

TRACECA - Project

Trade and Transport Sectors

Implementation of Pavement
Management Systems

Assistance to the
Armenian Road
Directorate

Inception Report

October 1997

KOCKS CONSULT GMBH
Consulting Engineers
Koblenz / Germany

Local Operator	EC Consultant
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Date of report : 10 October 1997

Reporting period : January 1997 to October 1997

Author of report: Frank Granberg/Werner P. Weiler

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EC Delegation			
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TACIS Bureau (Task Manager)			
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1. PROJECT SYNOPSIS

Project Title	: Traceca Project - Implementation of Pavement Management Systems
	Addendum No. 1, Component 1: Transit Roads - Armenia, Azerbaidjan & Georgia Assistance to the Armenian Road Directorate (ARD) Development of a Routine Maintenance Contract System
Project Number	: TELREG 9305
Country	: Armenia

Project objective[s]: The main objective is to assist the Armenian Road Directorate of the Ministry of Transport and Communications in the Republic of Armenia in the development of a system whereby routine road and bridge maintenance will be carried out by contract.

The assistance shall be given in the form of a pilot project and in such a way that the results of the project will be sustainable in Armenia, and possible to transfer to other countries with similar conditions.

The success and sustainability of the project requires that the project be carried out in the very closest co-operation between the consultant and the ARD.

This present project forms a component of ongoing technical assistance by TRACECA and of a loan package from the World Bank to the ARD. As a result of co-ordination, the present technical assistance is proposed in 3 Parts:

Project	Main Content	Suggested Timing
Part 1 (present contract)	Pre-study and Detailed Plan for Routine Maintenance by Contract Pilot Project	15 September - 7 December 1997
Part 2 (new)	Tender Procedure for Pilot Project	January - September 1998
Part 3 (new)	Implementation and Follow-up of Pilot Project	October 1998 - October 1999

For Part 1, a working proposal was prepared and accepted by the ARD, in consultation with the World Bank and TACIS TRACECA. Services under Part 1 will be provided until the present service contract ceases on 7 December 1997. Proposals for continuation under Parts 2 and 3 are included in the Report.

Planned Outputs: The concrete results of the present contract (Part 1) will be a pre-study for Routine Maintenance by Contract, and a detailed plan for a pilot project. There will be a number of seminars, requiring heavy involvement by the Client in constructive discussions about subjects and documents, like the following:

- Maintenance standards, stating the required service level and standard the Contractor has to achieve in a contract
- Contract forms for maintenance of a road network area and Bill of Quantities (to the extent required), which are the documents governing the Contractors obligations and payments, to FIDIC and other international standards. Bid evaluation - how the competing contractors' bids should be evaluated by the Client and how the winning contract is chosen
- Quality Assurance routines - how the required quality of work is controlled and secured, and the roles of the Client and the Contractor in this process. Formal or informal documents which support the actors in the Client-Contractor situation.

Project activities since start:

- Preparation of the Working Proposal for consent by the ARD, and non-objection by the World Bank and TACIS - TRACECA
- Selection of team members experienced in the Routine Maintenance by Contract System.
- Extension of service contract to 7 December 1997
- Mobilisation of team
- Introductory visit at ARD by the Project Director, arrangement of logistics
- Commencement of services by expert team.

Project starting date: Commencement of services in ARD on 09.09.1997

Project duration: Services under Part 1 until 07.12.1997

2. **ANALYSIS OF PROJECT, START SITUATION**

The project commenced with the arrival of the Project Director Mr. Werner P. Weiler in Jerevan on 09.09.1997. The commencement and the objectives were discussed with Mr. Elarian, Director of ARD, and key personnel. Logistics and resources were prepared for the arrival of the team on 19.09.1997, slightly delayed because of delays in granting of visa in the Russian Embassy in Stockholm.

