finance, management and support for institutional efficiency. The Government has developed such sector strategy, policy framework and road map. These will require strengthening over time but the basic elements are in place, thus meeting the principal MFF criteria.
- (iii) The MFF provides financing stability for a long term program. It also allows the Government and ADB to finance more than one sector at a time. The current business plan covers roads, urban services and reforms. Given the limited financing envelope but multiple needs, the MFF allows funding to be structured around both priorities and project readiness.
- (iv) The MFF front-loads a critical analytical work at the start, thus placing greater emphasis on implementation. Financing will be matched closely to project readiness as the previous tranche allocates enough resources to prepare the next one (including design work). This helps speed up contract awards, disbursements, and results.

<b>Rationale</b>	Rehabilitation of the road network is a top priority for Armenia. Improving logistics increases trade, investment flows and jobs. Better connectivity aids regional cooperation and integration and increases the country's competitiveness. This Investment Program complements similar ones in Azerbaijan and Georgia supported by ADB. It fits within ADB's <i>Strategy 2020</i> , and is part of country operations business plan. It is also aligned to the regional cooperation economic program for Central Asia and the Caucasus. The corridor provides Central Asian countries with improved access to the ports of Poti and Batumi and connects the Caspian Sea to the Black Sea.
<b>Impact and Outcome</b>	The Investment Program will contribute to economic development and regional trade. The outcome will be a more efficient, safer and sustainable transport network.
<b>Investment Plan</b>	The Investment Plan is estimated at \$962 million. The share assigned to ADB over the next few years is \$500 million. The estimated total cost of Tranche 1 Project is \$70 million.

**Investment Program**  
(\$ million)

Item	Cost
A. Infrastructure Development	
1. North–South Road Corridor Improvement	942.0
2. Border Infrastructure and Facilities Improvement	10.0
B. Institutional Development	10.0
<b>Total</b>	<b>962.0</b>

Source: Asian Development Bank estimates.

**Tranche 1 Project**  
(\$ million)

Item	Cost
<b>A. Base Cost</b>	
1. Civil Works	38.0
2. Project Management and Institutional Support	7.0
3. Taxes and Duties	10.0
<b>Subtotal (A)</b>	<b>55.0</b>
<b>B. Contingencies</b>	<b>13.0</b>
<b>C. Interest During Construction</b>	<b>2.0</b>
<b>Total</b>	<b>70.0</b>

Source: Asian Development Bank estimates.

**Financing Plan**

**Investment Program**

Source	Amount (\$ million)	%
A. Asian Development Bank		
1. Ordinary Capital Resources	440.0	46
2. Special Fund Resources	60.0	6
B. Government and Other Cofinanciers	462.0	48
<b>Total</b>	<b>962.0</b>	<b>100</b>

Source: Asian Development Bank estimates.

**Tranche 1 Project**

<b>Source</b>	<b>Amount</b> (\$ million)	<b>%</b>
A. Asian Development Bank Special Funds Resources	60.0	86
B. Government	10.0	14
<b>Total</b>	<b>70.0</b>	<b>100</b>

Source: Asian Development Bank estimates.

**MFF Amount and Terms**

The OCR financing will follow the provisions of ordinary operations loan regulations, subject to modifications that may be included under individual loan agreements. An OCR loan will have an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions set forth in the related loan agreement. A loan from the Special Funds resources will have a term of 32 years, including a grace period of 8 years, and interest of 1.0% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the related loan agreement.

**Period of Utilization**

Until 30 June 2017

**Estimated Completion Date**

31 December 2016

**Executing Agency**

Ministry of Transport and Communication (MOTC)

**Implementation Arrangements**

The Project Governing Council (PGC), comprising members from ministries of transport and communication, economy, finance, justice, territorial administration, and civil societies will provide overall oversight of the Investment Program. PGC is cochaired by the ministers of economy and transport and communication. Its key functions include (i) guiding overall policy and strategic directions, (ii) reviewing performance, and (iii) coordinating with other projects financed by other development partners.

Implementation and monitoring will be delegated to the Armenian Roads Directorate (ARD), which will serve as the implementing agency. ARD will set up a program management unit (PMU) to handle all day-to-day execution tasks, including (i) screening and approving individual tranche projects; (ii) planning and executing procurement; (iii) reviewing and approving final project designs; (iv) managing contractors and supervising consultants; (v) maintaining financial management controls, including project accounts; (vi) monitoring and reporting on project implementation performance and results; (vii) dealing with all warranties and representations made to ADB, including full compliance with environmental and social safeguard policies and action plans; and (viii) managing the institutional effectiveness program.

<b>Procurement</b>	ARD will procure works and goods to be financed under the MFF in accordance with ADB's <i>Procurement Guidelines</i> . A procurement plan has been prepared for Tranche 1 Project. Civil works are packaged into one contract to be procured through international competitive bidding. Small works costing less than \$1 million, although not anticipated at this stage, will be procured using national competitive bidding procedures. National competitive bidding will be conducted according to the Law on Procurement of Armenia (effected on 5 June 2000 and updated in 2008), subject to clarifications and modifications as agreed with ADB.
<b>Consulting Services</b>	<p>The Investment Program will require consulting services to (i) prepare detailed designs and supervise works; (ii) monitor project performance, including benefits and safeguards compliance; and (iii) help prepare and implement individual tranche projects. MOTC will select consulting firms and/or individuals in accordance with ADB's <i>Guidelines on the Use of Consultants</i>, using the quality- and cost-based selection, quality-based selection, or consultants' qualification selection method depending on the needs of individual project components and procurement plan. ADB and MOTC will undertake appropriate due diligence before using any of the suggested methods, and identify a suitable weighting system for evaluating the firms' proposals.</p> <p>Tranche 1 Project will require about 89 person-months of international and 296 person-months of national consulting services to work on project design and supervision of awarded civil works contracts. These advisors will be tasked with the preparation of investments under subsequent tranches. In addition to these services, under the Tranche 1 Project, the Government will procure the services of international (32 person-months) and national (45 person-months) experts to help strengthen a road subsector plan and guide its implementation. For project management and administration, ARD will recruit a team of individual consultants, which will be work in the PMU.</p>
<b>Advance Contracting and Retroactive Financing</b>	To facilitate project implementation the Government requested ADB approval for advance contracting and retroactive financing for works and consulting services.
<b>Environment Assessment</b>	An environmental assessment and review framework for the Investment Program was prepared. Tranche 1 Project is classified category B. An initial environmental examination was undertaken (Supplementary Appendix G).
<b>Social Safeguard Assessment</b>	<p>Involuntary resettlement: Category C - limited or no impact</p> <p>Indigenous people: Category C - limited or no impact</p> <p>A summary poverty reduction and social strategy is in Appendix 11. This is based on consultations during the preparation of the</p>

## Investment Program and the Tranche 1 Project.

### **Investment Program Benefits and Beneficiaries**

The Investment Program will benefit road users, road construction companies, traders, and others who derive income from the development of transport, logistics and trade along the road corridor. The direct benefits include (i) lower road transport and maintenance costs, (ii) faster and more reliable road transport services, (iii) reduced traffic accidents, (iv) improved access to markets and social services, and (v) jobs and income created during implementation (i.e., use of local labor and construction materials) and after completion (i.e., roadside business activities). The direct benefits will initially accrue to vehicle owners and operators and road construction companies, but will ultimately be shared with passengers and freight customers through reduced bus fares and freight charges. While Armenia is the major beneficiary, other countries in the Caucasus subregion will also benefit from a more efficient movement of traffic to and via Armenia. Indirect benefits, which are expected to become tangible after the completion of Tranche 1 Project, include improved road network management, and increased business activities and jobs that have forward or backward links to the corridor.

The Investment Program will contribute to poverty reduction by stimulating economic development. This will benefit rural communities, especially the rural poor and women. In particular, it will increase the mobility of about 3 million people living in six *marzes* (provinces), where the road corridor lies.

The majority of women in the program areas are engaged in agriculture-related activities or with small and medium-size agro-industries (including cottage industries). Reduced travel time and more available transport services will help improve the lives of people—especially women, the elderly, and children—as improved road transport under the Investment Program will increase their access to the nearest markets and social service delivery, including schools, hospitals, and clinics. The investments will also create direct employment opportunities in industry and services. It is anticipated that greater road connectivity may have a positive impact on less-educated girls and women by promoting their access to more education and training opportunities.

Armenia has many historical sites that date back to the 4th and 5th centuries and are home to Christian shrines and places of religious worship. Jermuk and Tatev are the two tourism hot spots along the north–south road corridor. These attract tourists from around the world. It is expected that the corridor will promote tourism activities and socioeconomic development in the region.

### **Risks and Assumptions**

The Investment Program was designed with the following assumptions: (i) continued Government commitment to the concept of transport and economic corridors; (ii) efficient

implementation of the sector strategy, policy framework and road map; (iii) adequate external financial resources; (iv) adequate road maintenance; (v) timely provision of counterpart funds; and (vi) sound designs and civil works schedules and efficient MOTC's diligent oversight of works and contracts.

The main risks include (i) macroeconomic instability in Armenia and the subregion due to the current global financial crisis, (ii) reduced commitment to corridors and weak implementation capacity, and (iii) cost overruns due to sharp escalation of prices. The Government is committed to mitigate these risks.

The recent macroeconomic imbalances are being corrected with help from the International Monetary Fund (IMF) and other partners such as ADB and the World Bank. After the global financial crisis in 2008, the foreign debt of Armenia is being closely monitored by external aid agencies, especially the IMF. The latter expects that Armenia's debt ratios will rise sharply—albeit from a low base—with the ratio of public debt to gross domestic product (GDP) increasing from 18% in 2008 to 43% in 2010. However, the debt–GDP level is not projected to be excessive. Standard stress tests show that Armenia is at low risk of debt distress. Economic conditions are expected to improve by the end of 2010.

The investment plan includes contingencies. The same applies to the financing plan. This will help tackle possible cost overruns and/or changes to the program and Tranche 1 Project. Tranche 1 Project is fairly straightforward and unlikely to need extra financing.

PROJECT MAP

## I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed multitranche financing facility (MFF) and (ii) proposed administration of cofinancing that may be provided by development partners under the MFF, to the Republic of Armenia for the North–South Road Corridor Investment Program (the Investment Program). The design and monitoring framework is in Appendix 1.

## II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

### A. Trade and Transport in the Subregion

#### 1. Subregional Context

2. The Caucasus subregion acts as a landbridge between the Black and Caspian seas. It connects Central Asia to Europe, the Russian Federation, and Turkey. The subregion, once part of the historic Silk Road, is becoming a transit route for crude oil exports. It has the potential to become an established business, logistics and transit hub. But to tap this potential, it first needs to expand and improve its transport network, including roads, railways and ports.

3. The Agarak–Kapan–Yerevan–Bavra road crosses Armenia from south to north, and then connects to Georgia's southern road corridor, reaching the ports of Poti and Batumi in the Black Sea in the west, and Tbilisi in the east. An integrated road corridor between Armenia and Georgia connects not only these two countries, but also complements another road corridor being developed between Azerbaijan and Georgia. The latter is already under reconstruction. ADB is financing a share of the investments in the Azerbaijan section of the corridor. Given the size of the investments in Armenia and Georgia, both countries have approached ADB and other development partners to cofinance the new corridor. This submission covers only the investments in Armenia. A parallel proposal is being prepared for Georgia.

#### 2. Trade and Transport

4. Armenia is a mountainous landlocked country bordering Azerbaijan, Georgia, Iran, and Turkey. The location presents an opportunity for trade; the topography—a challenge. The transport infrastructure, built mostly under the former Soviet Union in 1960s–1970s, is in a poor condition. This affects transit costs, competitiveness, trade, investment and job creation.

5. Armenia has achieved impressive economic recovery since independence. Economic recovery began in 1993, yielding annual gross domestic product (GDP) growth of 5.4% during 1993–2000; it then accelerated to double-digit growth during 2001–2007. Transport demand grew correspondingly by 8% in terms of value of merchandise exports and 20% for imports during 2003–2008. Exports are predominantly precious stones (principally diamonds), ferrous metals, ore and beverages, accounting for about 70% of the total. Imports include mainly fuel, bitumen, and precious stones accounting for around one-third of the total. The Russian Federation, Kazakhstan and European countries are the main trading partners.

6. Armenia's transport policy is captured in the National Program (2006–2009).<sup>1</sup> This supports a so-called Partnership and Cooperation Agreement (PCA) with the European Union (EU) signed in 1996. But Armenia has ambitions not only to improve connectivity to Europe, but

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<sup>1</sup> Government of Armenia. 2006. *Armenia National Program (2006–2009)*. Yerevan (23 March).

also to Central Asia. Armenia has signed most of the international conventions relating to transport and trade facilitation. It is expected to negotiate and sign a free trade agreement with the EU in 2010 and looking into similar arrangements with Asia.

## **B. Sector Performance and Analysis**

7. The road subsector has technical, operational, financial, regulatory, and institutional deficiencies. Combined, these lead to an inefficient, incomplete, and unsafe network of widely variable quality. These problems can be addressed over time through targeted investments and reforms, including greater institutional effectiveness.

### **1. Road Network**

8. The road network in Armenia was developed mostly in the 1960s–1970s. The country is reasonably well-connected with a coverage ratio of about 280 kilometers (km) of roads per 1,000 square km (km<sup>2</sup>). The network is 7,704 km long (1,686 km of interstate roads, 4,056 km of republic roads, and 1,962 km of local roads). Road conditions vary among *marzes* (provinces), ranging from only 10% being in good condition in some (Tavush) to 90% in others (Ararat and Vayots Dzor). The average roughness for interstate roads is about 5.0 meters (m) per km international roughness index (IRI). Lack of quality control during construction and inadequate maintenance since independence has resulted in rapid deterioration of pavements. A large part of the road network is in a poor state of repair, with only about 15% of interstate and republic roads in good condition. The north–south road corridor is also deteriorating fast and cannot meet the increasing traffic demand. The total cost of rehabilitation and reconstruction is estimated at \$1.5 billion–\$2.0 billion up to 2020. External assistance has helped Armenia improve interstate and local roads since 1995, but pavements that were not rehabilitated now require full reconstruction. A detailed assessment of the road subsector, including a problem tree analysis, is in Appendix 2.

9. International road corridors in Armenia are substandard and do not comply with the requirements of international agreements and conventions. For instance, Armenia is a signatory to the EU Agreement on Traffic Arteries<sup>2</sup> that includes two roads in Armenia classified as "the international E-road network." These are routes E117 and E691. They form the north–south road corridor. The agreement stipulates minimum conditions to which the selected roads should conform in terms of classification, geometric standards, road safety equipment, environment and landscaping, and maintenance.

### **2. Cross-Border Traffic**

10. Cross-border traffic has been increasing. It uses three main crossings: two with Georgia (Bagratashen and Bavra) in the north, and one with Iran (Mehri) in the south. Trucks entering from Georgia come primarily from the Russian Federation, other Commonwealth of Independent States countries, Europe, and Turkey. The average number of trucks entering Armenia daily in 2007 was 84 from Iran and 114 from Georgia. In 2008, an average of 59 trucks per day entered from Georgia as transit traffic—47% from the port of Poti, 6% from the port of Batumi, and 40% from Sarpi (Georgia–Turkey border). By comparison, only eight loaded trucks per day transited from Armenia through Georgia. Turkish trucks on the Transports Internationaux Routiers system enter Armenia through Georgia.

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<sup>2</sup> United Nations. 1975. *European Agreement on Main International Traffic Arteries (AGR)*. Washington, D.C.

### 3. Road Sector Management

11. Road sector management is the responsibility of the Ministry of Transport and Communication (MOTC). The work covers strategy, policy, planning, investment, regulation, asset management, evaluation and results reporting. The Armenia Roads Directorate (ARD), a noncommercial state organization, assists MOTC in managing the network, including designing and implementing projects financed by external aid agencies. In the case of government-financed road works, which are limited to rural and local roads, ARD is responsible for feasibility studies and management of the construction and periodic maintenance works outsourced to private firms through competitive bidding. ARD also conducts safety audits and monitors environmental and social compliance requirements. ARD maintains a road inventory and traffic database and uses the Highway Design and Maintenance Model (HDM-4) to prioritize its maintenance program.

12. While the institutional capacities of MOTC and ARD are improving over the years, they are still weak. The main gap is project management, evaluation and reporting. MOTC does not always have enough financial resources for maintenance and operations. Road asset management is below par, although improving. Besides organizational gaps, MOTC encounters difficulties to retain talented staff, especially for project management. With the planned investments of \$1 billion over the medium term, the workload will be increasing and this implies higher investments in human resources. MOTC needs an action plan to train more road engineers, economists and other road sector professionals. An HDM-4 needs to be expanded to introduce fully integrated pavement and bridge management systems. A comprehensive transport development strategy is in place, prepared with ADB assistance.<sup>3</sup> This has paved the way for a policy framework, road map and investment program in Appendix 3. But the challenge is to raise finance and execute the investments. The strategy focuses first on the reconstruction of major road corridors, institutional effectiveness and people. Rural roads and improved urban transport systems are also part of the strategy.

### 4. Road Maintenance and Financing

13. Road maintenance has been a problem for most of the past decade, inadequate financing being a key contributor to it. This has cut the quality and value of road assets. But the situation is being reversed with a 25% annual increase in budgetary allocations for rehabilitation, repairs and winter maintenance. The allocation is now equivalent to \$66 million a year—\$5,600/km—quite close to international standards. The challenge will be to maintain this level of funding. The cost of overlay programs alone ranges from \$20 million to \$46 million. The application of a "user-pays" approaches and the introduction of a transparent and autonomous road fund are being considered as additional measures to reinforce maintenance. The road sector policy framework and road map calls for incorporating these measures.

14. MOTC adopted a 3-year maintenance program during 2006–2008.<sup>4</sup> A second 3-year performance-based maintenance program started in 2008, with 34 contracts under ARD's supervision, covering 2,892 km of routine and 3,127 km of winter maintenance. MOTC also introduced performance-based routine and winter maintenance contracts on main and secondary roads in 2006. Performance-based contracts allow MOTC and ARD to reduce the administration and financial burden and improve road conditions. The benefit of performance

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<sup>3</sup> ADB. 2007. *Technical Assistance to Armenia for Transport Sector Strategy* (TA 4973-ARM, approved on 28 September).

<sup>4</sup> MOTC. 2005. *Endorsement of 3-Year Development and Annual Work Plan for State Roads*. Yerevan.

contracts is visible in areas where MOTC-administered roads merge with city-administered roads, as the latter are generally in worse condition. The next step for MOTC is to extend performance contracts to periodic maintenance and rehabilitation works. This is envisaged under the sector policy framework.

## **5. Road Safety**

15. Road safety in Armenia has been deteriorating quite fast. The number of accidents almost doubled from 1,025 in 2003 to 1,943 in 2007, and fatalities rose from 252 to 371 during the same period. The fatality rate of 10.6 per 10,000 vehicles is eight times higher than that in European countries. Of particular concern is the large number of pedestrian fatalities. The National Road Safety Council (NRSC), established in 2005 as a nongovernment organization, has been sponsoring a number of campaigns, including *Think Before You Drive* in 2006, and drove the initiative for a mandatory seat belt law in 2007. Other activities to improve road safety include (i) permanent stakeholder working groups including traffic police and nongovernment organizations, (ii) school visits and awareness campaign programs, and (iii) road safety programs to identify accident black spots. Self-financing of traffic police has led to an improvement in enforcement, in particular concerning the wearing of seat belts and drink driving. However, NRSC notes that traffic accident rates are underreported. For instance, accidents involving uninsured vehicles are not reported to police, and fatalities are reported within 7 days of an accident, compared with the international norm of reporting within 30 days.

## **6. Design, Construction, and Consulting Services**

16. Road design, construction, and pricing standards for civil works are outdated and do not comply with international best practice and standards. Inherited from former Soviet Union standards, these are not based on economic efficiency, and unit prices are derived from price schedules of the 1970s–1980s with almost no competition-driven costs.<sup>5</sup> Geometric designs are based on the technical classification of roads (categories I–V) without due regard to their functions. Construction specifications are not benchmarked or adjusted to modern road construction equipment. This contributes to high construction costs. Inefficient and outdated construction equipment employed by the local contractors makes them uncompetitive and unreliable. Despite being built up with external aid, the construction industry remains fragmented and weak. There are no national contractors with enough resources to manage large contracts. International contractors have not worked in Armenia and alliances with international groups have not been materialized. In addition, bitumen and prefabricated concrete elements for road construction are usually imported, posing additional challenges to road construction. However, cement for construction is abundant in Armenia and even exported around the region.