The Project Manager, Mr. Frank Granberg and the Road Maintenance Expert, Mr. Kurt Ahrling arrived in Yerevan early on the 19th September. Mr. Carsten Griese, Road Engineer and PMS Specialist, arrived on 23.09.1997. They were well received by the Counterpart Staff, and the staff of ARD, consisting of

- Mr. Nikolay Elarian – Director of PIU
- Mr. Samvel Avetian – Office Manager
- Mr. Hakob Petrosyan – Project Coordinator
- Mr. Ruben Sulkhanyan – Computer Expert
- Mr. George Sarkissian – Finance Manager
- Ms. Varya Bzhikyan – Interpreter
- Mr. Moses Peroglyan – Driver

An office, within the premises of ARD, with three desks, computers and printer was assigned to the team. Copying facilities, fax and international telephone connection were readily available.

Accommodation was arranged in a four-room flat in Yerevan.

There have been frequent discussions with the Project Co-ordinator, Mr. Hakob Petrosyan and other persons within the ARD, as well as some inspection tours.

The second and third week of the visit coincided with a visit by the World Bank evaluation mission. This offered an opportunity to discuss in a constructive way, the project with the representatives of the Bank, Mr. Anders Bonde and Robert Nooter.

Initial Findings

Definitions

For the purpose of the discussions in the project it is important to define the terms used.

1. Routine Maintenance covers the road maintenance activities, which are required more or less continuously on any road. These activities are such as removal of debris and other obstacles to traffic, repairing of pot-holes, drainage clearing, grass cutting, bush clearing, road sign cleaning and repair, repairing of ruts, grading on gravel roads, patching, repairing edges and sealing cracks on paved roads. Sub-groups of activities in routine maintenance are:

- Urgent repairs and works which are required to keep the road open to traffic in a relative safe way,
 - Recurrent maintenance of paved roads, which means repair activities performed at intervals during the year to decelerate the deterioration of the paved surface,
 - Recurrent maintenance of gravel roads, which includes grading and pothole repair,
 - Winter maintenance, which includes snow and ice removal, gritting and salting.
2. Periodic Maintenance, which covers maintenance required at intervals of several years, like maintenance of side drains and other drainage facilities, regravelling of gravel roads and gravel shoulders on paved roads, resealing and resurfacing of paved roads, and renewal of road signs and markings

Bridge maintenance is an important aspect of road maintenance, which can be fitted in with the above definitions.

3. **PROJECT PLANNING**

Existing Goals and Objectives

From a recent draft document from the ARD the following is quoted.

Obstacles in the development system

- Presently the financing of the road sector is from the limited state budget. Roads are not highly prioritised in competition with other urgent state obligations. Roads were assigned the funds left over after all urgent matters were given their share. This has been far from satisfactory.
- There are no legal means to enforce and prevent damage to the roads, construction of building and other obstacles intruding on the road or the road reserve or causing traffic hazards.
- Road project have not always been optimally prioritised
- The state monopoly and lack of competition in the road construction and maintenance sector has detrimental to quality of works and cost efficiency.

Objectives of the state road system

- To construct and maintain state roads in order to improve transport economy
- To plan and construct roads for the development of the state road network
- To satisfy the demand from road users, and reduce transport costs and travel time for goods and people, and satisfy the population's social demands.
- To apply technical policies and standards approved by RA for road construction and maintenance, and utilise advanced technical methods and experiences.
- To protect the environment.
- To study and present norms and standards for the road sector.
- To propose legal instruments for the development of market economy relations in the road sector.
- To improve traffic safety
- To create an IT system for the road sector

- To study road user demands and means to satisfy these demands
- To carry out practical research in the road sector
- To study and apply scientific and technical achievements about materials and methods in the road sector

State road policy

- To support reconstructed villages and settlements near the state border
- To contribute to solving the accommodation of refugees
- To promote the interest of road users
- To reduce environmental damages
- To promote traffic safety
- To introduce market economy in the road sector
- To arrange stable financing for roads
- To establish modern planning system
- To introduce and implement a priority system for road construction, improvement, rehabilitation and maintenance
- To introduce modern equipment, materials and methods
- To open the international market for bidding on road construction projects

The objectives of the state road system will be achieved through the following policies

- Creation of legal instruments and standards
- Creation of effective organisation and management for the state road sector
- Introduce modern methods for project prioritisation, and construction
- Control and maintain the condition of roads
- Promote privatisation of selected enterprises and workshops
- Participate in the improvement of the infrastructure

Present ARD Organisation and Characteristics

The present organisations and manning of ARD and PIU are shown in Appendix A and B. The organisational and institutional development of ARD toward a market-oriented organisation is a major commitment by the management of ARD. When the ARD management has found a suitable objective for their development, they might however need a supporting management expert to strengthen them and put pressure on the process of change.