## **7. Government Strategy, Policy, and Road Map**

17. Faced with competing transport routes across the Caucasus, the Government's strategy is to develop transit routes that provide shorter and competitive links and services to national and international operators. The proposed corridor is part of this strategy (Appendix 3). The policy framework calls for improved road management, institutional effectiveness, outsourcing to the private sector and greater attention to maintenance. The investment plan comprises physical and nonphysical investment components and is phased. The physical component

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<sup>5</sup> Price schedules are converted to current prices on the basis of the arbitrary conversion factors issued by the Ministry of Urban Development. The local contractors' prices are evaluated against these price schedules.

targets upgrading and rehabilitating major highways, lifeline road networks. The nonphysical component targets institutional effectiveness, planning, project management, best practice and standards related to construction, maintenance and operations, improved safety, and training. It also covers monitoring, reporting, and evaluation. The total cost of the investment plan is estimated at \$1.45 billion over the medium term (2010–2017). International financing institutions—including ADB, the European Bank for Reconstruction and Development, Japan International Cooperation Agency (JICA), and the World Bank—have been requested to help finance this investment plan.

## **8. ADB's Strategy and Sector Assistance**

18. ADB's country operations business plan for Armenia<sup>6</sup> focuses on transport and urban infrastructure, regional cooperation and private sector development.

19. ADB assistance to Armenia has focused thus far on the rehabilitation of rural roads (two loans approved for \$48 million since 2007). ADB is also financing water and sanitation services in secondary towns (an investment being executed through a management contract with an international operator). In 2009, Armenia benefited from a crisis support facility arranged by ADB on account of the sharp economic downturn following the global financial crisis.

## **9. Lessons**

20. ADB experience with road projects in Armenia is confined to the rural roads program approved in 2007. Some issues arising from this operation suggest some lessons, including the need to pay more attention to (i) sound cost estimations to avoid supplementary financing requests, (ii) realistic procurement schedules backed by better planning and advance actions, (iii) more extensive stakeholder consultation for better social safeguard planning, (iv) adequate and timely government counterpart funding, and (v) improved project management. Under the proposed MFF each tranche will be converted into a loan only when the executing agency has prepared a detailed project design and is ready for bidding and contract award. This will be complemented by advance actions on land acquisition and resettlement, which in turn implies adequate counterpart financing. A program management unit will be set up to strengthen project management and execution scheduling, evaluation, results measurement, and reporting.

## **10. Other External Assistance**

21. The road subsector has received \$300 million in external assistance since 1995 mainly for rehabilitation of 1,100 km of interstate and rural roads. Apart from ADB, other sources of external assistance are the World Bank, the Lincy Foundation (funded by Armenia Diaspora in the United States), and the Millennium Challenge Corporation. External assistance helped with roads and "soft" infrastructure, including management and planning capacities of MOTC. External financiers are earmarking an additional \$250 million for the sector during 2010–2012. This includes \$110 million from the World Bank, \$40 million–\$50 million from the European Bank for Reconstruction and Development and the European Investment Bank, and \$70 million from JICA (the latter directed at the north–south road corridor). More information on external assistance is given in Appendix 4.

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<sup>6</sup> ADB. 2007. *Armenia: Country Operations Business Plan (2008–2010)*. Manila.

### III. THE PROPOSED INVESTMENT PROGRAM

#### A. Impact and Outcome

22. The Investment Program will contribute to economic development and regional trade. The outcome will be a more efficient, safer, and sustainable transport network.

#### B. Outputs

23. Key outputs include (i) 550-km of improved road sections in the corridor, (ii) modernized border and customs infrastructure and related facilities, and (iii) more efficient and effective road corridor management.

24. The outputs of the Tranche 1 Project will be (i) a reconstructed 18.4 km four-lane section of the corridor between Yerevan and Ashtarak; (ii) improved safety of the Yerevan–Ararat road; (iii) due diligence, final design and bidding documents for tranche 2 and 3 projects; and (iv) execution of road sector institutional effectiveness plan. A preliminary road design for Tranche 1 Project has been completed and is summarized in Appendix 5. Tranche 1 Project is ready for bidding under advance contracting.

25. Tranche 2 project may include (i) upgrading an 88-km Ashtarak–Gyumri section of the corridor, (ii) developing a cross-border agreement with Georgia, (iii) undertaking feasibility studies and completing the design of subsequent tranches, (iv) improving border infrastructure, systems and procedures, and (v) completing the implementation of institutional effectiveness reforms. Subsequent tranches under the MFF will complete the upgrading of remaining parts of the north–south road corridor. All subprojects will be selected based on the criteria in Appendix 6.

#### C. Special Features

26. **Concept of Transport and Economic Corridors.** The proposed MFF supports the concept of road corridors, not just national road sections. The idea is to improve national and regional connectivity and in this manner expand the regional cooperation agenda. Azerbaijan and Georgia are already following this approach. The proposed MFF brings Armenia into the same model. The investments will benefit all the countries in the region and ultimately connect the Caspian Sea to the Black Sea. The Investment Program was prepared and will be implemented in close coordination with all the players involved in subregional roads corridor development programs. It is also being coordinated with other development partners and linked to Central Asia Regional Economic Cooperation (CAREC).

27. **Strong Cofinancing Content.** ADB has been working with agencies on the definition, financing and implementation of a regional investment programs. CAREC is the reference point for coordination, although at the subregional level. ADB intends to establish a formal mechanism to expand partnerships and cofinancing.

#### D. Investment Plan

28. The Investment Plan is estimated at \$962 million (Table 1). Tranche 1 Project amounts to \$70 million (Table 2). More details are given in Appendix 7.

**Table 1: Program Investment Plan**  
(\$ million)

Item	Amount
<b>A. Road and Border Infrastructure Development</b>	
1. North–South Road Corridor Improvement	942.0
2. Border Infrastructure and Facilities Improvement	10.0
<b>Subtotal (A)</b>	<b>952.0</b>
<b>B. Institutional Development</b>	<b>10.0</b>
<b>Total (A+B)</b>	<b>962.0</b>

Source: Asian Development Bank estimates.

**Table 2: Cost Estimates of Tranche 1 Project**  
(\$ million)

Item	Amount
<b>A. Base Cost<sup>a</sup></b>	
1. Civil Works	38.0
2. Project Management and Institutional Support <sup>b</sup>	7.0
3. Taxes and Duties <sup>c</sup>	10.0
<b>Subtotal (A)</b>	<b>55.0</b>
<b>B. Contingencies<sup>d</sup></b>	<b>13.0</b>
<b>C. Financing Charges During Implementation<sup>e</sup></b>	<b>2.0</b>
<b>Total (A+B+C)</b>	<b>70.0</b>

<sup>a</sup> In mid-2009 prices.

<sup>b</sup> Includes management and administration cost of the project management unit and all consulting services required for implementation and institutional support.

<sup>c</sup> Includes value-added tax and import duties.

<sup>d</sup> Includes physical and price contingencies.

<sup>e</sup> Includes interest charges during construction.

Source: Asian Development Bank estimates.

## **E. Financing Plan**

29. The Government has requested ADB to finance the Investment Program through an MFF up to \$500 million. A framework financing agreement (FFA) has been negotiated and its signing by the Government is being delayed due to the need on the part of the Government to complete intergovernmental procedures and to obtain requisite signing authorizations. The FFA signing is expected before the Board approval. Financing will be provided in tranches through individual loans from ADB's Special Funds resources and ordinary capital resources (OCR) in accordance with relevant ADB policies and the FFA to be signed between ADB and Armenia, subject to modifications that may be included under individual financing agreements. An OCR loan will have an interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per annum, and such other terms and conditions set forth in the related loan agreement. A loan from the Special Funds resources will have a term of 32 years, including a grace period of 8 years, and interest of 1.0% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the related loan agreement. The tentative financing plan for the Investment Program is shown in Table 3. The financing plan for Tranche 1 Project is in Table 4. A detailed breakdown of costs by financier and expenditure categories is in Supplementary Appendix A.

**Table 3: Financing Plan for the Investment Program**

<b>Source</b>	<b>Amount (\$ million)</b>	<b>%</b>
A. Asian Development Bank		
1. Ordinary Capital Resources	440.0	46
2. Special Fund Resources	60.0	6
B. Government and other Cofinanciers	462.0	48
<b>Total</b>	<b>962.0</b>	<b>100</b>

Source: Asian Development Bank estimates.

30. The Investment Program sets out a framework for effective partnership with third parties—investors and financiers—over the medium term. While some multilateral development partners may provide financing for some parts of the Investment Program in parallel, other development partners may determine to complement ADB's financing, after the Board's approval of the proposed MFF, through cofinancing to be administered by ADB. The amounts of cofinancing to be provided by such other development partners and administered by ADB will be within the total MFF amount. Such cofinancing may be provided as loans or grants, and may take the form of parallel or joint cofinancing. ADB's administration of such cofinancing from time to time will be reported to the Board for information annually.<sup>7</sup> JICA is expected to extend financing towards the Investment Program. This cofinancing is part of an Accelerated Cofinancing Scheme agreed with ADB in 2007. The cofinancing will be made on a joint basis and will be administered by ADB. ADB has been requested to raise additional cofinancing for the Investment Program.

**Table 4: Financing Plan for Tranche 1 Project**

<b>Source</b>	<b>Amount (\$ million)</b>	<b>%</b>
A. Asian Development Bank		
Special Fund Resources	60.0	86
B. Government	10.0	14
<b>Total</b>	<b>70.0</b>	<b>100</b>

Source: Asian Development Bank estimates.

## **F. Implementation Arrangements**

### **1. Program Management**

31. The Project Governing Council (PGC), consisting of members from the Armenia's ministries of economy, finance, justice, transport and communication, territorial administration, and civil societies, will provide overall guidance to the executing agency responsible for the Investment Program. PGC will be cochaired by the ministers of economy and of transport and communication.

<sup>7</sup> ADB. 2008. *Mainstreaming the Multitranches Financing Facility*. Manila. See paragraph 79.

32. MOTC will be the executing agency and will sign and act as an employer for contracts with consultants and contractors. Implementation and monitoring will be delegated to ARD, which will serve as the implementing agency. A facility administration memorandum (FAM) summarizes the list of executing tasks and their sequencing (Supplementary Appendix H). Key functions assigned to ARD include (i) screening and approving individual tranche projects; (ii) planning and executing procurement; (iii) reviewing and approving final project designs; (iv) managing contractors and supervising consultants; (v) maintaining financial management controls, including project accounts; (vi) monitoring and reporting on project implementation performance and results; (vii) dealing with all warranties and representations made to ADB, including full compliance with environmental and social safeguard policies and action plans; and (viii) managing the institutional effectiveness program. ARD will set up a program implementation unit (PMU) structured to include technical, legal, financial, feasibility study and project design, and procurement and project management teams. These teams will also engage the services of evaluation and safeguards experts. The program implementation organization chart is in Appendix 8.

## **2. Implementation Period**

33. The Investment Program will be implemented over 7 years starting in 2009. Tranche 1 Project is expected to start in April 2010, with completion by December 2013. The implementation schedules for the Investment Program and Tranche 1 Project are in Appendix 9.

## **3. Procurement**

34. ARD will procure works and goods to be financed under the MFF according to ADB's *Procurement Guidelines* (2007, as amended from time to time). The procurement plan for the first 18 months of the Tranche 1 Project is in Appendix 10. Civil works for Tranche 1 Project are packaged into one contract to be procured through international competitive bidding. Small works costing less than \$1 million, although not anticipated at this stage, will be procured using national competitive bidding procedures, which will be conducted according to the Law on Procurement of Armenia (dated 1 January 2005), subject to clarifications and modifications as agreed with ADB.

## **4. Consulting Services**

35. The Investment Program will require services of international and national experts. These services will involve consulting firms and individuals. The work includes design and supervision, safeguards, due diligence or feasibility studies for subsequent tranches, monitoring, evaluation and reporting, and assistance with procurement. Experts will also be engaged to work on institutional effectiveness programs, including help with planning, project management, and training. MOTC will select firms according to ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time), using the quality- and cost-based selection, quality-based selection, or consultant qualification selection method depending on the needs of individual project components and the agreed procurement plans. ADB and MOTC will perform due diligence in accordance with ADB's *Guidelines on the Use of Consultants* before using any of the selection methods.

36. Tranche 1 Project will require immediate assistance. This includes about 89 person-months of international and 296 person-months of national consulting services. The most immediate task is to complete the final design (preliminary design already done) and supervise the construction of the agreed road sections. They will also prepare tranche 2 and 3 investments,

including completing design work. Another immediate task is to strengthen a road subsector plan and guide its implementation. ARD will engage 32 person-months of international and 45 person-months of national consulting services for this work. Terms of references are in Supplementary Appendixes B, C, and D. The principal approach is to agree on the core team members and to leave contingency financing to secure the services of short-term experts, as and when required. The detailed design work will require the services of a consulting firm to be selected on the basis of consultants' qualification selection. The scope of services is small and the Government wishes to expedite completion of designs for bidding the civil works. Other assignments will follow quality- and cost-based selection. Full technical proposal will be used for evaluating proposals for the supervision work, and simplified technical proposals will be used for the experts needed to work on the road subsector plan. It is envisaged that 80:20 quality–cost ratio will be used, although other weighting system may be considered, depending on the circumstances. For project management and administration, ARD will recruit a team of individual consultants in accordance with ADB's procedures for recruitment of individual consultants to work in the PMU.

## **5. Program Performance Monitoring, Evaluation and Results**

37. The Investment Program will be monitored and evaluated against a set of indicators relating to the impact, outcome, and outputs in the design and monitoring framework shown in Appendix 1. MOTC will provide detailed baseline indicators before start of civil works, and will adopt systematic data collection procedures for reporting on results. A team of experts located in the PMU will assist MOTC with this work.

## **6. Advance Contracting and Retroactive Financing**

38. To facilitate program implementation, the Government requested ADB approval for advance contracting and retroactive financing of works, goods, and consulting services eligible for financing from the MFF proceeds. Advance contracting will help the Government start procurement activities prior to the signing of legal agreements. The Government was informed that, in order for expenses incurred under advance contracting to be eligible for retroactive financing, such procedures (including advertising) must comply with ADB's *Procurement Guidelines* and *Guidelines on the Use of Consultants*. Once a tranche becomes effective, up to 20% of resources from such tranche financing may be used to retroactively finance eligible expenditures incurred during the period not exceeding 12 months prior to signing of the relevant legal agreement. The Government acknowledges that any concurrence by ADB with the procedures, documentation, or proposal for award does not commit ADB to finance such expenses or the related project.

## **7. Anticorruption**

39. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to and discussed with the Government. The Government acknowledges that, consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to any project under the MFF. To support these efforts, relevant provisions of ADB's *Anticorruption Policy* are included in the loan regulations and the bidding documents for individual tranche projects. In particular, all contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of ARD and all contractors, suppliers, consultants, and other service providers financed under the MFF. In case of any irregularities, ADB reserves the right to suspend and/or terminate financing under the MFF.

40. The Government agreed to take additional measures to tighten and supervise governance, accountability, and transparency related to the Investment Program. These measures include (i) independent external auditing of contracts, project accounts, and financial statements; (ii) decisions on all procurement-related matters by the PGC; and (iii) timely disclosure of information on selection of consultants and contractors through local newspapers.

## **8. Disbursement Arrangements**

41. The loan proceeds under the MFF will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2007, as amended from time to time), primarily utilizing direct payment procedure. To facilitate cash flows and program implementation, the imprest account procedures described in ADB's *Loan Disbursement Handbook* will be followed. ARD will open and manage an imprest account at a bank acceptable to ADB after the effectiveness of each individual tranche. The imprest account will be exclusively used to finance ADB's share of eligible expenditures under the concerned tranche and will be liquidated and replenished in accordance with ADB's *Loan Disbursement Handbook*. The total advance will not exceed ADB's estimated share of eligible project expenditures to be financed through the imprest account for the next 6 months, or 10% of the tranche amount, whichever is lower. For simplified documentation, the statement of expenditure procedures, as described in the *Loan Disbursement Handbook*, will be followed to reimburse expenditures and liquidate advances provided to the imprest account for any individual payment transaction of \$100,000 equivalent or less. The Ministry of Finance will monitor the imprest account and review monthly reconciliation of the accounts.

## **9. Accounting, Auditing, and Reporting**

42. The Government agreed to adhere to sound financial management requirements during implementation of the Investment Program. ARD will be responsible for financial management functions. Financial management assessment of ARD was conducted in 2007. The review and update of this assessment in 2009 confirms that ARD's financial management system is satisfactory as it has (i) extensive experience in external aid projects and associated risks are low, (ii) an adequate accounting system supported by standardized accounting software, (iii) a systematized bookkeeping and reporting system, and (iv) a consistent internal control system.

43. ARD will maintain separate project records and accounts adequately to identify (i) the goods and services financed from the MFF proceeds, (ii) the financing resources received, (iii) the project expenses incurred on the components of each project, and (iv) the use of counterpart funds. ARD will engage independent external auditors acceptable to ADB to audit project accounts including the imprest account and the statement of expenditure procedures annually. ARD will submit to ADB certified copies of audited annual project accounts with a separate audit opinion on the imprest account and the statement of expenditure procedures, as well as the auditor's report in English within 6 months of the end of each fiscal year during implementation. ARD was advised of ADB's requirement for timely submission of audited annual project accounts, and the suspension of disbursements of ADB loans in case of noncompliance with the requirement.

44. ARD will prepare and submit to ADB quarterly progress reports on individual tranche projects, which will include (i) a narrative description of progress made during the reporting period, (ii) changes in the implementation schedule, (iii) problems or difficulties encountered, and (iv) activities to be undertaken in the next reporting period. ARD will prepare and submit to ADB a project completion report within 3 months of the completion of each tranche, and a program completion report after the completion of all tranches under the Investment Program.

## 10. Reviews

45. ADB will field an inception mission within 3 months of the approval of each tranche, and at least three review missions annually. The Government and ADB will jointly undertake a midterm review of the Tranche 1 Project in 2011 and a midterm review of the Investment Program in 2014. The timing of midterm reviews of subsequent tranches will be agreed during the appraisal of each tranche. The midterm reviews will assess whether attainment of program objectives are still likely. The work will focus on (i) execution milestones, institutional, administrative, organizational, technical, environmental, social, economic, and financial aspects; (ii) whether covenants remain relevant or need to be reconsidered; (iii) validate the soundness of the program and/or tranche; and (iv) review, and if needed, revise the design and monitoring framework of the Investment Program.

## 11. Preparation of Subsequent Tranche Projects

46. MOTC/ARD will prepare subsequent tranche projects to be financed under the MFF. This work will include technical, commercial, financial, safeguards, governance, implementation and other due diligence. Future tranches will also require final designs and advance actions on procurement. MOTC/ARD will then prepare and submit a periodic financing requests (PFRs) to ADB for approval with the project appraisal report and a summary of the design and procurement plan. The PFRs and the project appraisal report will be prepared in accordance with the criteria and procedures stated in Schedule 4 of the FFA, and other related requirements of the Government and ADB. ADB will undertake due diligence on these submissions in accordance with its operating policies and procedures, and approve PFRs when deemed ready. If required by ADB, ARD will amend the PFRs and request the Government to resubmit it to ADB for approval.

## IV. INVESTMENT PROGRAM BENEFITS, IMPACTS, AND RISKS

### A. Benefits

47. The Investment Program will improve the north–south road corridor and will benefit road users, road construction companies, traders, and people. The direct benefits will include (i) lower road transport and maintenance costs, (ii) faster and more reliable road transport services, (iii) reduced traffic accidents, (iv) improved access to markets and social services, and (v) jobs and income created during implementation (i.e., use of local labor and construction materials) and after completion (i.e., roadside business activities). The direct benefits will initially accrue to vehicle owners and operators and road construction companies, but ultimately be shared with passengers and freight customers through reduced bus fares and freight charges. While Armenia is the major beneficiary, other countries in the Caucasus subregion will also benefit from efficient movement of traffic to and via Armenia. Indirect benefits, which are expected to become tangible after completion of the Tranche 1 Project, will include (i) improved road network management, and (ii) increased business activities and jobs that have forward or backward linkages to the north–south road corridor development.

48. The Investment Program will contribute to poverty by stimulating economic development. In particular, it will increase the mobility of about 3 million people living in six *marzes* (provinces), where the north–south road corridor lies. The poverty incidence in two *marzes* (25.5% in Ararat and 32.1% in Shirak) exceeds the national average of 25.0%. The unemployment rate is high (about 12%) in Shirak and Syunik *marzes* as compared with the national average of 6.2%. It will significantly benefit the predominantly rural populations in Aragatsotn, Ararat, and Vayots Dzor *marzes*, which are deprived of reliable access to health care services. The Investment Program will

generate an estimated 2,500–3,000 jobs during implementation, of which an estimated 45%–50% will be sourced locally in the form of unskilled labor or related services to the construction sites.

49. The employment level among the households along the north–south road corridor is 70%, of which around 30% are engaged in agriculture activities or small and medium-size agro-industries (including cottage industries). Reduced travel time and better transport services will help improve the lives of people—especially women, the elderly, and children—as improved road transport under the Investment Program will increase their access to the nearest markets and social service delivery institutions such as schools, hospitals, and clinics, and create employment opportunities. The summary poverty reduction and social strategy is in Appendix 11.

50. Armenia has many historical sites that date back to the 4th and 5th centuries and are home to Christian shrines and places of religious worship. Jermuk and Tatev are the two tourism hot spots along the north–south road corridor which attract many tourists from around the world. The Investment Program is expected to promote tourism activities and thus socioeconomic development in the region.

## **B. Economic Analysis**

51. Economic analysis of all projects financed under the MFF will be conducted in accordance with ADB's *Guidelines for the Economic Analysis of Projects*.<sup>8</sup> The economic analysis for Tranche 1 Project is in Appendix 12. It is based on a comparison of with- and without-project cases and covers a period of 23 years (2010–2032), comprising 3 years of construction and 20 years of operation. On the basis of projected GDP growth and the estimated income elasticity of demand in Armenia, traffic on the improved Yerevan–Ashtarak road is projected to grow by 8.3% annually, with average daily traffic increasing from about 13,060 vehicles in 2012 to 65,605 vehicles in 2032.

52. The major benefits of Tranche 1 Project are savings in vehicle operating costs and travel time. The upgraded road will have an average IRI value of 2.0 m/km, compared with the present IRI value of 5.4 m/km in 2009. Savings on vehicle operating costs and travel time were calculated using the HDM-4 software. The economic analysis shows that Tranche 1 Project is economically viable, with an estimated economic internal rate of return (EIRR) of 16.8% and an estimated net present value of \$12.4 million at a 12% discount rate. A sensitivity analysis of the economic viability of Tranche 1 Project shows that the EIRR is reduced to 14.9% when the capital cost is increased by 20%, and to 14.6% when road user benefits are reduced by 20%. In the case of a simultaneous increase in cost of 20% and reduction in benefit of 20%, the EIRR is reduced to 12.9%. The switching values are 67% for cost increase, 40% for benefit reduction, and 25% for a combination of cost increase and benefit reduction. This proves the robustness of the economic viability of the Tranche 1 Project. Detailed economic analysis is in Appendix 12.

## **C. Social Safeguards**

53. A land acquisition and resettlement framework (LARF) regulating land acquisition and resettlement activities for the Investment Program in compliance with national laws and ADB's *Involuntary Resettlement Policy* (1995) has been prepared and was approved by the Government (Supplementary Appendix E). The LARF is summarized in the summary social safeguards (Appendix 13). The resettlement classification of the Tranche 1 Project is C. Civil works will entail the improvement of an existing four-lane highway and will take place within the

<sup>8</sup> ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.

existing right-of-way or on unused state-owned land. No relocation of households or acquisition of productive land is expected. Borrow pits or quarries are also available in the state-owned empty land, within easy access and away from residential areas.

54. In Armenia there are no groups with characteristics fitting the definition of indigenous people of ADB's *Policy on Indigenous Peoples* (1998). Therefore, the entire Investment Program and all tranche projects will be categorized as C for impact on indigenous people.

55. Information and periodic seminars on HIV/AIDS prevention will be made available through the construction company to people associated with the Investment Program and residents in the program area. These outreach activities will be designed by the construction company and submitted to MOTC for approval as part of the health and safety management part of the quality assurance and/or quality control plan. ADB will review and make recommendations, if necessary. The preparation and execution of this plan will be an integral part of the construction contract.

#### **D. Environmental Impacts**

56. An environmental assessment and review framework (EARF) covering environment safeguard tasks for the Investment Program in compliance with national laws and ADB's *Environment Policy* (2002) has been prepared and was approved by the Government (Supplementary Appendix F). The environmental classification for the Tranche 1 Project is category B. An initial environmental examination (IEE) was carried out in accordance with ADB's *Environment Policy* and *Environmental Assessment Guidelines* (2003) and is in Supplementary Appendix G. It shows that the Tranche 1 Project road section would not have a significant irreversible or permanent negative environmental impact during or after construction. MOTC will require the contractor to refine and implement the environmental management plan (EMP) outlined in the IEE, and abide by the environmental laws and regulations of Armenia and ADB's policies, procedures, and guidelines. A cumulative impact assessment is not required as it is unlikely that significant cumulative or induced impacts will occur as a result of the Investment Program. However, tranche 2 and 3 projects will widen and upgrade the existing road sections and this may impact on areas of environmental or archaeological importance. The terms of references for the environmental impact assessment for tranche 2 and 3 projects include provisions to ensure that the scope covers associated impacts.

#### **E. Assumptions and Risks**

57. The Investment Program was designed with the following assumptions: (i) continued Government commitment to the concept of transport and economic corridors; (ii) efficient implementation of the sector strategy, policy framework and road map; (iii) adequate external financial resources; (iv) adequate road maintenance; (v) timely provision of counterpart funds; and (vi) sound designs and civil works schedules and MOTC's efficient and diligent oversight of works and contracts.

58. Risks to the Investment Program include (i) macroeconomic instability in Armenia and the subregion due to the current global financial crisis, (ii) reduced commitment to corridors and weak implementation capacity, and (iii) cost overruns due to sharp escalation of prices. The Government is committed to mitigate these risks. The recent macroeconomic imbalances are being corrected with help from the International Monetary Fund (IMF) and other partners such as ADB and the World Bank. After the global financial crisis in 2008, the foreign debt of Armenia is being closely monitored by external aid agencies, especially the IMF. The latter expects that

Armenia's debt ratios will rise sharply—albeit from a low base—with the ratio of public debt to GDP increasing from 18% in 2008 to 43% in 2010. However, the debt–GDP level is not projected to be excessive. Standard stress tests show that Armenia is at low risk of debt distress. Economic conditions are expected to improve by the end of 2010.

59. The investment plan and the financing plan for the Tranche 1 Project include large contingencies. This will help tackle possible cost overruns and/or changes to the program and Tranche 1 Project scope. Tranche 1 Project is fairly straightforward and unlikely to need extra financing.

## V. ASSURANCES

### A. Specific Assurances

60. In addition to the standard assurances, the Government has given the following assurances incorporated in the various legal documents:

- (i) **Road subsector plan.** MOTC will finalize the Road Subsector Plan (2010–2020) prepared under the ADB-assisted Transport Sector Strategy, obtain an endorsement from various government and external stakeholders and submit it to the Government for approval by 2011. The current version of the road map, strategy, and policy framework is in sound shape, but the formal government approval will add credibility to them.
- (ii) **Counterpart funding.** The financial, technical, and human resources are made available for the Investment Program and Tranche 1 Project, including adequate funds for road maintenance.
- (iii) **Transport policy and management.** The policies under the PCA with the EU are sound, coherent, and suitable for implementation.
- (iv) **Good governance.** All contracts financed by ADB under the MFF include provisions specifying the right of ADB to audit and examine the records and accounts of ARD and all contractors, suppliers, consultants, and other service providers as they relate to the Investment Program.
- (v) **Construction quality.** (a) The road corridor is improved to comply with the international standards, particularly international agreements to which Armenia is a signatory; (b) sound contract management and quality control procedures are performed in accordance with internationally acceptable standards; and (c) completed works comply with the design drawings, construction specifications, and other documents stipulated in the bidding documents.
- (vi) **Environment.** (a) The projects under the Investment Program are designed, implemented, maintained, and monitored in compliance with (1) all applicable environmental laws and regulations of Armenia; (2) ADB's *Environment Policy* (2002), or, if applicable, ADB's *Safeguard Policy Statement*;<sup>9</sup> (3) environmental assessments (IEEs/environmental impact assessments [EIAs]) prepared for each individual project; (4) EMPs, including the mitigation measures and monitoring

<sup>9</sup> ADB. 2009. *Safeguard Policy Statement*. Manila.

requirements arising from the implementation of the IEEs/EIAs; and (5) a strategic assessment of potential interactions between the Investment Program and the environment; (b) civil works contractors' specifications include requirements to comply with the environmental mitigation measures contained in the IEEs/EIAs and EMPs; and (c) civil works contractors are supervised to ensure compliance with the requirements of the IEEs/EIAs and EMPs.

- (vii) **Land acquisition and resettlement.** (a) In the event that land acquisition or resettlement becomes necessary, appropriate land acquisition and resettlement plans (LARPs) will be prepared in accordance with the national laws and regulations, the resettlement framework, and ADB's *Policy on Involuntary Resettlement* (1995), or, if applicable, the *Safeguard Policy Statement*, in consultation with affected people; (b) endorse and disclose all LARPs to the public and submit them to ADB for approval; (c) all land and rights-of-way required for the project implementation are made available in a timely manner; (d) land acquisition and resettlement are carried out promptly and efficiently following the LARPs agreed with ADB and monitored, evaluated, and reported to ADB as required in the LARPs; and (e) civil works will commence only after the required land has been acquired and affected persons have been compensated at full replacement cost.
- (viii) **Local consultation and gender.** (a) All local consultations to address safety, social, and cultural issues during implementation of the Investment Program are carried out as recommended in the summary poverty reduction and social strategy; (b) men and women are given equal employment opportunities directly, or indirectly, arising from the Investment Program and without any differentiation of wages for equal work; and (c) mechanisms for maximizing local employment benefits will be included in the bidding documents.
- (ix) **Employment and labor.** All civil works contracts under the Investment Program will (a) comply with applicable labor laws of Armenia, and (b) use best efforts to employ women and local people, including disadvantaged people living in the vicinity of the program area. Each civil works contract will contain provisions (a) prohibiting use of child labor and differentiation in wages between men and women for work of equal value or type, (b) requiring dissemination of information on the risks of sexually transmitted diseases to those employed at the construction sites, and (c) requiring health, sanitation, and appropriate working conditions at the construction sites. Compliance with these assurances will be recorded in the project performance monitoring system and monitored during implementation.
- (x) **Health risks and prevention.** All civil works contracts include a requirement to conduct an information and education campaign on sexually transmitted diseases and HIV/AIDS for construction workers as part of the health and safety program at campsites during the construction period.
- (xi) **Illegal trafficking.** Undertake concrete and adequate measures to detect and prevent trafficking of humans, wildlife, endangered species, and illegal substances through the road corridor.
- (xii) **Change in ownership and operation.** Seek ADB's consent at least 6 months prior to (a) changing ownership of the road, road facility, or structure financed

under the Investment Program; (b) selling, transferring, or assigning the interest or control over the road, road facility, or structure financed under the Investment Program; and (c) leasing or other contract or modification of the functions and authority of ARD over operation and maintenance of any road, road facility, or structure financed under the Investment Program. Such changes will be carried out in a legal and transparent manner.

- (xiii) **Compliance with international agreements.** Build, equip, operate, maintain, and manage the facilities financed under the Investment Program in compliance with all international agreements and conventions to which Armenia is a party.

## VI. RECOMMENDATION

61. I am satisfied that the proposed multitranche financing facility would comply with the Articles of Agreement of the Asian Development Bank (ADB) and, acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement of ADB, I recommend that the Board approve

- (i) the provision of loans under the multitranche financing facility in an aggregate principal amount not exceeding \$500,000,000 equivalent to the Republic of Armenia for the North–South Road Corridor Investment Program comprising
  - (a) a loan in various currencies equivalent to Special Drawing Rights 38,443,000 from ADB’s Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; a term of 32 years, including a grace period of 8 years; and
  - (b) loans from ADB’s ordinary capital resources, with interest to be determined in accordance with ADB’s London interbank offered rate (LIBOR)-based lending facility; and
- (ii) the administration by ADB of cofinancing to be provided to the Republic of Armenia for the North–South Road Corridor Investment Program by development partners in the form of loans and grants as described in paragraph 30 of this Report;

and such other terms and conditions as are substantially in accordance with those set forth in the Framework Financing Agreement presented to the Board.

C. Lawrence Greenwood, Jr.  
Vice-President

8 September 2009

## DESIGN AND MONITORING FRAMEWORK

### Table A1.1: Multitranche Financing Facility

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b> Increased subregional trade and accelerated economic development in Armenia</p>	<p>Increase in Armenia's exports from \$300 million in 2007 to \$600 million in 2017</p> <p>Increase in Armenia's imports from \$1.1 billion in 2007 to \$2.0 billion in 2017</p>	<p>National economic and trade statistics</p> <p>Customs statistics</p> <p>Statistics from international organizations</p>	<p><b>Assumption</b> Continued Government commitment to regional cooperation</p> <p><b>Risk</b> Macroeconomic instability in Armenia and subregion due to current global financial crisis</p>
<p><b>Outcome</b> Efficient, safe, and sustainable transport on the north–south road corridor</p>	<p>Increased transit traffic across Armenia on the north–south road corridor to about 200 vehicles a day in 2017</p> <p>Increased cross-border traffic on the north–south road corridor from 4.6 billion ton-km in 2008 to 10.0 billion ton-km in 2017</p> <p>Reduced travel time along the north–south road corridor from 3–4 days in 2008 to 2 days by 2017</p> <p>Increased average daily traffic on the north–south road corridor from 3,000 vehicles in 2008 to 6,000 vehicles in 2017</p> <p>About 3 million people will benefit from the Investment Program</p>	<p>Investment Program and tranche completion reports</p> <p>Investment Program and tranche progress reports</p> <p>National and MOTC traffic statistics</p>	<p><b>Assumptions</b> Other external aid agencies' support for the north–south road corridor</p> <p>The Government's implementation of road maintenance program</p> <p><b>Risk</b> Reduced commitment to corridors and weak implementation capacity</p>
<p><b>Outputs</b> 550 km north–south road corridor improved</p>	<p>Road corridor upgraded to 100 km/hr operation standard</p> <p>IRI value for the north–south corridor reduced to 2.5 by 2017 and kept below 4.0 IRI for the next 5 years.</p>	<p>Investment Program and tranche progress and completion reports</p> <p>Investment Program and tranche performance monitoring system</p> <p>Investment Program and</p>	<p><b>Assumptions</b> Timely provision of counterpart funds by the Government</p> <p>MOTC and ARD maintain diligent oversight of works and efficiently administer contracts to deliver program on time and budget</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks						
<p>Border and customs facilities modernized and a cross-border agreement with Georgia in place</p> <p>Road subsector plan implemented</p> <p>Road subsector management and institutional capacities improved</p> <p>Road safety improved</p>	<p>At least three border facilities improved to handle increased traffic flows</p> <p>5% annual increase in road maintenance financing from actual budget in 2008 adjusted for inflation</p> <p>Road asset management system introduced</p> <p>Project planning, evaluation, execution and reporting capacities reinforced</p> <p>Skills and human resources development plans implemented</p> <p>Reduced road accident fatalities by 20% by 2017 from 11 accidents per 1,000 vehicles in 2008</p>	<p>tranche audit reports</p> <p>Data from ministries and agencies concerned</p> <p>National road accident statistics</p>	<p><b>Risk</b></p> <p>Cost overrun due to the sharp escalation of prices of construction materials and labor</p>						
<p><b>Activities with Milestones</b></p> <ol style="list-style-type: none"> <li>1. Financing framework agreement signed by the Government and ADB by September 2009</li> <li>2. PFR for Tranche 1 Project submitted by the Government and approved by ADB in September 2009</li> <li>3. Tranche 2 project prepared by the Government by May 2010 and PFR approved by ADB in July 2010</li> <li>4. Subsequent tranche projects prepared by mid-2010 and PFRs approved by ADB within 2 months of submission during 2011–2014</li> <li>5. The Investment Program completed 2016</li> </ol>			<p><b>Inputs</b></p> <p><b>ADB:</b></p> <table> <tr> <td>ADF</td> <td>\$60 million</td> </tr> <tr> <td>OCR</td> <td>\$440 million</td> </tr> </table> <p><b>Government/Cofinanciers:</b></p> <table> <tr> <td></td> <td>\$462 million</td> </tr> </table> <p><b>Total \$962 million</b></p>	ADF	\$60 million	OCR	\$440 million		\$462 million
ADF	\$60 million								
OCR	\$440 million								
	\$462 million								

ADB = Asian Development Bank, ADF = Asian Development Fund, ARD = Armenian Roads Directorate, IRI = international roughness index, MOTC = Ministry of Transport and Communication, OCR = ordinary capital resources, PFR = periodic financing request.

Table A1.2: Tranche 1 Project

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b></p> <p>Increased subregional trade and accelerated economic growth in Armenia</p>	<p>Increase in Armenia's exports to Georgia from \$87.9 million in 2007 to \$150.0 million in 2017</p> <p>Increase in imports to Armenia from Georgia from \$46.3 million in 2008 to \$100.0 million in 2017</p>	<p>Investment Program and tranche completion reports</p> <p>Investment Program and tranche progress reports</p>	<p><b>Assumptions</b></p> <p>Other aid agencies' support for the north–south road corridor development</p> <p>The Government's implementation of sustainable road maintenance</p>
<p><b>Outcome</b></p> <p>Improved section of road corridor from Yerevan to Gyumri</p>	<p>Reduced travel time from Yerevan to Gyumri to 1.0 hour by 2015 from 1.5 hours in 2008</p> <p>Increased daily traffic from Yerevan to Gyumri to 7,000 vehicles in 2015 from 3,000 vehicles in 2008</p> <p>About 1.6 million people will benefit from improvement of Yerevan to Gyumri road</p>	<p>Investment Program and tranche completion reports</p> <p>Investment Program and tranche progress reports</p> <p>National traffic statistics</p>	<p><b>Assumption</b></p> <p>The Government secures enough finance, the design work is adequate and the contractor efficient</p> <p><b>Risk</b></p> <p>Reduced commitment to corridors and weak implementation capacity</p>
<p><b>Outputs</b></p> <p>Yerevan–Ashtarak section improved</p> <p>Road subsector plan strengthened and implemented</p>	<p>18.4-km four-lane road improved to 100 km/hr operational standard</p> <p>5% annual increase in road maintenance financing from actual budget in 2008 adjusted for inflation</p> <p>Road asset management system introduced</p> <p>Project planning, evaluation, execution and reporting capacities reinforced</p>	<p>Investment Program and tranche progress and completion reports</p> <p>Investment Program and tranche performance monitoring system</p> <p>Investment Program and tranche audit reports</p>	<p><b>Assumptions</b></p> <p>Timely provision of counterpart funds</p> <p>ARD's diligent oversight of works and efficient administration of contracts to deliver program on time and budget</p> <p><b>Risk</b></p> <p>Cost overrun due to the sharp escalation of prices of construction materials and labor</p>
<p><b>Activities with Milestones</b></p> <p>1.1 Advance procurement initiated by August 2009</p> <p>1.2 Project supervision consultants recruited by December 2009</p> <p>1.3 Civil works contracts for road improvements awarded by April 2010</p> <p>1.4 Road improvement works started by April 2010 and completed by</p>			<p><b>Inputs</b></p> <p><b>ADB:</b></p> <p style="padding-left: 40px;">ADF \$60 million</p> <p><b>Government:</b> \$10 million</p> <p><b>Total</b>                 <b>\$70 million</b></p>

<p>December 2013</p> <p>2.1 Consulting services for road subsector strategy advertized by January 2010</p> <p>2.2 Consultants recruited and mobilized by June 2010</p> <p>2.3 The consulting services completed by 2012</p>	
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ADB = Asian Development Bank, ADF = Asian Development Fund, ARD = Armenian Roads Directorate.

## ROAD SUBSECTOR ANALYSIS

### A. Road Network

1. The road network in Armenia was developed mostly in the 1960s–1970s. The country is reasonably well-connected with a coverage ratio of about 280 kilometers (km) of roads per 1,000 square km (km<sup>2</sup>). The network is 7,704 km long (1,686 km of interstate roads, 4,056 km of republic roads, and 1,962 km of local roads). Some 2,224 km of local roads were redesignated as republic roads in 2008 with 2,500 km remaining undesignated. Lengths by *marzes* (provinces) and function are given in Table A2.1.

**Table A2.1: Road Length by Marzes, 2008**

Marz	Length by Road Function (km)				Area km <sup>2</sup>	Road Density km/1,000 km <sup>2</sup>
	Interstate	Republic	Local	Total		
Aragatsotn	178.2	427.0	150.0	755.2	2,753	274
Ararat	103.6	294.3	238.1	636.0	2,096	303
Armavir	167.3	274.7	209.4	651.4	1,242	525
Gegharkunik	224.5	350.3	211.8	786.6	3,300	238
Lori	213.4	471.4	223.1	907.9	3,789	240
Kotayk	49.0	442.8	118.8	610.6	2,089	292
Shirak	112.9	469.9	283.4	866.2	2,681	323
Syunik	373.0	470.7	220.4	1,064.1	4,506	236
Vayots Dzor	113.3	394.3	116.2	723.8	2,308	314
Tavush	150.8	460.9	190.8	802.5	2,704	297
Total Above	1,686.0	4,056.3	1,962.0	7,704.3	27,468	280
Yerevan				725.0		
Gyumri				265.0		
Vanadzor				162.0		
Other towns				1,962.7		
<b>Total</b>				<b>10,818.8</b>		

Source: Decree of Government of Armenia dated 1 March 2008.