Division of Armenia in Regions, Districts etc. – the Political Geography

Armenia used to consist of 38 Regions, but they are now rationalised into 10 Marzes. Each of these Marzes has a head and a second level government. In the Marzes are cities, municipalities, villages and communes. Streets on the Highway network are maintained by ARD except in Yerevan, Guimri and Vanadzor

Construction Units and Maintenance Units – Number, Capacity and Competence

Presently there are 16 state enterprises for road construction and maintenance. The unit in Guimry was visited. Economy, plant and supply of material seems to be the major problems.

The Present State Road Network - Road Classification and Network Composition

The State road network has presently a total length of some 7600 km. The replacement value of this network may roughly be estimated at $3 \cdot 10^9$ USD. The efforts to maintain the roads and the value of this asset could be compared with this figure.

Road Class	Length, kms	% paved	Road Administrator
National (Interstate) Highways	1502	97	ARD
Republican Roads	1787	88	ARD
Local Roads	4348	67	ARD

Road Classes are based on functional criteria. Highways and to some extent Republican roads are the only ones which have any maintenance. On some of the main Highways the riding surface has been improved, but there seems to have been no maintenance whatsoever to other road elements. Drainage in the form of side drains is normally non-existing, as they were never constructed in the first place. Guard rails are frequently damaged and of dubious design. Pavement edges are not protected and not aligned with the side slope. There has been no bush and grass clearing at the sides of the roads. Pavement markings are normally missing. Signs are rare, as most of them have disappeared. If there are any signs left, they are hardly legible. Stones, used as stopping blocks for disabled cars and trucks, remain in the carriageway. Bridge maintenance seems to be worth much more concern than present.

The main basic problem is the lack of funds, but also defects in the supply system has caused considerable delay for instance in WB financed rehabilitation projects, where the funds are secured.

Local Roads are intended to transfer from ARD to local authorities. These roads receive no maintenance at present and in reality the change will not be significant in any direction of maintenance standard. How these roads ought to be maintained and by whom and from what financial sources is a question outside this project. Besides, there are communal roads and city streets. In Yerevan there are some 800 – 1000 km of streets.

Road Financing and Budget

Allocation for Road Maintenance since independence has been very minimal. In 1994 and 95 nothing was allocated to road maintenance. In 1996 the amount from the Armenian State Budget was enough only for 183 km of road (2% of the network). A World Bank loan has made it possible to save parts of the main Highway network through a rehabilitation programme. The needs for funds correspond to an annual amount in the vicinity of USD 1000 per km or 8 million USD (3 800 million ARD) per year. This is 0.25% of the estimated replacement value of the road network.

Discussions are ongoing about Road User Charges and the establishment of a Road Fund. Without sufficient financing, the roads will continue to deteriorate to a state beyond repair.

The Plant Pool

The Plant Pool was created as a support to the new enterprises. In the future it is anticipated that it will become Private Enterprise acting in accordance with market economy principles. The enterprises are not yet ripe for such a development.

Procurement document and procedures

A number of rehabilitation projects are ongoing tender and contract documents are based on a World Bank Standard, which most likely will be a suitable starting point for the development of contract document for Routine Maintenance by Contract.

Specifications and regulations about material, methods and products are found in a number of documents of varying quality from FSU and some western countries. A list of these is found in Appendix D.

Methodology

The participation of the Client (ARD) cannot be over-emphasised. The Consultant's role is to propose and inspire new approaches and solutions, assist and support the Client. Consequently, it is the Client's responsibility to manage the project, make the required decisions, collect and process data needed for the project, and organise and manage the Pilot Project.

The following items, which are not in order of priority, will be dealt with as described under each heading.

- Pre-study for Routine Maintenance by Contract. It is important to identify factors which influence the possibility of a positive development. Among the ones already identified are financing, which is critical, supply of material, equipment and development of ARD's organisation. Also the problem for the test is critical and may determine the design of the test.
- Road Sector Finance is of fundamental importance. Unless the financial situation for road maintenance is radically improved, e.g. through a system with Road User Charges and a Road Fund, it seems very hard to justify a Pilot Project on non-existing routine road maintenance, and radical organisational changes.
- Collaborate liaison with concurrent projects is important as much work which fits into the project is likely to be done in other projects. Double work must be avoided, for instance, it is envisaged that the forms for contract etc. used in the World Bank Highway Project can be used or supplemented to fill the needs of this project.
- Organisational development of ARD into a Client organisation is a basic prerequisite. The process of discussing this matter and inspiring the ARD management to develop the organisation has started and will continue throughout the project and its possible extensions.
- Detailed plan for a pilot project will include selection of test area/road network, plan for inspection and documentation of the test area, selection of suitable enterprise for the test and plan for pilot study management.
- Road and Bridge Maintenance Standards, stating the required Service Level and standard the Contractor has to achieve in a contract.
- Contract forms for maintenance of a road network area will if possible build on the format used in the WB Highway Project and other recent and ongoing projects.

- Bill of Quantities (to the extent required), which are the documents governing the Contractors obligations and payments. The format will to some extent be borrowed from the Swedish system. A selective choice of items is necessary in order not to complicate the contract. An inspection and an inventory have to be made for the test area.
- Bid evaluation - how the Client should evaluate competing bids and choose the winning contract should be based on 100% objectivity.
- Rationalisation seems to be an area with great prospect. In a fully fledged Client/Contractor system this ought to be the concern of the contractor, but in the present situation it could be of value to show both Client and Contractor of the potential in this area.
- Quality - how the required quality of work is controlled and secured, and the roles of the Client and the Contractor in this process. Formal or informal documents which support the actors in the Client-Contractor situation. I should be discussed how much of QA and self-control is possible to demand presently.
- Manuals and Guidelines are probably needed and this need has to be identified and possibly documented in proposals for additional projects.
- Legislation related to maintenance by contract will be left with an expert, hired by the ARD.
- Seminars, requiring heavy involvement by the Client in constructive discussions about subjects and documents, like the following.
 - Development of ARD organisation and management
 - What is an acceptable standard of road maintenance for different types of roads?
 - Priorities for different road classes and different maintenance activities.
 - How to bring the roads to a maintainable standard?
 - Contract documents and specifications.
 - Quality
 - Rationalisation
 - Control
 - The definition and development of the Client role

Revised Work Programme and Proposals for Additional Works

Work Programme

The reviewed and slightly more than previously detailed Work Programme is shown in a diagram Appendix G.