2. The road network is 78% paved, 19% gravel, and 3% earth. The interstate network is fully paved, and about 90% of republic roads (prior to 2008 additions) are paved. It is estimated that 15% of interstate and republic roads are in good condition, 75% in fair condition, and 10% in poor condition. Local roads and many roads redesignated as republic roads in 2008 are in poor condition. Road conditions vary among marzes, ranging from only 10% being in good condition in some (Tavush) to 90% in others (Ararat and Vayots Dzor). The average international roughness index (IRI) value for interstate roads is about 5.0. Lack of quality control during construction and ineffective maintenance since independence has resulted in rapid deterioration of pavements, prompting urgent rehabilitation and reconstruction. External assistance has helped Armenia rehabilitate interstate and local roads since 1995, but pavements that were not rehabilitated require reconstruction. Substantial investments, estimated at \$1.5 billion–\$2.0 billion, will be required to improve the road network to an acceptable level.

3. International road corridors in Armenia are standards and do not comply with the requirements of international agreements and conventions. For instance, Armenia is a

contracting party to the European Union (EU) Agreement on Traffic Arteries<sup>1</sup> that includes two roads in Armenia classified as "the international E-road network." These are routes E117 and E691 that form the north–south road corridor. The agreement stipulates conditions to which the selected roads should conform in terms of classification, geometric standards, road safety equipment, environment and landscaping, and maintenance.

## **B. Road Subsector Management**

4. Road sector management is the responsibility of the Ministry of Transport and Communication (MOTC). The work covers strategy, policy, planning, investment, regulation, asset management, evaluation and results reporting. The Armenia Roads Directorate (ARD), a noncommercial state organization, assists MOTC in managing the network, including designing and implementing projects financed by external aid agencies. In the case of government-financed road works, which are limited to rural and local roads, ARD is responsible for the feasibility studies and management of the construction and periodic maintenance works outsourced to private firms through competitive bidding. ARD also conducts safety audits, and monitors environmental and social compliance requirements. ARD maintains a road inventory and traffic database and uses the Highway Design and Maintenance Model (HDM-4) to prioritize its maintenance program.

5. While the institutional capacities of MOTC and ARD are improving over the years, they are still weak. The main gap is project management, evaluation and reporting. The ministry does not always have enough financial resources for maintenance and operations. Road asset management is below par, although improving. Besides organizational gaps, the ministry encounters difficulties to retain talented staff, especially for project management. With the planned investments of \$1 billion over the medium term, the workload will be increasing and this implies higher investments in human resources. The ministry needs an action plan to train more road engineers, economists and other road sector professionals. An HDM-4 needs to be expanded to introduce fully integrated pavement and bridge management systems. A comprehensive transport development strategy is in place, prepared with ADB assistance.<sup>2</sup> This has paved the way for a policy framework, road map and investment program. But the challenge is to raise finance and execute the investments. The strategy focuses first on the reconstruction of major road corridors, institutional effectiveness and people. Rural roads and improved urban transport systems are also part of the strategy.

## **C. Road Transport**

6. Road transport is largely privatized and is developing rapidly to meet the demand for higher service quality. There has been significant progress in private sector involvement in urban transport. The Government has removed most of the subsidies to public transport companies and privatized bus and taxi companies. The number of bus and minibus routes and the number of vehicles operating them are given in Table A2.2.

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<sup>1</sup> United Nations. 1975. *European Agreement on Main International Traffic Arteries*. Washington, DC.

<sup>2</sup> ADB. 2007. *Technical Assistance to Armenia for Transport Sector Strategy* (TA 4973-ARM, approved on 28 September).

**Table A2.2: Bus and Minibus Operations**

Service	Bus		Minibus		Total	
	Routes	Vehicles	Routes	Vehicles	Routes	Vehicles
Inter-Marz	87	259	126	749	213	1,008
Intra-Marz	235	446	119	338	354	784
City	50	337	184	3,633	234	3,970
Total Domestic	372	1,042	429	4,721	801	5,762
International		26	–	71	20	97

Source: Ministry of Transport and Communication of Armenia.

7. Cross-border traffic has been increasing. It uses three main crossings: two with Georgia (Bagratashen and Bavra) in the north, and one with Iran (Mehri) in the south. Trucks entering from Georgia come primarily from the Russian Federation, other Commonwealth of Independent States countries, Europe, and Turkey. The average number of trucks entering Armenia daily in 2007 was 84 from Iran and 114 from Georgia. In 2008, an average of 59 trucks per day entered from Georgia as transit traffic—47% from the port of Poti, 6% from the port of Batumi, and 40% from Sarpi (Georgia–Turkey border). By comparison, only eight loaded trucks per day transited from Armenia through Georgia. Turkish trucks on the Transports Internationaux Routiers system enter Armenia through Georgia.

#### D. Vehicle Fleet

8. The vehicle registrations show that cars constitute 80% of the fleet (Table A2.3). There is little variation in car ownership levels between marzes, ranging from 45 vehicles per 1,000 people in Gegharkunik to 79 in Vayots Dzor. Yerevan is an exception, with 120 vehicles per 1,000 people, a reflection of higher incomes. The average age of the fleet is 12 years.

**Table A2.3: Vehicle Fleet (2007)**

Marz	Cars	Buses	Trucks			Total	% of Total	Cars /'000
			Light	Medium	Heavy			
Yerevan	132,668	8,458	9,641	8,326	412	159,505	48.4	120
Aragatsotn	8,478	395	663	1,800	62	11,398	3.5	61
Ararat	16,726	746	1,526	2,555	601	22,154	6.7	61
Armavir	21,981	720	1,327	2,039	100	26,167	7.9	78
Gegharkunik	10,869	492	1,282	3,005	59	15,707	4.8	45
Lori	15,244	926	863	3,135	354	20,522	6.2	54
Kotayk	16,852	1,479	1,648	3,707	197	23,883	7.2	61
Shirak	16,538	867	786	2,924	421	21,536	6.5	59
Syunik	8,165	373	599	3,037	73	12,247	3.7	53
Vayots Dzor	4,400	129	370	1,113	71	6,083	1.8	79
Tavush	7,319	345	752	2,209	28	10,653	3.2	55
(Non-Yerevan)	(126,572)	(6,472)	(9,816)	(25,524)	(1,966)	(179,350)	(51.6)	(59)
Total	259,240	14,930	19,457	33,850	2,378	329,855	100.0	80
<b>% of Total</b>	<b>79</b>	<b>4</b>	<b>6</b>	<b>10</b>	<b>1</b>	<b>100</b>		

Source: Police of Armenia.

## E. Traffic Growth

9. Automatic traffic counters are available on six international "M" routes. Annual recorded traffic volumes for 2005–2007 are given in Table A2.4. Figures for 2005–2006 show a 32% growth in truck traffic, a 7% growth in light vehicle traffic, and overall growth of 12%. In 2006–2007 truck traffic grew by 37%, light vehicle traffic fell by 1%, and total traffic increased by 7%.

10. Classified traffic counts were conducted by the Millennium Challenge Corporation in 2006. The expansion factor 1.06 was derived to convert 12-hour counts to 24-hour counts. Expansion factors to annual average daily traffic were based on the primary function of each link: (i) serving summer residences, a factor of 1.5; (ii) serving areas of recreation/leisure interest, a factor of 2.0; (iii) serving primary tourist/cultural interest areas, a factor of 1.5; and (iv) others, a factor of 1.25. Seasonal adjustment factors were derived from quarterly traffic counts.

**Table A2.4: Traffic Volume on M-Routes, 2005–2007**

Location of Counter	Light Vehicles	Trucks	Truck Trailers	Total
M1 Yerevan–Gyumri–Georgia border, 20+700 meters (m)	8,316	1,351	71	9,738
M2 Yerevan–Meghri–Iran border, 9+380 m	17,032	4,963	630	22,625
M2 Yerevan–Meghri–Iran border, 200+320 m	560	185	15	760
M2 Yerevan–Meghri–Iran border, 367+250 m	340	271	59	670
M3 Margara–Vanadzor–Georgia border, 125+830 m	1,900	290	20	2,210
M3 Margara–Vanadzor–Georgia border, 135+160 m	569	282	10	861
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 80+300 m	1,338	104	13	1,455
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 10+320 m	15,110	4,288	86	19,484
M5 Yerevan–Armavir–Ijevan–Turkish border, 9+400 m	17,572	1,425	49	19,046
M6 Vanadzor–Alaverdi–Georgia border, 59+050 m	532	141	48	721
<b>Total 2005</b>	<b>63,269</b>	<b>13,300</b>	<b>1,001</b>	<b>77,570</b>
M1 Yerevan–Gyumri–Georgia border, 20+700 m	8,813	1,428	82	10,323
M2 Yerevan–Meghri–Iran border, 9+380 m	17,586	5,389	624	23,599
M2 Yerevan–Meghri–Iran border, 200+320 m	726	238	38	1,002
M2 Yerevan–Meghri–Iran border, 367+250 m	400	325	79	804
M3 Margara–Vanadzor–Georgia border, 125+830 m	2,251	985	112	3,348
M3 Margara–Vanadzor–Georgia border, 135+160 m	487	877	53	1,417
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 80+300 m	2,126	144	31	2,301
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 10+320 m	17,933	4,833	111	22,877
M5 Yerevan–Armavir–Ijevan–Turkish border, 9+400 m	16,946	2,829	40	19,815
M6 Vanadzor–Alaverdi–Georgia border, 59+050 m	702	571	92	1,365
<b>Total 2006</b>	<b>67,970</b>	<b>17,619</b>	<b>1,262</b>	<b>86,851</b>
M1 Yerevan–Gyumri–Georgia border, 20+700 m	6,195	3,441	317	9,953
M2 Yerevan–Meghri–Iran border, 9+380 m	18,352	5,673	526	24,551
M2 Yerevan–Meghri–Iran border, 367+250 m	495	221	124	840
M3 Margara–Vanadzor–Georgia border, 125+830 m	2,372	1,578	245	4,195
M3 Margara–Vanadzor–Georgia border, 135+160 m	903	416	62	1,381
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 80+300 m	825	103	33	961
M4 Yerevan–Sevan–Ijevan–Azerbaijan border, 10+320 m	17,605	6,853	928	25,386
M5 Yerevan–Armavir–Ijevan–Turkish border, 9+400 m	18,863	3,477	862	23,202
M6 Vanadzor–Alaverdi–Georgia border, 59+050 m	670	504	123	1,297
<b>Total 2007</b>	<b>66,280</b>	<b>22,266</b>	<b>3,220</b>	<b>91,766</b>

Source: Ministry of Transport and Communication of Armenia.

11. The Millennium Challenge Corporation study used gross domestic product (GDP) per capita and income elasticity of demand to forecast growth in car ownership, which was taken as a proxy for traffic growth for all vehicles types, cars being the dominant vehicle. An elasticity of 1.1–1.2 was assumed. The forecasts for GDP per capita and traffic growth are given in Table A2.5. Car ownership of 80 per 1,000 population would increase to 344 by 2026. ARD assumes an annual traffic growth rate of 4% for its economic analysis.

**Table A2.5: Traffic Growth Forecast**

Item	2006–2010	2010–2015	2015–2026	Index 2026 2006=100
A. Annual GDP per Capita Growth (%)				
Low	7.0	6.0	4.0	
Central	9.0	7.0	5.0	338
High	10.0	8.0	6.0	
B. Annual Traffic Volume Growth (%)				
Low	7.7	6.6	4.4	
Central	10.8	8.4	6.0	430
High	12.0	9.6	7.2	
ARD	–	4.0	4.0	223
ADB Rural Roads PPTA	6.0	6.0	6.0	320

ADB = Asian Development Bank, ARD = Armenian Roads Directorate, GDP = gross domestic product, PPTA = project preparatory technical assistance.

Source: Millennium Challenge Corporation feasibility study of lifeline road network. 2007.

## F. Road Sector Financing and Maintenance

12. Road maintenance has been a problem for most of the past decade, inadequate financing being a key contributor to it. This has cut the quality and value of road assets. But the situation is being reversed with a 25% annual increase in budgetary allocations for rehabilitation, repairs and winter maintenance. The allocation is now equivalent to \$66 million a year—\$5,600/km—quite close to international standards. The challenge will be to maintain this level of funding. The cost of overlay programs alone ranges from \$20 million to \$46 million. The application of a "user-pays" approaches and the introduction of a transparent and autonomous road fund are being considered as additional measures to reinforce maintenance. The road sector policy framework and road map calls for incorporating these measures. MOTC expenditures on roads for 2006–2007, the budget allocation for 2008, and expenditure planned under the Medium-Term Expenditure Framework 2009–2011 are given in Table A2.6. A major increase in budget allocation for capital repairs is included up to 2011.

**Table A2.6: MOTC Road Budget 2006–2011**  
(AMD billion)

Item	2006	2007	2008	2009 <sup>a</sup>	2010 <sup>a</sup>	2011 <sup>a</sup>
Capital repair of roads	11.93	13.60	12.66	15.97	17.95	19.95
Operation and maintenance	5.02	5.99	6.19	6.90	7.36	7.36
Capital repair of structures	0.55	0.45	1.10	0.50	0.50	0.50
Total AMD billion	17.50	20.04	19.95	23.37	25.81	27.81
Total \$ million	42.07	56.12	66.06	77.38	85.46	92.09

<sup>a</sup> Medium-Term Expenditure Framework 2009–2011.

Source: Ministry of Transport and Communication of Armenia.

13. For the first time, MOTC adopted a 3-year maintenance program for 2006–2008 in 2005 (Decision No. 2412-N, *Endorsement of 3-Year Development and Annual Work Plan for State*

Roads, 29 December 2005). MOTC also introduced performance-based maintenance contracts on the main and secondary roads in 2006–2008. A second round of 3-year routine maintenance contracts started in 2008, with 34 contracts under ARD's supervision. These cover 2,892 km, with winter maintenance of 3,127 km.

14. Funding for local roads was transferred to the responsibility of MOTC under the 10 decree on 10 January 2008. Some 2,277 km was transferred with most of the length redesignated as republic road, but without additional budgetary funding for maintenance and upgrading. The 2007 budget allocated an average of \$5,600/km for routine maintenance. About \$12 million is needed for routine maintenance of the transferred roads.

15. The cost of an overlay program (30 millimeters [mm] to 50 mm) ranges from \$20 million to \$36 million a year, depending on its scope (Table A2.7). The funding of this program needs to be sought with consideration given to introducing a road fund. For a sustainable, transparent, and accountable road fund, management by an autonomous committee or board, consisting of government representatives, road administration, road users, etc., is advisable.

**Table A2.7: Periodic Road Maintenance Program**

Option	Overlay Length (km over 10 years)	Cost/sq m (\$)	Annual Cost (\$ million)
I	30% of Interstate (1,686*0.3=500)	30	500,000m*8m*30/10=12.0
	15% of Republic (4,056*0.15 =600)	20	600,000m*7m*20/10= 8.4
II	30% of Interstate (1,686*0.3=500)	30	500,000m*8m*30/10=12.0
	30% of Republic (4,056*0.3=1,200)	20	1,200,000*7*20/10=16.8
III	30% of Interstate (1,686*0.3=500)	30	500,000m*8m*30/10=12.0
	30% of Republic (4,056*0.3=1,200)	20	1,200,000*7*20/10=16.8
	30% of Local (1,962*0.3=600)	20	600,000*6*20/10=7.2

Source: Project preparatory technical assistance estimates.

16. Recommended measures to improve road maintenance include (i) introducing a periodic road maintenance program and allocating sufficient funds, possibly through introducing a dedicated road fund; (ii) implementing computerized road asset management and programming tools built on databases of road inventory, condition, contract documents, unit prices of work items, and available funds; (iii) developing road maintenance manuals; (iv) extending performance-based road maintenance to fully cover the road network; and (v) controlling vehicle overloading.

## G. Road Safety

17. The road safety situation in Armenia is serious and deteriorating. The number of accidents almost doubled from 1,025 in 2003 to 1,943 in 2007, and fatalities rose from 252 in 2003 to 371 in 2007 (Table A2.8). The fatality rate per 10,000 vehicles is eight times as high as in European countries. Of particular concern is the large number of pedestrian fatalities.

**Table A2.8: Road Accidents, 2001–2007**

Item	2001	2002	2003	2004	2005	2006	2007
Number of accidents	1,021	1,002	1,025	1,164	1,312	1,574	1,943
Deaths	237	235	252	259	310	332	371
Injuries	1,258	1,213	1,294	1,492	1,774	2,089	2,720

Source: 2007. *Statistical Yearbook of Armenia*. Yerevan: National Statistical Service of the Republic of Armenia.

18. The National Road Safety Council (NRSC), established in 2005 as a nongovernment organization (NGO), sponsored a number of campaigns, including *Think Before You Drive* in 2006, and drove the initiative for a mandatory seat belt law in 2007. Other activities to address road safety included (i) establishing permanent stakeholder working groups that included traffic police and nongovernment organizations, (ii) launching school visits and campaign programs, and (iii) launching a road safety program to identify accident black spots. The NRSC notes that traffic accident rates are underreported. For instance, accidents involving uninsured vehicles are not reported to police, and fatalities are reported only within 7 days of an accident occurrence, compared with the international norm of reporting within 30 days. Self-financing of traffic police has led to an improvement in enforcement, in particular concerning wearing of seat belts and drink driving.

19. Road safety workshops held in September–October 2008 highlighted the need for a \$10 million program for 2009–2013 targeting a 10% reduction in fatalities (saving around 50 lives annually). It also emphasized the need for a road safety board chaired by the prime minister to which a permanent secretariat would report. The secretariat (expected to be within ARD) would monitor working groups for data management, safety engineering, and vulnerable road users. A draft action plan was prepared that includes measures on seat belt enforcement (\$2.0 million), speed management (\$2.0 million), drink driving (\$2.0 million), and vulnerable road users (\$1.5 million).

20. Some of the low-cost road safety measures can be implemented on a priority basis (i) improving road signage and marking, (ii) posting and enforcing reasonable speed limits, (iii) upgrading U-turn facilities to make them safer and eliminate abusive use of the median strip on dual-carriageway roads, and (iv) improving some of the long uninterrupted descents.

## **H. Construction industry**

21. The construction industry in Armenia is fragmented and weak, but is gradually building capacity through donor-funded roads projects. After independence, there were large road construction companies that were well equipped with plant and machinery. The plant and equipment is on average 20 years old and operating inefficiently. The limited market for road construction works has discouraged contractors from investing in new equipment. Replacement of plant and equipment requires contractors to borrow money, depreciate the new fleet, and adjust their unit prices. Hence, there are no national contractors who have the resources to manage large contracts. International contractors have not worked in Armenia and alliances with international groups have not been tried. In addition, bitumen and prefabricated concrete elements for road construction are imported, posing additional challenges to the road construction industry. Cement for construction, however, is abundant in Armenia and is exported around the region.

## I. Design, Construction, and Pricing Standards

22. Road design, construction, and pricing standards for civil works are outdated and do not comply with international best practice and standards. Inherited from former Soviet Union standards, these are not based on economic efficiency, and unit prices are derived from price schedules of the 1970s–1980s with almost no competition-driven costs.<sup>3</sup> Geometric designs are based on the technical classification of roads (categories I–V) without due regard to their functions. Construction specifications are not benchmarked or adjusted to modern road construction equipment. These factors, along with inefficient and outdated construction equipment employed by the national contractors and imported construction materials, have contributed to high construction costs.

23. Geometric highway design standards are given in Table A2.9. The axle-load limit on interstate roads is 11.5 tons and on all other roads it is 10.0 tons. Construction specifications are a mixture of former Soviet Union and American standards.