Proposals for Additional Tasks

Work Proposal For Phase 2 And 3

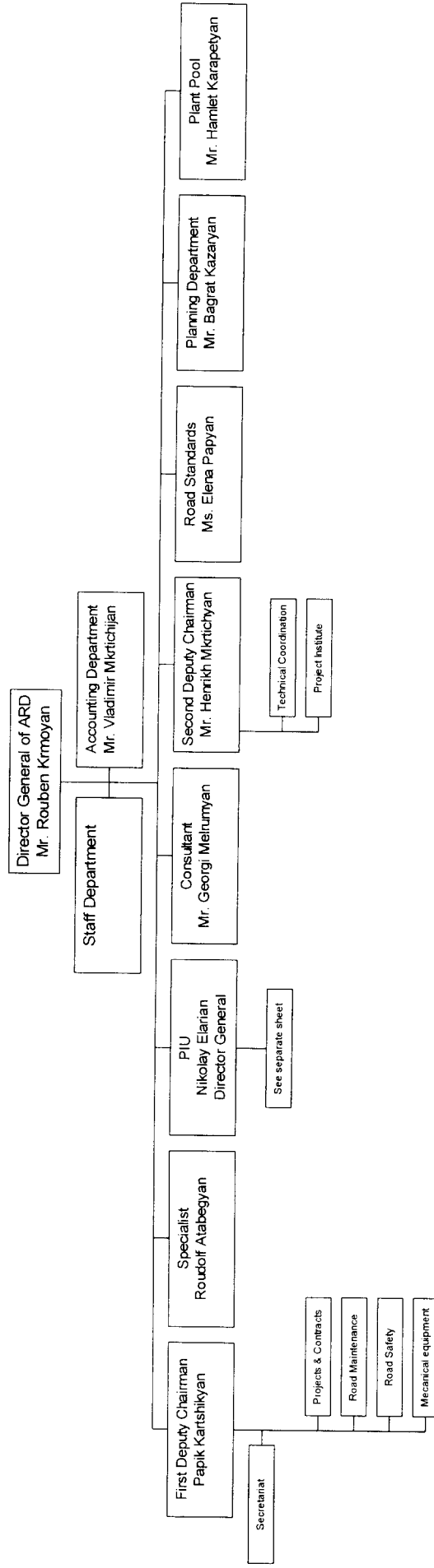
A revised proposal for the continuation of the project in Phase 2 and 3 is attached as Appendix H

Management Support to ARD during Transition Period

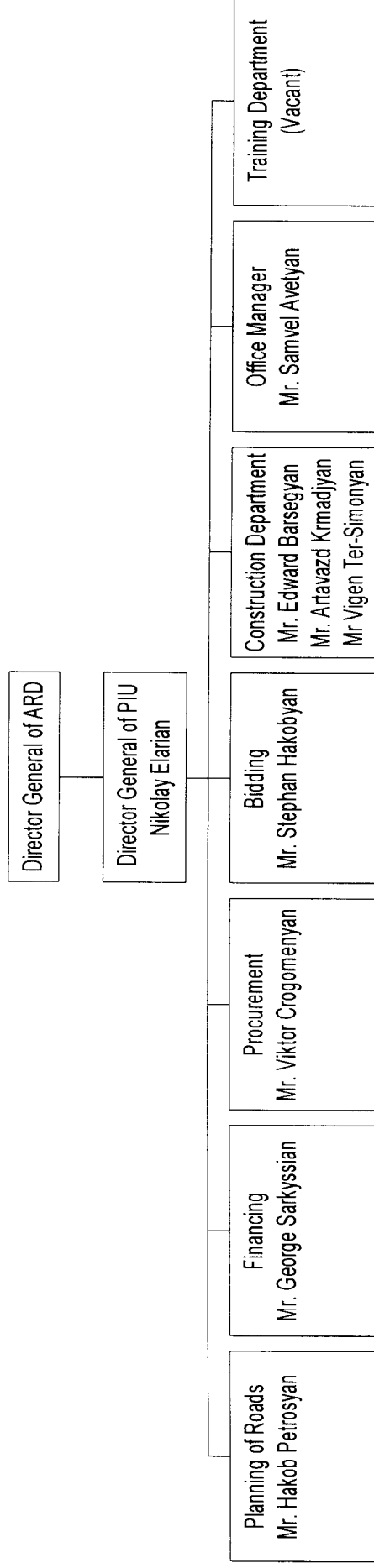
The ARD is heading for a demanding task if it will develop into a proper Client type organisation. The Management would most likely benefit greatly from the support of a qualified management expert who would visit at regular intervals, say every two or three month and assist the management and also put some pressure on the development process. The total costs for this assistance can be estimated at ECU 45 000. This proposal will be further discussed with ARD management.

APPENDICES

Appendix A - The Present Organisation of ARD



Appendix B - The Present Organisation of PIU



Appendix C – Excerpt from Project Working Proposal

Objectives

The main objective is to assist the Armenian Road Directorate of Ministry of Transport and Communications in the Republic of Armenia in the development of a system whereby routine road and bridge maintenance will be carried out by contract.