**Table A2.9: Highway Design Standard (m)**

Class Class by Status	I	II	III	IV
	Republic			
	Interstate		Local	
Right of way including drainage	26.4	13.2–13.8	10.8–11.4	9.0–9.6
Design speed (km/h)	<120	<100	<90	<80
-Moderately mountainous terrain	<100	<90	<80	<70
-Mountainous terrain	<80	<60	<50	<40
Carriageway width	2 x 7.2	6.6	4.8	3.6
Surface type		Asphalt concrete		Gravel or earth
Shoulder width	3.6	3.3	2.4	1.8
Width of storm water drainage ditches	1.6	1.6	1.6	1.6

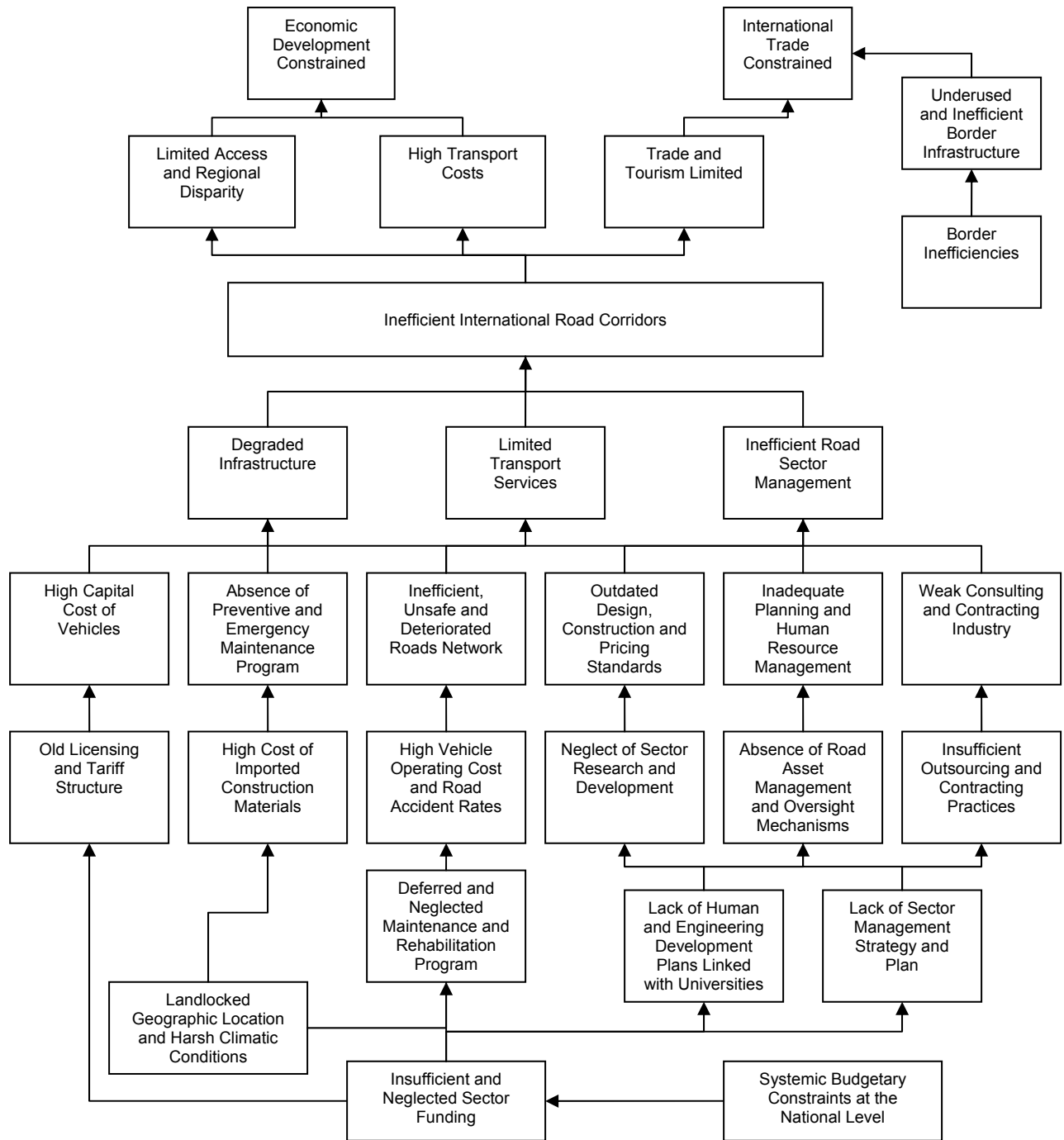
m = meter, km/h = kilometer per hour.

Note: This standard (IV-11.05.02-99) replaces former Soviet Union norms that distinguished five road classes.

Source: Ministry of Transport and Communication of Armenia.

<sup>3</sup> Price schedules are converted to current prices on the basis of the arbitrary conversion factors issued by the Ministry of Urban Development. The local contractors' prices are evaluated against these price schedules.

**Figure A2: Problem Tree**



## ROAD SUBSECTOR ROAD MAP AND INVESTMENT PLAN

### A. Sector Challenges

1. Armenia has experienced turbulent conditions since independence. This affected the roads subsector, which experiences the pressure and constraints associated with moving from central planning to market orientation. Within this context the subsector faces development challenges, both physical and nonphysical. The physical challenges are (i) the degraded state and substandard technical condition of the road network, especially subregional corridors; and (ii) underused and dilapidated infrastructure at the international borders. The nonphysical challenges are (i) limited institutional capacity to deliver the roads development program, (ii) insufficient road maintenance funding, (iii) lack of human resources and action plan to develop such resources, (iv) a weak construction industry and outdated design and construction standards, and (v) a deteriorating road safety record.

### B. Strategic Context

#### 1. Physical Infrastructure

2. The road network is deteriorated and extremely variable in quality. Before 2003, investment in roads and maintenance was negligible. It has increased somewhat since then, but significant parts of the road network remain in a poor state. In 2008, about 4% of the interstate roads and 30% of republic roads were reported to be in a poor state of repair.

3. The North–South Road Corridor Investment Program aims to promote regional trade through investment in road and border infrastructure, and this will require substantial investment. The Government's medium-term investment plan up to 2017 is estimated at about \$1.45 billion (Table A3.1).

#### 2. Nonphysical Infrastructure

4. Institutional capacities of the Ministry of Transport and Communications (MOTC) and the Armenian Roads Directorate (ARD) are gradually increasing. However, there are institutional, technical, financial, and operational constraints that need urgent attention and action. The constraints are (i) inadequacy of financing for road maintenance and operations; (ii) absence of adequate planning and human resource training integrated with university programs and curricula; (iii) lack of a competitive and efficient construction industry; (iv) lack of competitive consulting engineers; (v) inadequate and outdated design, construction, and pricing standards; and (vi) absence of road asset management and monitoring mechanisms. A strategy to solve these issues was prepared under Asian Development Bank (ADB)-financed technical assistance.<sup>1</sup> The Investment Plan will help implement the road subsector plan under the Transport Sector Strategy.

5. Shortage of financing for the road subsector reduces the sustainability of the assets being rehabilitated and/or reconstructed. The cost of a bitumen overlay program ranges from \$20 million to \$46 million. This program is heavily underfunded and new sources of funding need to be found. Stable and secure funding is required, including application of a "user-pays" approaches and the introduction of a transparent and autonomous road fund.

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<sup>1</sup> ADB. 2007. *Technical Assistance to Armenia for Transport Sector Development Strategy*. Manila (TA 4973-ARM) (attached to ADB. 2007. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Armenia for the Rural Road Sector Project*. Manila [Loan 2351-ARM]).

6. MOTC and ARD lack adequate management and technical skills, systems, and procedures. Retaining talented staff is a challenge and there are no programs that link industry with the engineering universities to supply needed human resources for the road subsector. With the planned investments of over \$1 billion in the medium term, the workload will increase, particularly as the entire road network undergoes improvement. This should prompt investments in developing human resources and an action plan to train road engineers, economists, and other related professionals to international standards.

7. The construction industry in Armenia is fragmented and weak but gradually is building capacity through donor-funded roads and highways programs. However, there are no national contractors with the resources to undertake large contracts. International contractors have not worked in Armenia and alliances with international groups have not been tried. The contractors' equipment and technologies are outdated and inefficient. In addition, bitumen and prefabricated concrete elements for road construction are imported, posing additional challenges to the road construction industry. Cement for construction, however, is abundant in Armenia and is exported around the region.

8. Design, construction, and pricing standards for civil works in Armenia are outdated and do not comply with international best practices and standards. Inherited from former Soviet Union standards, they are not based on economy and efficiency, and unit prices are derived from price schedules of the 1970s–1980s with no competition-driven costs. The geometric designs are based on the technical classification of roads (categories I–V) without due regard to function (trunk road or rural road), and construction specifications are not adjusted to modern road construction equipment. All of these factors, together with inefficient and outdated construction equipment employed by local contractors, contribute to high construction costs.

9. Road asset management needs to be introduced to capitalize on the intensifying road improvement program in Armenia. ARD maintains a road inventory and traffic database. The Highway Design and Maintenance Model (HDM-4) is used to prioritize the maintenance program. This platform will need to be expanded to introduce fully integrated pavement and bridge management systems.

### **C. Policy Framework**

10. The Government's short- to medium-term policy priorities in the road subsector are to (i) define and implement a roads development strategy; (ii) mobilize needed financial, technical, and human resources to support the implementation of the strategy; (iii) strengthen policy making and planning roles of institutions; (iv) develop capacities of road subsector institutions for efficient road management; (v) improve the worsening road safety situation; (vi) establish a legal and regulatory framework for the private sector to participate in road network development, financing, maintenance, and operation, and (vii) introduce revenue generating mechanisms. The sector road map was developed in line with this policy framework.

### **D. Investment Plan and Sector Road Map**

11. A medium-term road subsector investment plan for 2010–2017 was prepared based on the *Armenia Transport Sector Development Strategy 2020*. Priority investments were identified to improve the interstate and rural road network during 2010–2017 at an estimated cost of \$1.45 billion. The investment components of the plan will construct, upgrade, and rehabilitate approximately 1,460 kilometers (km) of roads, comprising 620 km of subregional road corridors

and 840 km of rural roads. The noninvestment component will focus on priority reforms, including the development of regulations and operational procedures; encouragement of private sector participation in construction and maintenance; and capacity building for planning, monitoring, evaluation, and reporting. Most of this will be financed from external aid agencies along with Government budgets. The Investment Program will improve the north–south road corridor and help the Government implement the road subsector plan. The Government is seeking other external assistance to implement its investment plan, with the European Bank for Reconstruction and Development, European Investment Bank, Japan International Cooperation Agency, and World Bank as the main sources. The indicative investment plan is shown in Table A3.1 and the road subsector road map is in Table A3.2.

**Table A3.1: Indicative Investment Plan, 2010–2017**

Road and Section	Length (km)	Cost (\$ million)	Financing	Status	Completion
<b>A. North–South Corridor M-1</b>					
Bavra–Gyumri N.	38	50	ADB	FS	2016
Gyumri Bypass	20	62	ADB	FS	2015
Gyumri–Mastara	40	104	ADB	FS	2014
Mastara–Ashtarak	48	138	ADB	FS	2014
Ashtarak–Yerevan	18	43	ADB	Loan	2013
<b>Total</b>	<b>164</b>	<b>397</b>			
<b>B. North–South Corridor M-2</b>					
Yerevan–Yeraskh <sup>a</sup>	50	6	ADB	FS	2014
Yeraskh–Goris <sup>a</sup>	173	52	ADB/WB	FS	2013
Goris–Kapan Alternative Route	75	290	ADB	FS	2011
Kapan–Iran Border	83	40	ADB	FS	2016
<b>Total</b>	<b>381</b>	<b>388</b>			
<b>C. M-3: Georgia–Vanadzor–Turkey</b>					
Spitak–Ashtarak	22	50	WB	Loan	2013
<b>D. M-6 Vanadzor–Alaverdi–Georgia</b>					
Vanadzor–Alaverdi	45	49	WB	Loan	2013
Alaverdi–Georgia	8	9	WB	Loan	2013
<b>Total Interstate Roads</b>	<b>620</b>	<b>893</b>			
<b>E. Rural Roads Program</b>					
Rural Roads Sector Project	227	66	ADB	In progress	2010
Lifeline Roads 2009	100	25	WB	In progress	2011
Rural Roads 2009	140	36	WB	Loan 2009	2011
Rural Roads Project	100	120	JICA	Review	2015
Government	273	54	Budget	Review	2013
<b>Total</b>	<b>840</b>	<b>301</b>			
<b>Taxes and Duties</b>		<b>239</b>			
<b>Total Investments plus Government taxes</b>		<b>1,433</b>			

Road and Section	Length (km)	Cost (\$ million)	Financing	Status	Completion
1. Implementation of Road Subsector Plan		10	ADB		
2. Implementation of Road Safety Strategy		10	Government		
<b>Total Noninvestment Components</b>		<b>20</b>			
<b>Total</b>		<b>1,453</b>			

ADB = Asian Development Bank, FS = feasibility study, JICA = Japan Agency for International Cooperation, WB = World Bank.

<sup>a</sup> With alternative alignment options.

Source: Ministry of Transport and Communication of Armenia and project preparatory technical assistance estimates.

**Table A3.2: Road Subsector Road Map, 2010–2017**

Objective	Impact	Performance Target	Measurement	Responsible Party
Road network development	An efficient, safe, and affordable network meeting the needs of Armenia and the subregion	Road subsector strategy for roads endorsed in 2010 and set for implementation	MOTC data, measurements of travel time and road condition	All concerned government agencies
		620 km interstate roads and 1,200 km rural roads improved by 2017	Statistics from NRSC and Traffic Police	MOF/MOE for budget allocation
		Interstate roads built to 100 km/hr operating speed		MOTC/ARD for implementation and compliance with social, environmental and road safety requirements
		Average road roughness on rural roads brought to below 5 m/km IRI		
		Road accident fatality rates reduced 10% annually		
		Road safety audit incorporated in all main road improvement works by 2017		
		Road projects comply with accepted environmental safeguards and impact mitigation requirements		
		Road projects comply with accepted social safeguards and impact mitigation requirements		
Road improvement and sustainable maintenance	Extended life of investments and road network	Average condition of roads rated "good" surpass 80% by 2017	Road condition surveys	MOF/MOE MOTC/ARD
		Average condition of roads rated "poor" brought to less than 10% by 2017	MOTC statistics and contracts	
		Performance-based maintenance contracts	MOF and other government statistics	

Objective	Impact	Performance Target	Measurement	Responsible Party
		extended to all road maintenance activities		
		Budget for routine maintenance kept at \$5,000-7,000 per km for interstate roads adjusted for inflation		
		Budget of \$10 million for annual periodic of road maintenance activities achieved		
		Revenue generating mechanisms through tolling and/or shadow tolling introduced by 2017		
Improve road subsector planning and management	An efficient planning and management capacity of road subsector agencies	Economic appraisal and planning unit established under MOTC/ARD and staff trained by 2010	MOTC/ARD reports Other government agency reports	MOTC/ARD/ National Road Safety Council
		Social and environmental compliance unit established under MOTC/ARD and trained by 2010		
		National road subsector human resource strategy and action plan adopted and programs with universities launched by 2012		
		New national road design and construction standards introduced by 2014		
		Automated traffic monitoring, safety monitoring and axle weight control system introduced by 2014		
		Road asset management system introduced and fully implemented by 2015		
		National Road Safety Strategy implemented fully by 2015		
		Advanced financial management systems and methodologies introduced and staff trained by 2015		

ARD = Armenian Roads Directorate, IRI = international roughness index, m/km = meter per kilometer, MOE = Ministry of Economy, MOF = Ministry of Financing, MOTC = Ministry of Transport and Communication, km = kilometer.

Source: Ministry of Transport and Communication of Armenia and project preparatory technical assistance recommendations.

## EXTERNAL ASSISTANCE TO THE ROAD SUBSECTOR

Loan/TA/ Project Number	Project Name	Amount (\$ million)	Date Approved
<b>A. Asian Development Bank</b>			
Loan 2351	Rural Road Sector Project (220 km)	30.60	Sep 2007
Loan 2467	Supplementary Loan for Rural Road Sector Project	17.32	Oct 2008
	<b>Total</b>	<b>47.92</b>	
TA 4973	Transport Sector Development Strategy	0.60	Sep 2007
TA 7208	Preparing North–South Road Corridor Development	1.00	Dec 2008
	<b>Total</b>	<b>1.60</b>	
<b>B. Lincy Foundation</b>			
Grant	Rehabilitation of highways and secondary roads (435 km)	73.40	2001
Grant	Rehabilitation of city streets (22.3 km)	13.50	2003
Grant	Rehabilitation of secondary roads (87.4 km)	16.00	2004
Grant	Rehabilitation of city streets (7.5 km)	20.90	2004
	<b>Total</b>	<b>123.80</b>	
<b>C. Millennium Challenge Corporation</b>			
Grant	Lifeline Road Network Program	<b>6.80</b>	Sep 2006
<b>D. World Bank</b>			
Loan	Highway Project	36.90	1995
Loan	Transport Project (227 km)	28.40	Jun 2000
Loan	Lifeline Road Network Program (120 km)	25.00	2009
	<b>Total</b>	<b>90.30</b>	
<b>E. Japan International Cooperation Agency</b>			
Grant	Road Construction Equipment	<b>5.00</b>	
Grant/Loan	Lifeline Road Network Program	<b>50.00</b>	
	<b>Total</b>	<b>55.00</b>	
	<b>Total External Assistance</b>	<b>325.42</b>	

TA = technical assistance.

Source: Ministry of Transport and Communication of Armenia.

## PRELIMINARY ROAD DESIGN SUMMARY

1. **Project Road.** The Agarak–Kapan–Yerevan–Bavra route (M1 and M2 roads), crossing Armenia from south to north, is further connected to the east–west highway of Georgia that leads to Poti and Batumi on the Black Sea. It is part of the Asian Highway (AH 82) and the "international E-road network" designated as E117 and E691 roads.

2. **Tranche 1 Project: Yerevan–Ashtarak and Yerevan–Ararat Road Improvement.** The proposed Tranche 1 Project will reconstruct the existing 18.4 kilometer (km) of the existing dual-carriageway and four-lane road, including the intersections between Yerevan and Ashtarak to internationally acceptable standards, and improve traffic safety measures between Yerevan and Ararat (about 38 km). The road works will be confined to the existing right-of-way and be constructed in sections, one side of the four-lane carriageway at a time to enable continued use of the existing road during construction. There will be no changes to vertical or horizontal alignments. The works are comprised of:

### A. Yerevan–Ashtarak Road Improvement

- (i) reconstruct the road bed and pavement structure including surface pavement;
- (ii) reconstruct the road shoulders and road drainage system, including cross drainage and side ditches;
- (iii) improve traffic safety measures including traffic signs, direction signs, traffic delineators, guardrails, traffic markings, waiting lanes, and interchanges;
- (iv) install speed warning and traffic monitoring equipment;
- (v) improve road lighting at key locations and major interchanges;
- (vi) repair road structures including bridges, overpasses, underpasses, and cutting and/or embankment slopes; and
- (vii) landscaping.

### B. Yerevan–Ararat Road Safety Improvement

- (i) improve traffic safety measures including traffic signs, direction signs, traffic delineators, guardrails, traffic markings, and waiting lanes; and
- (ii) install speed warning and traffic monitoring equipment.

3. **Existing Project Road Conditions.** The existing 18.4 km Yerevan–Ashtarak road (Km 11.8 to Km 30.2) is four-lane divided highway originally built in the 1970s with extensions in the mid-1980s; partial pavement rehabilitation was done between 1990 and 2004. The original construction quality was substandard; pavement service life has expired and the surface is deteriorating rapidly. Hence, reconstruction of pavement layers and subgrade is needed to meet the design and construction standards associated with international transit routes. The road is not adequately drained; the shoulders in some parts are narrow and not properly paved. There are 15 existing structures that provide crossing and/or grade separation to the traffic, pedestrians, and wildlife. Some substructures have been exposed without proper slope protection, and some superstructure has been covered with inadequate pavement, which needs rehabilitation to ensure structural integrity.

4. The existing 38 km Yerevan–Ararat road (Km 9.6 to Km 47.2) is four-lane divided highway built in the mid-1970s and rehabilitated substantially in 2002–2003. It is in relatively good condition and the wide median allows for future expansion to six lanes.

5. Both road sections are located in arid areas. The landscape along the Yerevan–Astharak road is gently rolling uplands, and is flat along the Yerevan–Ararat road. There are no unique areas, no protected areas, and no forests or ecological reserves, but there are two known archeological sites along the Yerevan–Astharak road. There may be undiscovered archaeological remains or artifacts below ground.

6. The core samples taken from the selected locations indicate that the thickness of the existing asphalt concrete varies between 10 centimeters (cm) and 18 cm built on 12–18 cm of base and sub-base material. The subgrade material appears to be unsuitable soil, and includes boulders. Hence, findings of the preliminary design indicate that pavement layers and subgrade need to be replaced with properly engineered materials. Detailed calculations will be carried out at the detailed design stage to design pavement type, layer thicknesses, and subgrade strength required to sustain the projected cumulative axle loads over the life of the pavement.

7. **Geometric Design Standards.** The project road will be classified as a category 1 road. Geometric design parameters shown in Table A5 will be adopted for the detailed design. They follow the Construction Norms of Republic of Armenia IV11.05.02—99 with some adjustments made to take into account the E-road standards (refer to United Nations document on European Agreement on Main International Traffic Arteries, 2008).<sup>1</sup>

**Table A5: Adopted Geometric Design Standard – Category 1**

No.	Main Parameter	Unit	Flat	Rolling
1.	Design speed	km/h	120	100
2.	Number of lanes	no.	4/2	4/2
3.	Traffic lane width	M	3.75	3.75
4.	Outer shoulder width	M	3.25	3.25
5.	Inner shoulder width	M	1.5	1.5
6.	Maximum longitudinal gradient	%	4	5
7.	Median to be applied over 4-lane	M	2	2
8.	Minimum horizontal curvature	M	670	425
9.	Superelevation at minimum horizontal curvature	%	6	6
10.	Minimum radii of vertical curves: crest	M	12,500	8,000
11.	Minimum radii of vertical curves: sag	M	6,000	4,500
12.	Cross fall of carriageway	%	2	2
13.	Cross fall of shoulder	%	4	4

m = meter, km/h = kilometer per hour, no. = number.

Source: Ministry of Transport and Communication.

8. **Pavement Improvements.** The preliminary pavement design consists of 50 millimeters (mm) of fine-grained asphalt concrete as a surface course (wearing course), 70 mm of coarse-grained asphalt concrete as a binder course, 80 mm of aggregate mix with bitumen and 350 mm of crushed stone aggregate as a base course (road base), and 150 mm of gravel-sand as a sub-base. Armenia has abundant deposits of cement for construction of cement concrete roads. However, roads have traditionally been built with asphalt concrete. A detailed study will be undertaken during the detailed design by the international pavement specialist, and will include (i) a comparative analysis of asphalt concrete and cement concrete pavements to arrive at the best option, (ii) detailed pavement calculations and design for the preferred pavement option, and (iii) detailed construction specifications for the preferred pavement option. The analysis of best option will be based on projected cumulative equivalent standard axle loads, state-of-the-art construction standards and equipment application, the availability of domestic materials,

<sup>1</sup> <http://www.unece.org/trans/conventn/legalinst.html>.

durability of the pavement, ease of maintenance, environmental concerns (comparing emissions produced for production of materials and construction), risks associated with construction such as expertise and quality control, construction cost, and projected total cost of the pavement throughout its design life.

9. **Road Safety Improvement.** Road safety provisions on both roads are inadequate and do not comply with international standards. There are randomly located U-turn facilities; signage, road markings, and lighting are absent or inadequate; there are insufficient crash barriers and median separation barriers; and traffic flows at some interchanges are unsafe. The median separation is misused by local traffic and this poses a large safety hazard. The proposed improvements are summarized in para. 2.

10. **Material, Equipment, and Labor.** Construction materials, such as embankment soil, aggregate, gravel, and sand, are locally available. A detailed material source study and analysis will be carried out during the detail design or prior to the construction works. Other materials such as bitumen, steel, high-strength cement, mechanical/electrical material and equipment, and spare parts will be imported. Dismantled asphalt pavement materials can be used for the road bed or as recycled asphalt pavement material, if the material can be treated satisfactorily and the quality maintained successfully in the required tests prior to construction. Most skilled and all unskilled labor is available in Armenia for road construction.

## SELECTION CRITERIA AND APPROVAL PROCESS FOR PROJECTS

1. The Asian Development Bank (ADB) will only finance projects and/or subprojects that (i) are part of the Investment Program and the Investment Plan 2009–2017 adopted by Armenia as described in Schedule 1 of the Framework Financing Agreement (FFA), (ii) adhere to the implementation arrangements set forth in Schedule 3 of the FFA, (iii) fully comply with the social dimensions and safeguard frameworks in Schedule 5 of the FFA, and (iv) meet the eligibility requirements set forth in this appendix.

### A. Selection Criteria

2. To be financed under the multitranche financing facility (MFF), each proposed project or subproject shall

- (i) construct, upgrade, or rehabilitate roads of high development priority, assessed from their contribution to implementation of the Investment Plan 2009–2017 and to achieving the objectives of the road subsector road map;
- (ii) be in line with the approved feasibility assessment meeting the engineering, financial, economic, environmental, and social requirements of Armenia and ADB;
- (iii) have detailed engineering designs completed;
- (iv) have been allocated counterpart funding sufficient to implement the project or subproject as scheduled and maintain such project/subproject facilities upon completion; and
- (v) have been granted government approvals and endorsements.

### B. Approval Procedures

3. Approval procedures for projects proposed for financing under the MFF will follow the required Government review and approval processes as supplemented by the requirements of the Armenian Roads Directorate (ARD) attached to Schedule 5 of this FFA.

4. For the Tranche 1 Project proposed for financing under the MFF, all necessary government approvals will have been obtained as of the date of the FFA.

5. For all projects intended for financing under subsequent tranches of the MFF, the approval procedures will be as follows:

- (i) ARD will have all the engineering designs reviewed and finalized;
- (ii) ARD will review the project proposals to confirm compliance with eligibility criteria and then submit those eligible projects or subproject proposals to the Ministry of Transport and Communication (MOTC) for endorsement.
- (iii) ARD will prepare a periodic financing request (PFR) in a format agreed with ADB to finance specific projects, and submit it to the Project Governing Council for review and approval. Upon approval, the Ministry of Economy will submit,

through MOTC, the PFR to ADB, with those eligible project and subproject proposals.

- (iv) For projects or subprojects that are added in the course of updating the Government's Investment Plan, all statutory clearances should be sought prior to submission of the PFRs to ADB.
- (v) MOTC, the Ministry of Economy, ARD, and ADB will maintain contact through periodic ADB review missions and quarterly progress reports, and in so doing may effect advanced consultation on PFRs prior to submission to ADB.
- (vi) Subject to satisfactory compliance with the selection criteria and approval procedures, and in compliance with ADB's relevant policies, ADB will approve the proposals of the projects.
- (vii) Upon receipt of ADB approval, ARD will proceed with tendering in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time).

## DETAILED COST ESTIMATES BY EXPENDITURE CATEGORY AND FINANCIER (TRANCHE 1 PROJECT)

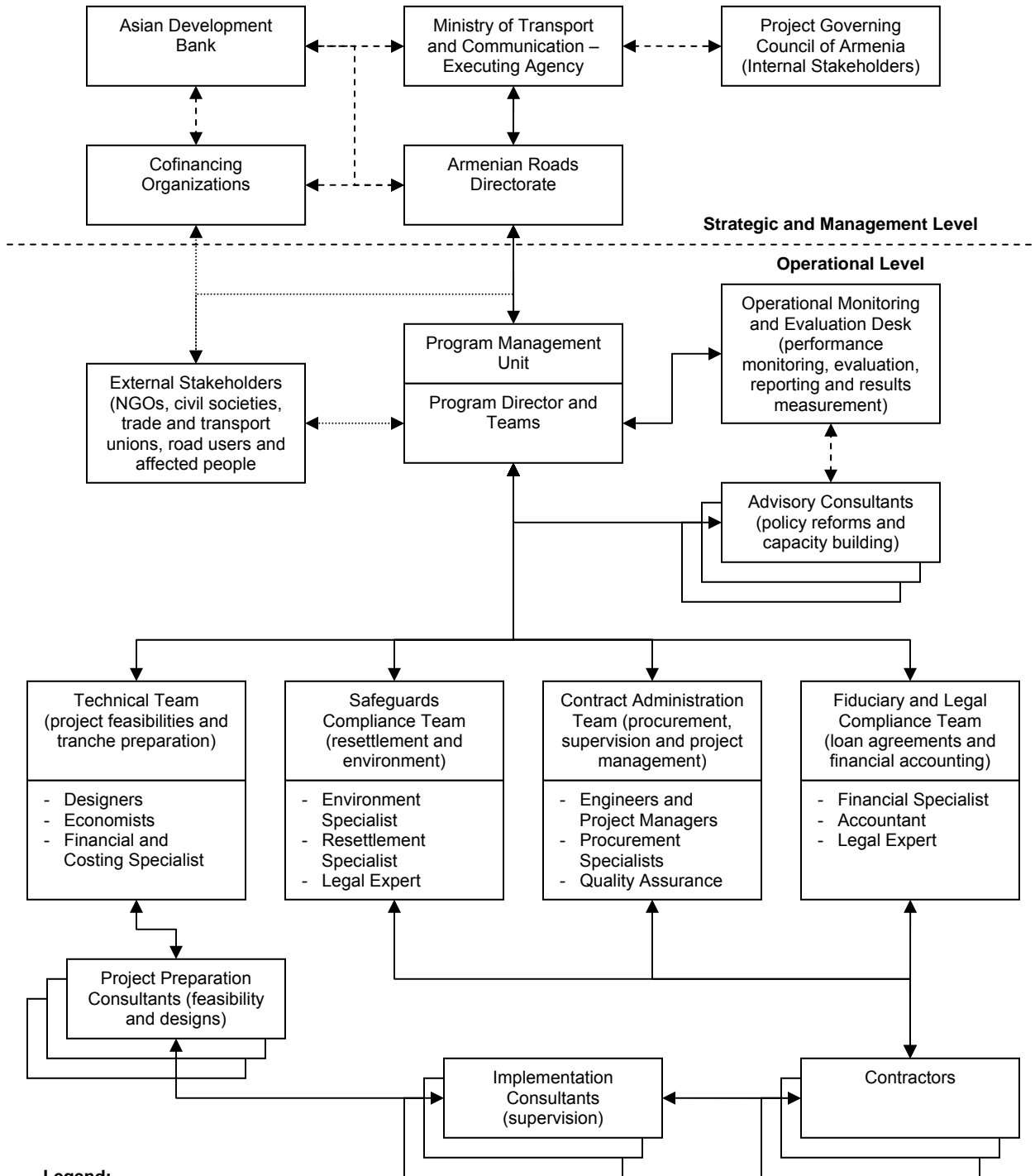
Item	ADB (\$ million)	Government (\$ million)	Total Cost (\$ million)	% of Total Base Cost	% of Financing ADB	Government
<b>A. Base Costs<sup>a</sup></b>						
1. Civil Works for Road Improvement						
a. Yerevan–Ashtarak Road (km 11.8–km 30.2)	33.7	0.0	33.7	61.3	100	0
b. Road Safety Improvement for Yerevan–Ararat Road	4.3	0.0	4.3	7.8	100	0
2. Project Management Support						
a. Project Management Unit <sup>b</sup>	0.9	0.0	0.9	1.6	100	0
b. External Financial Audit	0.1	0.0	0.1	0.2	100	0
3. Project Implementation Consultants						
a. Detailed Design for Tranche 1	0.1	0.0	0.1	0.2	100	0
b. Construction Supervision and Design for Tranche 2	3.9	0.0	3.9	7.1	100	0
4. Support for Implementation of Road Subsector Plan						
a. Consulting Services	1.0	0.0	1.0	1.8	100	0
b. Traffic Management and Monitoring Equipment	1.0	0.0	1.0	1.8	100	0
5. Taxes and Duties <sup>c</sup>	0.0	10.0	10.0	18.2	0	100
<b>Subtotal (A)</b>	<b>45.0</b>	<b>10.0</b>	<b>55.0</b>	<b>100.0</b>	<b>82</b>	<b>18</b>
<b>B. Contingencies<sup>d</sup></b>						
1. Physical Contingency	9.0	0.0	9.0	16.4	100	0
2. Price Contingency	4.0	0.0	4.0	7.3	100	0
<b>Subtotal (B)</b>	<b>13.0</b>	<b>0.0</b>	<b>13.0</b>	<b>23.6</b>	<b>100</b>	<b>0</b>
<b>C. Financing Charges During Implementation<sup>e</sup></b>						
	<b>2.0</b>	<b>0.0</b>	<b>2.0</b>	<b>3.6</b>	<b>100</b>	<b>0</b>
<b>Total</b>	<b>60.0</b>	<b>10.0</b>	<b>70.0</b>	<b>127.3</b>	<b>86</b>	<b>14</b>

ADB = Asian Development Bank.

<sup>a</sup> In mid-2009 prices.<sup>b</sup> Includes project management and administration cost of the management unit under the Ministry of Transport and Communication.<sup>c</sup> Includes value-added tax and import duties.<sup>d</sup> Physical contingencies are computed at 20% of base costs. Price contingencies are computed at 2% on foreign exchange costs and 12% on local currency costs. Includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.<sup>e</sup> Includes interest charges during construction.

Source: Asian Development Bank estimates.

**PROGRAM IMPLEMENTATION ORGANIZATION CHART**



**Legend:**

- > Direct subordination, supervision, and reporting
- - - - -> Coordination and submissions and/or approvals
- .....> External communication with stakeholders

Sources: Ministry of Transport and Communication and Asian Development Bank recommendations.

IMPLEMENTATION SCHEDULE

Activity	2009				2010				2011				2012				2013				2014				2015				2016																			
	Quarter 3		Quarter 4		Quarter 1		Quarter 2		Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4																	
	July	August	September	October	November	December	January	February	March	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D						
<b>Tranche 1</b>																																																
<b>Project Preparation TA</b>																																																
<b>Construction Supervision - Tranche 1 (procurement period)</b>																																																
Document Preparation by ARD																																																
Approval Period (MOTC, ADB)																																																
Advertisement for EO <sup>a</sup> - (4 weeks)																																																
Evaluation																																																
Approval of Shortlist																																																
Proposal Period - (6 weeks)																																																
Evaluation																																																
Approval Period (MOTC, ADB)																																																
Award of Supervision Contract																																																
<b>Detailed Design - Tranche 1, including Road Safety</b>																																																
Selection of Design Consultant - Local																																																
Highway/Pavement Specialist - Foreign																																																
<b>Civil Works Prequalification - Tranche 1</b>																																																
Prequalification Document Preparation																																																
Approval Period (ADB)																																																
Announcement and Prequalification Period (6 weeks)																																																
Prequalification Evaluation and Short-listing																																																
Approval Period (MOTC, ADB)																																																
<b>Civil Works Procurement - Tranche 1</b>																																																
Bidding Document Preparation																																																
Approval Period (MOTC, ADB)																																																
Invitation and Bidding Period (6 weeks)																																																
Bid Evaluation																																																
Approval Period (MOTC, ADB)																																																
Contract Negotiations																																																
Award of Civil Works Contract																																																
<b>Civil Works Contract Period - Tranche 1 (30 months<sup>a</sup> plus 12 months Defects Liability Period)</b>																																																
<b>Detailed Design - Tranche 2</b>																																																
Prequalification of Bidders - Tranche 2																																																
<b>Implementation - Tranche 2</b>																																																
Bidding and Award Period																																																
<b>Civil Works Contract Period (35 months<sup>a</sup> plus 12 months Defects Liability Period)</b>																																																
<b>Detailed Design - Tranche 3</b>																																																
Prequalification of Bidders - Tranche 2																																																
<b>Implementation - Tranche 3</b>																																																
Bidding and Award Period																																																
<b>Civil Works Contract Period (48 months<sup>b</sup> plus 12 months Defects Liability Period)</b>																																																

ADB = Asian Development Bank; AMU = April, May, June; ARD = Armenian Roads Directorate; EO<sup>a</sup> = expression of interest; JAS = July, August, September; JFM = January, February, March; MOTC = Ministry of Transport and Communication; OND = October, November, December; TA = technical assistance.  
<sup>a</sup> The construction period has been determined in consideration of prevailing climatic conditions and allows for a complete construction season at the end of the construction period.  
<sup>b</sup> 48months, in consideration of complexity of works.  
 Source: Asian Development Bank estimates.

## PROCUREMENT PLAN (TRANCHE 1 PROJECT)

<b>Project Name:</b> North–South Road Corridor Investment Program	<b>Multitranche Financing Facility Number:</b> to be assigned <b>Periodic Financing Request 1 Number:</b> to be assigned
<b>Multitranche Financing Facility Amount:</b> \$500 million <b>Tranche 1 Periodic Financing Request Amount:</b> \$60.0 million	<b>Executing Agency:</b> Ministry of Transport and Communication
<b>Date of First Procurement Plan:</b> 29 July 2009	<b>Date of this Procurement Plan:</b> 1 September 2009

### A. Section 1: Process Thresholds, Review, and 18-Month Procurement Plan

#### 1. Project Procurement Thresholds

1. Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works	
Method	Threshold
International Competitive Bidding for Works	More than \$1,000,000
International Competitive Bidding for Goods	More than \$500,000
National Competitive Bidding for Works	Less than \$1,000,000
Shopping for Works	Less than \$100,000
Shopping for Goods	Less than \$100,000

#### 2. ADB Prior or Post Review

2. Except as ADB may otherwise agree, the following prior- or post-review requirements apply to the various procurement and consultant recruitment methods used for the Project.

Procurement of Goods and Works		
Procurement Method	Prior or Post	Comments
International Competitive Bidding for Works	Prior	
International Competitive Bidding for Goods	Prior	
National Competitive Bidding for Goods	Prior	
National Competitive Bidding for Works	Prior	
Shopping for Works	Prior	
Shopping for Goods	Prior	

Recruitment of Consulting Firms		
Method	Prior or Post	Comments
Quality- and Cost-Based Selection	Prior	
Other selection methods: QBS, CQS, LCS, or SSS	Prior	To be determined during implementation.
Recruitment of Individual Consultants		
Individual Consultants	Prior	

CQS = consultant's qualification selection, LCS = least cost selection, QBS = quality-based selection, SSS = single source selection.

### 3. Goods and Works Contracts Estimated to Cost More than \$1 Million

3. The following table lists goods and works contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value (\$ million)	Procurement Method	Prequalification of Bidders (Yes/No)	Advertisement Date (quarter/year)	Comments
Civil Works	38.0	ICB	Yes	Q4 2009	

ICB = international competitive bidding, Q = quarter.

### 4. Consulting Services Contracts Estimated to Cost More than \$100,000

4. The following table lists consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Contract Value (\$ million)	Recruitment Method	Advertisement Date (quarter/year)	International or National Assignment	Comments
Detailed Design for Tranche 1 Project	0.2	CQS and international individual consultant	Q3 2009	International or National	With international individual consultants
Construction Supervision and Design of Tranche 2 and 3 Projects	3.8	QCBS	Q4 2009	International	Quality–cost ratio 80/20
Consulting Services for Implementation of Road Subsector Plan	1.0	QCBS	Q4 2009	International	Quality–cost ratio 80/20

CQS = consultant's qualification selection, QCBS = quality- and cost-based selection, Q = quarter.

### 5. Goods and Works Contracts Estimated to Cost Less than \$1 Million and Consulting Services Contracts Less than \$100,000

5. The following table groups smaller-value goods, works, and consulting services contracts for which procurement activity is either ongoing or expected to commence within the next 18 months.

General Description	Value of Contracts (cumulative)	Number of Contracts	Procurement/ Recruitment Method	Comments
Traffic Management and Monitoring Equipment	\$1.0 million	Up to 10	Shopping	

## B. Section 2: Project Procurement Plan

### 1. Indicative List of Packages Required Under the Project

6. The following table provides an indicative list of all procurement (goods, works, and consulting services) over the life of the project.

General Description	Estimated Value (\$ million, cumulative)	Estimated Number of Contracts	Procurement Method	Domestic Preference Applicable	Comments
<b>Works</b>					
Civil works contract package for improvement of Yerevan–Ashtarak road (Km 11.8 to Km 30.2) and road safety improvement of Yerevan–Ararat road	38.00	1	ICB One-envelope single stage with prequalification	No	
<b>Goods</b>					
Traffic management and monitoring equipment	1.00	several	Shopping	No	
<b>Consulting Services</b>					
Design of Civil Works Tranche 1 Project	0.15 0.05	several	CQS and individual consultant		
Construction Supervision for Tranche 1 Project and Design of Tranche 2 and 3 Projects	3.80	1	QCBS with FTP		quality– cost ratio 80/20
Project Management Unit	0.90	several	Individual consultants		To be determined
External Financial Audit	0.10	1	LCS	Yes	

CQS = consultant's qualification selection, FTP = full technical proposal, ICB = international competitive bidding, LCS = least-cost selection, QCBS = quality- and cost-based selection.

## C. National Competitive Bidding

### 1. General

7. The procedures to be followed for national competitive bidding shall be the open tender method (including the two-stage where appropriate) set forth in the Law on Procurements of 1 January 2005 with the clarifications and modifications described in the following paragraphs required for compliance with the provisions of ADB's *Procurement Guidelines* (2007, as amended from time to time).

### 2. Eligibility

8. The eligibility of bidders shall be as defined under section I of ADB's *Procurement Guidelines*; accordingly, no bidder or potential bidder should be declared ineligible for reasons other than those provided in section I of ADB's *Procurement Guidelines*. Bidders must be nationals of member countries of ADB, and offered goods, services, and works must be produced in and supplied from member countries of ADB.

### **3. Prequalification**

9. Postqualification shall be used, unless prequalification is explicitly provided for in the loan agreement and/or procurement plan. Domestic and foreign contractors shall be allowed to participate in bid exercises using postqualification procedure. In case prequalification of contractors is stipulated in the loan agreement/procurement plan, domestic and foreign contractors shall be allowed to participate in the prequalification exercise.

### **4. Registration and Licensing**

- (i) Bidding shall not be restricted to pre-registered/licensed firms.
- (ii) Where registration or licensing is required, bidders (a) shall be allowed a reasonable time to complete the registration or licensing process; and (b) shall not be denied registration and/or licensing for reasons unrelated to their capability and resources to successfully perform the contract, which shall be verified through postqualification.
- (iii) Foreign bidders shall not be precluded from bidding. If a registration or licensing process is required, a foreign bidder declared the lowest evaluated bidder shall be given a reasonable opportunity to register or to obtain a license.