The present project is Part 1 only. Part 2 and 3 are suggested new projects in 1998 and 1999 to continue the development of a functioning system for routine maintenance by contract, as shown below.

Expected Results

The concrete results of the present contract (Part 1) will be a pre-study for Routine Maintenance by Contract, and a detailed plan for a pilot project. There will be a number of seminars, requiring heavy involvement by the Client in constructive discussions about subjects and documents, like the following.

- Maintenance standards, stating the required Service Level and standard the Contractor has to achieve in a contract.
- Contract forms for maintenance of a road network area and Bill of Quantities (to the extent required), which are the documents governing the Contractors obligations and payments. FIDIC and other international standards. Bid evaluation - how the competing contractors bids should be evaluated by the Client and how the winning contract is chosen
- Quality Assurance routines - how the required quality of work is controlled and secured, and the roles of the Client and the Contractor in this process. Formal or informal documents which support the actors in the Client-Contractor situation.

Appendix D – Specifications referred to in WB Highway Project

Item No	Standard name, number	Title
1	prEN 933-1	Determination of particle size distribution
2	prEN 933-3	Determination of particle shape of coarse aggregate
3	AASHTO T 85-91 (PANK2107)	Specific gravity (coarse) determination of particle density
4	AASHTO T 84-93 (PANK2107)	Specific gravity (fines) determination of particle density
5	prEN 12697-10, prEN 12697-5, AASHTO T 209-93	Compaction of bituminous mixtures using Marshall apparatus and maximum density of paving mixtures (%voids) and specific gravity of paving mixtures
6	prEN 12697-6, AASHTO T 166-91	Bulk specific gravity of bituminous paving mixtures using saturated surface dry specimen
7	prEN 126-97-8, AASHTO T 269-91	Percent of air voids in compacted dense and open bituminous pavement
8	prEN 227106, prEN 1980, TC 227107	Determination of bitumen content and gradation of asphalt concrete mix
9	AASHTO T 180-93	Moisture density relationship
10	AASHTO T 205-86	Density of soil in-place by rubber balloon method
11	AASHTO T 255-92	In-place density and moisture content
12	FinASp	Finnish asphalt specifications 1995
13	prEN 12591	Bitumen and bituminous binders
14	AASHTO T 202	Asphalt cement mix viscosity test
15	SNiP 2.05.03-84	Compaction
16	URNORM	Uniform requirement for methods of organisation of roadway movement, utilised during roadway construction, Moscow 1989
17	GOST 10178-95	Cement materials
18	VSN37-84	Traffic control
19	VSN 24-88 (17.5.21-5.5-23)	Aggregate material specification
20	SniP 2.05.02-85	Construction standards and rules for roads
21	SniP 3.06.03-85	Construction standards and rules for roads
22	SniP 2.06.02-85	Material for embankment
23	VSN 46-83	Russian soil classification
24	GOST 25192-82/87	Cement material specifications
25	VSN 42-91	Rates of application during construction and maintenance of highways and bridges
26	GOST 8267-82	Crushed stone
27	GOST 8367-82	Aggregates
28	GOST 26633.85/89	Cement material specifications
29	SNiP 3.06.06-88	Manual of asphalt concrete pavement and subgrade construction for roads and airfields
30	GOST 8736-89	Sand
31	3.50.1.1-144 3.501.0-46 3.501-59	Typical album series for culverts
32	503-09-7.84	Typical album for lined ditches
33	GOST 23457-79186	Technical specifications of organising traffic movement
34	GOST 10807-78(#3)	Traffic control material