### **5. Bidding Period**

10. The minimum bidding period is 28 days prior to the deadline for the submission of bids.

### **6. Bidding Documents**

11. Procuring entities should use standard bidding documents for the procurement of goods, works, and services acceptable to ADB.

### **7. Preferences**

12. No domestic preference shall be given for domestic bidders and for domestically manufactured goods.

### **8. Advertising**

13. Invitations to bid shall be advertised in at least one widely circulated national daily newspaper or freely accessible, nationally known website allowing a minimum of 28 days for the preparation and submission of bids. Bidding of national competitive bidding contracts estimated at \$500,000 equivalent or more for goods and related services or \$1,000,000 equivalent or more for civil works shall be advertised on ADB's website via the posting of the procurement plan.

### **9. Securities**

- (i) Bid security (tender security). Where required, bid security shall be in the form of a bank guarantee from a reputable bank.
- (ii) Performance security (contract execution security). Performance security shall be provided within 28 days of the notification of contract award.

**10. Bid Opening and Bid Evaluation**

- (i) Bids shall be opened in public.
- (ii) No bid shall be declared invalid/rejected at the time of bid opening.
- (iii) Minutes and/or record of bid opening shall be provided to all bidders.
- (iv) Evaluation of bids shall be made in strict adherence with the criteria declared in the bidding documents and contracts shall be awarded to the lowest evaluated bidder.
- (v) Bidders shall not be eliminated from detailed evaluation on the basis of minor, nonsubstantial deviations.
- (vi) No bidder shall be rejected on the basis of a comparison with the employer's estimate and budget ceiling without ADB's prior concurrence.
- (vii) A contract shall be awarded to the technically responsive bidder that offers the lowest evaluated price and meets the qualifying requirements. Negotiations shall not be permitted.
- (viii) Price verification shall not be applied.

**11. Rejection of All Bids and Rebidding**

14. Bids shall not be rejected and new bids solicited without ADB's prior concurrence. Bids shall not be declared invalid because of procedural delays on the part of executing agencies without ADB's prior approval.

**12. Participation by Government-Owned Enterprises**

15. Government-owned enterprises in Armenia shall be eligible to participate as bidders only if they can establish that they are legally and financially autonomous, operate under commercial law, and are not a dependent agency of the contracting authority/executing agency/implementing agency. Furthermore, they will be subject to the same bid and performance security requirements as other bidders.

**13. Right to Inspect/Audit**

16. A provision shall be included in all national competitive bidding works and goods contracts financed by ADB requiring suppliers and contractors to permit ADB to inspect their accounts and records and other documents relating to the bid submission and the performance of the contract, and to have them audited by auditors appointed by ADB.

**14. Fraud and Corruption**

- (i) The Borrower shall reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the contract in question.

- (ii) ADB will declare a firm or individual ineligible, either indefinitely or for a stated period, to be awarded a contract financed by ADB, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, an ADB-financed contract.

**15. Joint Venture and Estimated Contract Prices**

- (i) Joint venture partners shall be jointly and severally liable for their obligations.
- (ii) Estimated contract prices shall not be advertised.

**16. Disclosure of Decision on Contract Awards**

17. At the same time that notification on award of contract is given to the successful bidder, the results of bid evaluation shall be published in a local newspaper, or a well-known freely accessible website identifying the bid and lot numbers and providing information on (i) the name of each bidder who submitted a bid; (ii) bid prices as read out at bid opening; (iii) the names of bidders whose bids were rejected and the reasons for their rejection; and (iv) the name of the winning bidder, and the price it offered, as well as duration and summary scope of the contract awarded. The executing showing separately net cost, contingencies, and taxes agency/implementing agency/contracting authority shall respond in writing to unsuccessful bidders who seek explanations on the grounds on which their bids are not selected.

## SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

**Country/Project Title:** Armenia/North–South Road Corridor Investment Program

Lending/Financing  
Modality:

Multitranche Financing  
Facility

Department/  
Division:

Central and West Asia Department/  
Transport and Communications Division

### I. POVERTY ANALYSIS AND STRATEGY

#### A. Link to the National Poverty Reduction Strategy and Country Partnership Strategy

The Sustainable Development Program of the Government, which was approved in October 2008, is a long term development strategy. The program is Armenia's second Poverty Reduction Strategy Paper (PRSP II), which builds on the considerable achievements of PRSP I, and has three key goals covering the period 2009–2021 (with specific medium-term targets for 2009–2015): (i) reducing poverty and eliminating extreme poverty, (ii) ensuring human development, and (iii) deepening economic growth and accelerating the development of lagging regions. According to the Sustainable Development Program, the development and increased efficiency of the transport system is viewed as an important prerequisite for ensuring high growth, increased access to and efficiency of social services, increased labor force mobility, and elimination of regional disparities. That is why the Government made improving the existing regional road network a priority task, and it has developed an investment plan to improve the main road network. Its physical component will upgrade and rehabilitate Armenia's major highways, lifeline road network, and the cross-border infrastructure; the nonphysical component will facilitate implementation of the road sector development plan. The total cost of the Investment Program is estimated at \$1.45 billion over the medium term (2010–2020). International financing institutions including the Asian Development Bank (ADB), the World Bank, the Japan International Cooperation Agency, the European Bank for Reconstruction and Development, and other bilateral aid agencies will share these investment costs.

The Agarak–Kapan–Yerevan–Bavra route (M1 and M2 roads) crossing Armenia from south to north is connected to the east–west highway of Georgia that leads to Poti and Batumi on the Black Sea. This route provides Armenia with the shortest access to the seaports linked to the Russian Federation, Europe, and Turkey. Meanwhile in Georgia, the east–west highway is being improved as the Government's top priority, and Georgia plans to improve the Bavra–Zhdanov–Akhaltskha–Batumi road as an alternative link to Black Sea ports from Tbilisi. This will enable cargoes from Armenia to be transported to Black Sea ports more easily via a shorter route. On this basis, the Government has selected the north–south road corridor to be improved under the Investment Program as a priority, and ADB will support this program through a multitranche financing facility (MFF) of up to \$500 million. The Government requested ADB to extend technical assistance for preparing the North–South Road Corridor Investment Program to be financed by a blending of ADB's Asian Development Fund and ordinary capital resources and implemented in phases in line with the priorities that will be identified by the transport sector strategy currently under preparation.

Tranche 1 Project of the Investment Program will (i) reconstruct an 18.4-kilometer (km), four-lane section of the Yerevan–Ashtarak road to international standards, and (ii) facilitate implementation of the road subsector plan under the Transport Sector Strategy.

#### B. Poverty Analysis

**Targeting Classification:** General intervention

##### 1. Key Issues

The human development Index (computed by the United Nations Development Programme, 2006) for Armenia is 0.777, which gives the country a rank of 83rd out of 179 countries. It is better placed than Georgia (93rd) and Azerbaijan (97rd). The Human Poverty Index-1 value was 4.5 % for Armenia (2006) and, according to it, Armenia ranks 14th among 135 developing countries. The situation with human poverty is better than in the neighboring countries (the value for Georgia was 5.5% and for Azerbaijan 11.8%).

Armenia's rates for poverty (25.0% of the population) and extreme poverty (3.8%) in 2007 declined from the 2004 rates of 34.6% for poverty and 6.4% for extreme poverty. Poverty has become shallower and less severe as the poverty gap and the severity of poverty have also declined significantly. In 2007, the poverty gap was estimated at 4.9% (down from 7.4% in 2004), while the severity of poverty was estimated at 1.5% (down from 2.4% in 2004). The deficit between the consumption of the poor and the poverty line (expressed as a percentage of the poverty line) fell from 21% in 2004 to 19%. During 2004–2007, income inequality slightly decreased. Inequality measured by the Gini coefficient indicates that the population polarization in Armenia is deeper in income distribution than in consumption. In 2007 the consumption inequality measured by the Gini coefficient increased by 0.028 compared with 2004 (0.288).

in 2007 compared with 0.260 in 2004), while income inequality decreased by 0.024 (0.371 in 2007 compared with 0.395 in 2004).

Prudent fiscal and monetary policies were instrumental in maintaining macroeconomic stability and contributing to poverty reduction. Real gross domestic product (GDP) grew by 13.1% per year on average during 2003–2007, and inflation averaged 3.9% during the same period. Social expenditures increased to 4.7% of GDP, well above the projected PRSP I goal of 3.0%. Increased resources to the social sectors improved the access to and quality of general secondary education, and led to improvements in the use of and geographic access to basic health services, most notably through the free provision of primary health care to the population.

However, despite the fast poverty reduction (including very poor) in Armenia, the poverty level still significantly varies among *marzes* (provinces), and between rural and urban areas. This situation is mostly a result of the existing differences of economic development, and the peculiarities of physical, geographical, and infrastructure development of different regions. According to 2005 and 2006 National Statistical Service Household Survey data, the poverty incidence is higher in marzes affected by the earthquake of 1988; in bordering regions; in the regions with unfavorable conditions for agriculture, especially with small share of irrigated agriculture land; and in marzes with a predominantly urban population. The analysis of poverty incidence by gender during 1999–2007 shows that there are no significant gender disparities regarding poverty in the country.

After growing at an average rate of 13.5% in 2006–2007, the Armenian economy moderated with real GDP growth of 6.8% in 2008. It declined by 9.7% in the first 4 months of 2009 and is expected to decelerate by around 9.5% in 2009. Remittances, which at \$1.5 billion accounted for 13% of GDP in 2008, are projected to be around 30% less in 2009. The Armenian dram has depreciated by 25% against the US dollar, which is significant as 70% of the economy is dollarized. The Government faces a revenue shortfall of 22% and a financing gap of \$460 million. The fiscal deficit is estimated to increase from AMD40 billion (1.0% of GDP), forecast in the original 2009 budget, to 6.5% of GDP. Unemployment has increased and is likely to further rise. According to the National Statistical Service of Armenia, in 2009 unemployment is 6.6% (compared with 8% in 2007 and 6.2% in 2008), though unofficial estimates suggest figures closer to 20%–25%. The poverty and social analysis conducted for Tranche 1 Project will also be conducted for future tranche(s) as required.

## 2. Design Features

Design features may be incorporated to preserve and enhance local access along the four-lane highway for local produce vendors, such as creation of roadside markets, through local consultation, with full sanitary facilities on wide pull-out lanes. Other possible design features with poverty reduction potential will be explored during the planning and implementation of Tranche 1 Project and following tranches following recommendations in ADB's *Technical Note on Social Analysis for Transport Projects* (<http://www.adb.org/Documents/Books/Transport-Projects-Social-Analysis/Transport-Social-Analysis.pdf>)

## II. SOCIAL ANALYSIS AND STRATEGY

### A. Findings of Social Analysis

The social and poverty impact analysis of tranche 1 and 2 projects indicate that the poverty incidence in two marzes out of five (Ararat 25.5% and Shirak 32.1%) exceeded the national average of 25%. The unemployment rate is high in Shirak (11.8%) and Syunik (11.8%) marzes compared with the national republic average of 6.2%. While the Investment Program aims to facilitate regional trade and benefit major businesses and those involved in trade, it will also significantly benefit rural communities, especially rural poor. This is important taking into consideration that in three marzes (Aragatsotn, Ararat, and Vayots Dzor) the population is predominantly rural. While the incidence of rural poverty declined by 19.7% between 2004 and 2007, the trend is still 1.6 times lower than that in the urban area. In 2007, 25.5% of the rural population was poor compared to 25% of the population of Armenia and 24.7% in the urban area. The Investment Program will increase the mobility of about 1 million people living in six marzes, where the north–south corridor lies. In terms of human poverty modified index of 2005, an unfavorable situation has been recorded in three marzes—Aragatsotn (49.6%), Ararat (8.7%), and Shirak 34.8%, compared with the national average of 32.4%). From the viewpoint of human poverty (as against income poverty), the rural population is most vulnerable. The marz-level analysis of human modified index components shows that the most influential factor of human poverty in Armenia is the lack of access to health care services. According to survey data, about 62% of surveyed households visited health care facilities in case of need. Those who did not visit health care facilities (about 38%) cited high official and nonofficial payments for treatment as reasons for nonattendance.

Almost all marzes, except Ararat, are also in unfavorable situations in terms of social vulnerability index of 2005. In Syunik marz the social vulnerability index (37.5%) exceeds the national average (36.6%) and in Shirak it is equal to

the national average. This is because some social groups are heavily represented in the composition of marz population (lonely elderly, unemployed, elderly, and poverty family benefits receivers).

The majority of households in the program areas are engaged in agriculture activities or small and medium-size agro-industries (including cottage agro-industries). According to the same socioeconomic survey, 71.4% of household heads are employed, and about 30% of them are mainly occupied in agriculture activity. About 48% of households refer land as the main source of their food production, about 24% of households of which mentioned land as the main source of their income; 50% of surveyed households use the road corridor every day and about 40% use it several times a month. The majority of respondents think that improvement of the road will have a positive social impact. About 57% of the respondents believe that, as a result of the improvements, the road will be safer. More than 30% of respondents think that it will also have a positive economic impact. Hence, 17.9% of respondents think that it will promote trade and 14.3% think that the Investment Program will create short-term job opportunities for the community members during the construction period.

Reduced travel time and more available transport services will help improve the lives of people, especially women, the elderly, and children, as improved road transport under the Investment Program will increase their access to the nearest markets and social service delivery institutions such as schools, hospitals, and clinics, and create job opportunities. The Investment Program will generate estimated 2,500–3,000 jobs during implementation, of which an estimated 45%–50% will be sourced locally in the form of unskilled labor or related services to the construction sites.

Local community members have some concerns about construction waste, disturbance of land, and safety of their family members.

## B. Consultation and Participation

Consultation was carried out with all the stakeholders during the program preparation. Consultations were held at various levels such as the Armenian Roads Directorate (ARD), the Ministry of Transport and Communication (MOTC), the State Committee of Real Estate Cadastre, Municipality of Yerevan, Real World Real People (a nongovernment organization providing HIV/AIDS prevention and education services), and local communities to be directly affected by the Investment Program. The summary poverty reduction and social strategy recommends that (i) consultation on safety, social, and cultural concerns will be continued throughout the implementation of the Investment Program; (ii) men and women are given equal employment opportunities directly, or indirectly, arising from the Investment Program and without any differentiation of wages for equal work; and (iii) mechanisms for maximizing local employment benefits will be included in the bidding documents. These activities will be carried out by the program management unit to be established within ARD, with social and resettlement specialists supported by the supervision consultants. The specialists will organize public information meetings and workshops for stakeholders and affected persons, addressing the safety, social, and cultural issues and, in particular for involuntary resettlement. The land acquisition and resettlement framework (LARF) has been formulated and has been translated into Armenian, which will be distributed to the program regions for review and endorsement. During the different stages of the Investment Program (planning, implementation, and monitoring) following actions will be undertaken: (i) distribution of public information brochures or booklets in Armenian, (ii) placement of copies of land acquisition and resettlement plans (LARP) in Armenian in the *marzes* and local government offices, and (iii) uploading of the LARPs onto ADB's website. Community authorities and relevant stakeholders will be informed about all aspects of the Investment Program, and their assistance will be solicited. The processes and mechanisms ensuring active involvement of all stakeholders and affected persons will be detailed in the LARPs prepared for all future tranche projects, including the date, list of participants, and minutes of consultation meetings and workshops.

2. What level of consultation and participation (C&P) is envisaged during the project implementation and monitoring?  
 Information sharing     Consultation     Collaborative decision making     Empowerment

3. Was a C&P plan prepared?  Yes     No

Views and concerns of all stakeholders will be taken into account through consultation meetings and workshops and addressed whenever feasible.

## C. Gender and Development

1. **Key Issues.** The Investment Program will have a positive impact on gender equality. The majority of women in the program areas are engaged in agriculture activities or small and medium-sized agro-industries (including cottage agro-industries). Reduced travel time and more available transport services will help improve the lives of women and children, as improved road transport under the Investment Program will increase their access to the nearest markets

and social service delivery institutions such as schools, hospitals, and clinics, and create employment opportunities. It is anticipated that greater road connectivity will have a positive impact on less-educated girls and women by promoting their access to more education and training opportunities.

**2. Key Actions.** Measures included in the design to promote gender equality and women’s empowerment—access to and use of relevant services, resources, assets, or opportunities and participation in decision-making process:  
 Gender plan     Other actions/measures     No action/measure

Tranche 2 and 3 Projects will prepare a component to promote gender equality and women’s empowerment—access to and use of relevant services, resources, assets, or opportunities and participation in decision-making process

**III. SOCIAL SAFEGUARD ISSUES AND OTHER SOCIAL RISKS**

Issue	Significant/Limited/ No Impact	Strategy to Address Issue	Plan or Other Measures Included in Design
<b>Involuntary Resettlement</b>	No impact on Tranche 1 Project	LARF has been prepared for the MFF  LARP is under preparation for Tranche 2 Project	<input type="checkbox"/> Full Plan <input type="checkbox"/> Short Plan <input checked="" type="checkbox"/> Resettlement Framework <input type="checkbox"/> No Action
<b>Indigenous Peoples</b>	No impact		<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input type="checkbox"/> Indigenous Peoples Framework <input checked="" type="checkbox"/> No Action
<b>Labor</b> <input type="checkbox"/> Employment opportunities <input type="checkbox"/> Labor retrenchment <input type="checkbox"/> Core labor standards	No impact	The Investment Program will generate estimated 2,500–3,000 jobs during implementation, of which an estimated 45%–50% will be sourced locally in the form of unskilled labor or related services to the construction sites.  All civil works will comply with applicable national and international labor, health, and safety laws and standards including (i) employ women, handicapped, and minorities, if any, without discrimination; (ii) prohibit use of child labor and illegal immigrants, and differentiation in wages among male, female, and other social groups for work of equal value; (iii) disseminate information and raise awareness of health risks at project sites, such as proper construction safety standards, prevention of communicable diseases, and sexual harassment; (iv) provide healthy, safe, and secure working conditions as well as adequate medical care; and (v) observe local protocols on acceptable social and professional behavior towards the local population and employees.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action

Issue	Significant/Limited/ No Impact	Strategy to Address Issue	Plan or Other Measures Included in Design
<b>Affordability</b>	No impact		<input type="checkbox"/> Action <input checked="" type="checkbox"/> No Action
<b>Other Risks and/or Vulnerabilities</b> <input checked="" type="checkbox"/> HIV/AIDS <input type="checkbox"/> Human trafficking <input type="checkbox"/> Others (conflict, political instability, etc), please specify	Limited	It is expected that the 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 construction. This aspect will be studied further during the detailed design stage, and mitigation measures will be developed to counter the spread of sexually transmitted diseases in the project area. Information and periodic seminars on HIV/AIDS prevention will be made available through the construction company to people directly and indirectly associated with the project and also to residents in the project area. These outreach activities will be designed by the construction company and submitted to MOTC for approval as part of the health and safety management part of the quality assurance/quality control plan. ADB will review and make specific recommendations if necessary. The responsibility for preparing and implementing such a plan will be an integral part of the construction contract.	<input type="checkbox"/> Plan <input checked="" type="checkbox"/> Other Action <input type="checkbox"/> No Action
<b>IV. MONITORING AND EVALUATION</b>			
<p>Are social indicators included in the design and monitoring framework to facilitate monitoring of social development activities and/or social impacts during project implementation? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>The Design Monitoring Framework for the MFF and Tranche 1 Project include indicators to measure the number of beneficiaries served by the improved road at the outcome level.</p>			

## ECONOMIC ANALYSIS OF TRANCHE 1 PROJECT

### A. Introduction

1. An economic analysis has been undertaken for Tranche 1 Project, which will improve to international standard 18.4 kilometers (km) of the four-lane road section between Yerevan and Ashtarak. This is part of M1, the main gateway to Yerevan from the north. The road has never been rehabilitated and is in poor condition. The Project will reconstruct the carriageways and provide road furniture of appropriate standard. It will rationalize and improve U-turn facilities and upgrade the M1–M3 intersection. The benefits considered for normal and generated traffic are (i) vehicle operating cost savings from the improvement in the road surface quality and the provision of paved shoulders, and (ii) time savings.

### B. Basic Parameters

2. The parameter values for the Highway Design and Maintenance Model (HDM-4) analysis are given in Table A12.1.

**Table A12.1: Typical Vehicle Base Data**

Item	Car	Minibus	Bus	Trucks		
				2-Axle	3-Axle	>3-Axle
Economic cost (\$'000)	17	16	40	20	30	80
Fuel cost (cent per liter)	74	74	57	74	57	57
Oil cost (\$ per liter)	5.5	4.1	4.1	2.7	2.7	2.7
Tyre cost (\$ per tyre)	51	76	144	212	212	255
Maintenance labor (\$ per hour)	4.9	8.6	8.2	9.6	9.6	11.0
Crew wages (\$ per hour)	0.0	1.0	1.3	1.7	1.7	2.3
No. of passengers	2.5	15	40	0	0	0
Passenger work time (\$ per hour)	2.50	2.50	2.50			
Non-work time (\$ per hour)	0.83	0.83	0.83			
Work-related time (%)	75	75	75			
Annual utilization (km'000)	20	60	70	30	86	86
Vehicle life years	10	7	8	12	14	14

Source: Project preparatory technical assistance estimates.

3. **Generated Traffic.** Combined generated and induced traffic has been assumed to be 10% of normal traffic. Generated and induced benefits are evaluated at 50% of normal traffic benefits—equivalent to a normal traffic increase of 5%. The current international roughness index (IRI) of the project road is 5.4. After improvement, the IRI will initially be reduced to 2.0.

### C. Traffic Analysis

4. **Base-Year Traffic Volume.** Traffic counts were taken at three locations on the M1 and at the Armenia–Georgia border crossing of Bagratashen in May–July 2009 (Table A12.2). Based on Armenian Roads Directorate (ARD) monthly count data for interstate roads, the volume in May is typical of annual traffic volume and no seasonal adjustment factor has been applied. The volume in July at ARD's automatic counter at Km 20.7 (the count site) is on average 19.7% above annual average daily traffic volume. The July count has been adjusted by a factor of 0.835 to annual average daily traffic.

5. The Project comprises three homogeneous sections for traffic volume: (i) from the start of the four-lane road at Km 11.8 to the junction for Ashtarak at Km 23.2, (ii) from Ashtarak junction to the M3 intersection at Km 25.2, and (iii) from the M3 intersection to the end of the four-lane section at Km 30.2. Traffic volume on section (ii) is estimated at 70.0% of that on section (i), and the volume on section (iii) is estimated at 43.0% of that on section (i). The distance-weighted average volume for the Project is 81.3% of the volume on the counted section (i). The base-year 2009 traffic volume on the Project after seasonal adjustment and adjustment for homogeneous sections is 11,257 (16,582 multiplied by 0.835 multiplied by 0.813).

6. The Armenia–Georgia border on the north–south corridor at Bavra is unusable by heavy vehicles due to the deteriorated state of the road in Georgia immediately north of the border. This road is under reconstruction and vehicles traveling to western Georgia and Turkey via Bagratashan will be diverted to much shorter M1 route via Bavra by November 2010, before completion of the project. Based on the results of an origin-and-destination survey at Bagratashan, it is estimated that 56% of vehicles (423 vehicles) will divert. The base-year traffic volume for the project road, including diversion, is 11,680 (Table 12.2).

**Table A12.2: Traffic Counts**

Location	Car	Pick-up	Mini-bus	Bus	Trucks			Total	PCUs	Peak Hr (% of AADT)
					2-Axle	3-Axle	>3-Axle			
24-hour count:										
M-1 Km 20.7	13,761	938	965	217	446	191	64	16,582	17,275	8.1
M-1 Km 30	4,755	493	341	72	351	117	36	6,165	6,749	7.8
M-1 Km 70	2,215	236	229	26	121	33	31	2,891	3,161	8.3
Bagratashen	527	26	34	3	15	6	145	756	1,004	7.4
Composition (%)										
M-1 Km 20.7	83.0	5.7	5.8	1.3	2.7	1.2	0.4	100.0		
M-1 Km 30	77.1	8.0	5.5	1.2	5.7	1.9	0.6	100.0		
M-1 Km 70	76.6	8.2	7.9	0.9	4.2	1.1	1.1	100.0		
Bagratashen	69.7	3.4	4.5	0.4	2.0	0.8	19.2	100.0		
<b>Weighted Average Km 11.8–Km 30.2</b>	<b>9,601</b>	<b>650</b>	<b>672</b>	<b>149</b>	<b>311</b>	<b>138</b>	<b>159</b>	<b>11,680</b>		
<b>Composition %:</b>	<b>82.2</b>	<b>5.5</b>	<b>5.7</b>	<b>1.3</b>	<b>2.7</b>	<b>1.2</b>	<b>1.4</b>	<b>100.0</b>		

AADT = annual average daily traffic, PCU = equivalent passenger car unit, M = motorway, km = kilometer.  
Source: Project preparatory technical assistance estimates.

7. **Future Traffic.** Traffic growth over the analysis period to 2032 is based on projected growth of gross domestic product (GDP) and an estimate of demand elasticity. The International Monetary Fund (IMF) June 2009 forecast for Armenia's GDP is growth of 1.3% in 2010, 3.5% in 2011, and 4.5% per annum in 2012–2014. A GDP growth rate of 6.0% has been assumed for 2014–2020, and of 7.0% for 2020–2032. Little or no change in population is expected over the period. The average elasticity of traffic growth to GDP is taken as 1.2. The forecast traffic volume with and without the Project is given in Table A12.3.

**Table A12.3: Traffic Forecast**

<b>Section</b>	<b>2012</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2032</b>
With Project	13,060	17,110	24,490	36,660	65,605
Without Project	13,060	15,550	22,270	33,330	59,641

Source: Project preparatory technical assistance estimates.

#### **D. Economic Analysis**

8. **Economic Costs.** The economic cost of the Project comprises (i) capital investment, including civil works and physical contingency, environmental mitigation, and consulting services for construction supervision; and (ii) net road maintenance during the analysis period. All cost elements are valued at border prices, using a world price numeraire, with all taxes and duties excluded. A standard conversion factor of 0.97 is applied to nontradable items and labor. A shadow wage rate factor of 0.7 is used to estimate the economic price of unskilled labor, estimated to account for 5% of the construction cost. The periodic maintenance cost saving will occur with the project case, as a thicker overlay will be required in the without-project case to lower the high IRI. The total economic cost for improving the 18.4 km road is estimated at \$29.6 million. The residual value was assumed 30% of the initial investment cost.

9. **Economic Benefits.** The major economic benefits of the Project are savings on vehicle operating costs and travel time because of improved road conditions. These savings were calculated using the Highway Design and Maintenance Model (HDM-4) model. Travel time savings for passengers were calculated at \$2.50 per hour for work-related trips—the average hourly wage rate plus an overhead factor of one-third. For non-business trips, one third of the value of the work time saved is used as a proxy for willingness to pay. The time saved for freight is estimated at \$0.3 per ton per hour as defaulted in HDM-4. It is in line with a load of 2 tons with a value of \$10,000 per ton. The time savings for freight are, however, minor as freight traffic constitutes only 5% of forecast traffic.

10. **Economic Internal Rate of Return and Net Present Value.** The economic internal rate of return (EIRR) and the economic net present value (at a discount rate of 12%) were calculated by comparing the with-project and without-project scenarios for a 20-year period of operation. In the without-project case, surface condition is calculated within HDM-4 based on typical maintenance of an interstate highway. With the Project, the improved road section will be of a quality appropriate for the north–south corridor and for the main approach to Yerevan from the north, directly improving accessibility between the two largest cities of Yerevan and Gyumri, and between Armenia and the subregion. The Project will facilitate business and reduce the cost of doing business. As rural roads are being improved under the ADB and other external assistance, the accessibility of rural areas to international markets through the improved north–south corridor will be improved, providing all-weather access, faster travel, lower operating costs, and export of agro-based products.

11. The EIRR is estimated at 16.8% and the net present value at \$12.4 million (Table A12.4). The cost and benefit streams over the analysis period are in Table A12.5.

**Table A12.4: Construction Cost and Economic Analysis Results**

Location	Length (km)	Economic	IRI	2009	EIRR	NPV
		Cost (\$ million)		AADT		(\$ million)
Yerevan – Ashtarak	18.4	29.6	5.4	11,680	16.8	12.4

AADT = annual average daily traffic, EIRR = economic rate of return, IRI = international roughness index, km = kilometer, NPV = net present value.

Source: Asian Development Bank estimates.

**Table A12.5: Cost and Benefit Stream**  
(\$ million)

Year	Cost				Benefit			Net Benefit
	Initial Investment	Periodic Maintenance		Total Cost	VOC Saving	Time Saving	Total Benefit	
		With	Without					
2010	8.87	0.00	0.00	8.87	0.00	0.00	0.00	(8.87)
2011	14.79	0.00	3.59	11.20	0.79	0.40	1.20	(10.00)
2012	5.91	0.00	0.00	5.91	0.94	0.49	1.43	(4.48)
2013	0.00	0.00	0.00	0.00	1.27	0.08	1.35	1.35
2014	0.00	0.00	0.00	0.00	1.62	0.31	1.93	1.93
2015	0.00	0.00	0.00	0.00	2.04	0.60	2.64	2.64
2016	0.00	0.00	3.59	(3.59)	2.54	0.98	3.51	7.10
2017	0.00	0.00	0.00	0.00	1.88	0.29	2.18	2.18
2018	0.00	0.00	0.00	0.00	2.39	0.65	3.04	3.04
2019	0.00	2.76	0.00	2.76	3.00	1.10	4.10	1.34
2020	0.00	0.00	0.00	0.00	3.62	1.69	5.31	5.31
2021	0.00	0.00	3.59	(3.59)	4.48	2.44	6.92	10.50
2022	0.00	0.00	0.00	0.00	3.15	1.07	4.23	4.23
2023	0.00	0.00	0.00	0.00	3.95	1.79	5.74	5.74
2024	0.00	0.00	0.00	0.00	4.92	2.71	7.63	7.63
2025	0.00	0.00	0.00	0.00	6.06	3.87	9.92	9.92
2026	0.00	2.76	3.59	(0.83)	7.41	5.26	12.68	13.50
2027	0.00	0.00	0.00	0.00	6.13	2.63	8.75	8.75
2028	0.00	0.00	0.00	0.00	7.67	4.00	11.67	11.67
2029	0.00	0.00	0.00	0.00	9.46	5.77	15.23	15.23
2030	0.00	0.00	0.00	0.00	11.68	7.72	19.40	19.40
2031	0.00	0.00	3.59	(3.59)	14.36	10.46	24.82	28.41
2032	(8.87)	0.00	0.00	(8.87)	17.52	13.83	31.35	40.22
EIRR								<b>16.8%</b>
NPV								<b>12.4</b>

( ) = negative, EIRR = economic internal rate of return, NPV = net present value, VOC = vehicle operating cost.

Source: Asian Development Bank estimates.

12. **Sensitivity Analysis and Switching Values.** The impact of a cost increase of 20%, a benefits decrease of 20%, and a combined cost increase of 20% and benefit decrease of 20% on the project EIRR and net present value are shown in Table A12.6. The switching values which would reduce net present value to zero (at EIRR of 12%) are an increase of 67% in economic cost, a decrease of 40% in project benefits, or a simultaneous increase of 25% in economic cost and decrease of 25% in project benefits.

**Table A12.6: Sensitivity Analysis and Switching Values**

<b>Item</b>	<b>EIRR (%)</b>	<b>NPV (\$ million)</b>	
Base Case	16.8	12.4	
Cost + 20%	14.9	8.9	
Benefits -20%	14.6	6.2	
Cost/Benefits +/-20%	12.9	2.6	
	<b>Cost</b>	<b>Benefits</b>	<b>Cost/ Benefits</b>
Switching Values	+67%	-40%	25%

EIRR = economic internal rate of return, NPV = net present value.

Source: Asian Development Bank estimates.

## SUMMARY OF SOCIAL SAFEGUARDS

### A. Background

1. The Government of Armenia has developed a North–South Road Corridor Investment Program (the Investment Program) that will rehabilitate, improve, or construct the north-south road corridor in various regions of Armenia. The Ministry of Transport and Communications (MOTC) will be the executing agency and the Armenian Roads Directorate (ARD) will be the implementing agency. The Government has requested the Asian Development Bank (ADB) to help finance the Investment Program through a multitranche financing facility (MFF) up to the equivalent of \$500 million and to be implemented in tranches.

2. The Investment Program appraisal includes the appraisal of Tranche 1 Project that will reconstruct an 18.4-kilometer (km), four-lane section of the Yerevan–Ashtarak road and not entail land acquisition and resettlement (LAR) impacts. However, tranche 2 and 3 projects are expected to have substantial LAR impacts. The Investment Program will not cause impacts on indigenous people, as in Armenia there is no group that, based on the indigenous people definition of the ADB's *Policy on Indigenous Peoples* (1998), can be classified as such.

### B. General Procedures

3. LAR will be carried out according to the relevant laws of Armenia, ADB's *Involuntary Resettlement Policy* (1995), *Operations Manual F2 on Involuntary Resettlement* (2006) and the land acquisition and resettlement framework (LARF) prepared by ARD for the Investment Program. Based on ADB policy and practice, the appraisal of the MFF and of each tranche and approval of each project implementation will entail the following LAR-related conditions:

- (i) **MFF Tranche 1 Project appraisal:** Conditional on preparation/disclosure of a land acquisition and resettlement framework for the MFF acceptable to ADB and the land acquisition and resettlement plans (LARPs) for all tranche projects requiring LAR.
- (ii) **Tranches 2 and 3 periodic financing request (PFR) approval:** Conditional on LARF review/update, and preparation/disclosure of LARPs fitting the updated LARF for roads with LAR.
- (iii) **Contract awards signing:** Conditional on the preparation/disclosure of updated/implementation-ready LARPs approved by ADB and reflecting final impacts, affected persons lists, and official compensation rates.
- (iv) **Provision of notice to proceed to contractors:** Conditional on full implementation of LARP (full delivery of compensation/rehabilitation) for the relevant project. Such a condition will be clearly defined in the text of the civil works contract.

4. Based on the above, appraisal, signing of contract awards and civil works implementation for each individual project or subproject are conditional on the following:

- (i) **Appraisal:** (a) approval of the LARF and the LARP by ADB and Government, and (b) full disclosure of this LARP to the affected persons.
- (ii) **Contract awards signing and LARP implementation:** (a) update of the final LARP based on detail design as indicated in para. 3, (b) disclosure of the updated LARP to the affected persons, and (c) mobilization of the external monitoring agency. The updated LARPs will reflect final impacts, final affected persons lists, and final compensation rates, and will be readily implementable.

- (iii) **Provision of no-objection to initiation of civil works:** (a) full implementation of the compensation program described in this LARP, including the full delivery of compensation to the affected persons; and (b) preparation of a compliance report by the external monitoring agency.

5. To meet these conditions, ARD has prepared a LARF for the MFF. No LARP was prepared for Tranche 1 Project as it has no LAR impacts.

### C. Land Acquisition and Resettlement Framework

6. The LARF lists the following principles: (i) LAR will be avoided or at least minimized, (ii) compensation will guarantee the maintenance of the pre-Investment Program living standards of the people affected, (iii) those affected will be fully informed/consulted on compensation options, (iv) the sociocultural institutions of those people will be supported and used, (v) LAR provisions will equally apply to women and men, (vi) lack of formal title will not be a bar to compensation/rehabilitation, (vii) particular attention will be paid to households headed by women and to vulnerable groups, (viii) LAR will be conceived and executed as an integral part of the Investment Program and LAR budgets will be included in the costs of the Investment Program, and (ix) compensation will be fully provided prior to ground leveling and demolition. The LARF also covers all issues relevant to effectively conducting LAR tasks in compliance with ADB policy and sets the eligibility/entitlement provisions detailed in Table A13.

**Table A13: Compensation Matrix**

Type of Loss	Application	Definition of Affected Persons	Compensation Entitlements
Permanent loss of agricultural land	Affected person losing agricultural land regardless of impact severity	Owner with full registration	Compensation at market rate plus 15% either in cash or through replacement plots acceptable to the affected persons.
		Unregistered persons with ownership rights	Affected persons will be legalized and provided the same compensation as registered owner.
		Informal settlers/ affected persons with no registration/valid documentation	One-time self-relocation allowance in cash equal to 1 year at minimum salary.
Non-agricultural land	Affected person losing their commercial/ residential land	Owner with full registration	Compensation at market rate plus 15% either in cash or through replacement plots acceptable to the affected persons.
		Unregistered persons with ownership rights	Affected persons will be legalized and provided the same compensation as registered owner.
		Renter/leaseholder	Rental allowances in cash for 3 months
		Informal settlers/ affected persons without registration/valid documentation	One-time self-relocation allowance in cash equal to 1 year at minimum salary
Residential buildings		All affected person irrespective of registration status	Cash compensation plus 15% for loss of houses at full replacement cost free of depreciation/transaction costs. For partial impacts, and if so wished by the affected person, compensation may be provided only for repairs.
Nonresidential structures/assets		Affected persons with valid registration	Cash compensation plus 15% for loss of building/ structures at full replacement cost free of depreciation transaction costs. For partial impacts and, if so wished by the affected person, compensation may be provided only for repairs.
		Unregistered persons with ownership rights /informal settlers	As above but after building is legalized/registered.
Loss of communal property	Communal assets	Community/government	Reconstruction of lost structure in consultation with community and restoration of their functions
Crop losses	Standing crops	All affected persons regardless of	Crop compensation in cash at market rate by default

	affected	legal status (includes unregistered persons with ownership rights /informal settlers)	at gross crop value of expected harvest.
Tree losses	Trees affected	All affected persons including unregistered persons with ownership rights and informal settlers.	Cash compensation at market rate based on type, age, and productive value of the trees.
Business Employment Losses	Business employment loss	All affected persons including unregistered persons with ownership rights and informal settlers.	Owner: (i) (permanent impact) cash indemnity of 1 year net income, and (ii) (temporary impact) cash indemnity of net income for months of business stoppage. Assessment to be based on tax declaration, other valid documents or, in their absence, minimum salary. Permanent employees: indemnity for lost wages equal to 3 months of minimum salary.
Allowances for Severe Impacts	>10% income loss	All severely affected persons including informal settlers	Agricultural income: one additional crop compensation covering 1 year yield from affected land. Other income: one allowance covering 3 months of minimum salary.
Relocation allowances	Transport/transition costs	All affected persons to be relocated	Provision of funds to cover transport costs and livelihood expenses for 1 month.
Vulnerable People Allowances		Affected persons below poverty line or headed by women	Allowance equivalent to 3 months of minimum salary and employment priority in project-related jobs.
Temporary impacts		All affected persons	Due compensation will be assessed and paid based on this LARF during construction.
Unforeseen LAR impacts, if any			ARD will compensate unforeseen resettlement impact during project based on the above provisions.

Source: Project preparatory technical assistance for the North–South Road Corridor Development

## D. Eligibility

7. Affected persons entitled to compensation or at least rehabilitation under the Investment Program are

- (i) all affected persons losing land either covered by legal title/traditional land rights, unregistered persons with ownership rights, or without legal status;
- (ii) tenants and sharecroppers whether registered or not;
- (iii) owners of buildings, crops, plants, or other objects attached to the land; and
- (iv) affected persons losing business, income, and salaries.

8. Compensation eligibility will be limited by a cut-off date, which is the date of affected person census carried out during the preratation of each of subsequent tranche projects under the Investment Program. Affected persons who settle in the affected areas after the cut-off date will not be eligible for compensation. They will, however, be given sufficient advance notice, requested to vacate premises, and dismantle affected structures prior to implementation. Their dismantled structures materials will not be confiscated and they will not pay any fine or suffer any sanction.

9. **Institutional Responsibilities.** MOTC/ARD has overall responsibility for LARP preparation, implementation, and financing and will exercise its functions through a land acquisition and resettlement unit (LARU) tasked with management, planning, and implementation of land acquisition and resettlement works. The LARU will be aided by a social safeguard team under the supervision consultants. ARD will coordinate with local governments that have jurisdiction over land administration/title verification, and the independent assessors responsible for asset valuation. Apart from ARD and local governments, the Ministry of Finance

will be responsible for providing LAR funds to ARD and the State Committee of Real Estate will be responsible for all legal matters regarding land ownership and with the legalization of eligible affected persons. The LARU will be assisted in preparing the LARPs by resettlement specialists under the design contracts.

10. **Disclosure and Consultation.** LAR tasks will require intensive consultations with affected persons, the results of which will be fully documented in the LARPs. As an appraisal condition, LARF and LARPs in English will be disclosed on the ADB website. The LARF and the LARPs in Armenian will be disclosed on ARD's website and at local government offices. A pamphlet in Armenian summarizing the LARPs will be sent to all affected persons.

11. **Grievance Procedures.** Grievances will be first handled at the village level with involvement of the *rayon* (district) government. If no solution is reached, the persons affected will raise the complaint to ARD's regional office. If no settlement is reached, the case can be brought to the central ARD. If the grievance remains unsettled, the persons affected will be able to seek redress at the communal court.

12. **Monitoring and Evaluation.** ARD will monitor implementation of the LAR and will report to ADB through quarterly progress reports. External monitoring will be carried out by an independent agency, who will prepare a compliance report at the end of the implementation of the LARP for each tranche project under the Investment Program.

8. **Finances and Schedules.** The LARF prescribes that each LARP detail LAR budgets and provide clear schedules linking LAR tasks with the initiation of civil works.