Appendix E - Meetings Held and People Met

Date	Subject	People met	
20/9	General information	Mr. Papik Kartshikyan, Mr. Nikolay Elarian Mr. Hakob Petrosyan	First Deputy Chairman of ARD Director of PIU Project Coordinator
22/9	Project programme, winter maintenance	Mr. Papik Kartshikyan, Mr. Hakob Petrosyan Mr. Roudolf Atabegyan	First Deputy Chairman of ARD Project Coordinator Head Consultant
23/9, 24/9	Project Discussions	Mr. Hakob Petrosyan	Project Coordinator
25/9	Project programme	Mr. Nikolay Elarian Mr. Hakob Petrosyan Mr. Anders Bonde Mr. Robert Nooter	Director of PIU Project Coordinator WB Task manager WB Consultant
	Plant Pool	Mr. Hamlet Karapetyan Mr. Hakob Petrosyan Mr. Zohrab Petrossyan	Director of Plant Pool Project Coordinator Head of Sevan Enterprise
26/9	Inspection field tour Yerevan – <u>Guimry- Spitak</u>	Mr. Hakob Petrosyan Mr. Robert Sukiasyan.	Project Coordinator Chief Engineer, Guimry Construction Enterprise
27/9	Meeting with Finnroad, Supervisors on Armenia Highway Project	Mr. Aimo Aaltonen Mr. Vyatas Vilutis	Team leader Supervision Engineer
28/9	Sunday		
29/9	Meeting with WB Delegation	Mr. Anders Bonde Mr. Robert Nooter	Head of Mission Assistant
30/9	Visit to Traceca Office at MoFE	Business Card and Basic Project Data left at office	
1/10	Visit to Seminar on RUC and Road Fund at the American University. Seminar led by the Hon. Minister of Works, Mr. H. Kochinyan. Mr. Ian Heggie, WB, Mr. H. Millner, Latvian Road Fund were key lecturers.		
2/10	Planning of Seminar 1	Mr. Hakob Petrosyan Mr. Papik Kartshikyan,	Project Coordinator First Deputy Chairman of ARD
3/10	Seminar 1	Introduction to Maintenance by Contract, Client/supplier roles, Organisation (Mr. Paprik Kartshikyan, Mr. Hakob Petrosyan and 8 other participants)	
3/10	Meeting with Tacis Representatives	Mr. Khachatur Manukyan	Local Expert, Assistant

Appendix F - List of ARD Plant and Equipment and Plant Pool

Equipment Category	Total Number	In Working Order	Owned by Plant Pool
Passenger cars	59	41	3
Buses	67	51	4
Cargo trucks	130	101	4
Dump trucks	293	209	38
Bitumen sprayers	31	19	4
Bitumen sprayers	39	23	4
Fuel tank trucks	34	27	3
Water sprayers	70	45	10
Multipurpose trucks	33	26	4
Crane trucks	67	38	2
Road Painting machines	22	13	1
Low loader trailers	21	14	1
Chipping spreaders	12	11	4
Snow blowers	49	38	4
Crawler tractors	127	81	6
Excavators	103	55	4
Motorgraders	137	88	40
Motorscrapers	59	41	-
Asphalt plants	54	36	-
Asphalt pavers	40	19	-
Bucket wheel loaders	76	28	1
Compactors	104	46	4
Air compressors	59	29	4
Wheel tractors	65	44	-
Steam units	58	44	-
Electric welding machines	122	84	-
Electric generators	38	18	-
Crushing plants	66	50	-

Appendix G - Plan of Operations for the next Period (Work Programme)

Project title: Traceca Project - Implementation of Pavement Management Systems, Assistance to the Armenian Road Directorate	Project number: TELREG 9305	Country: Armenia	Page: 1
Planning period: 10/1997 - 12/1997	Prepared on: 13/10/1997	EC Consultant: KOCKS CONSULT GMBH, Koblenz/Germany	

Project objectives: Assistance to the Armenian Road Directorate in the Development of a Routine Maintenance Contract System

No.	Main Activities	TIME FRAME 1997 Months				INPUTS		
		October	November	December	PERSONNEL	EQUIPMENT AND MATERIAL	OTHER	
					EC	Counterpart		
1	Management Development and Documentation							
1.1	Summer Routine Maintenance Standards							
1.2	Review existing standards	X	X		1 week	1 week		
1.3	Recommendation of standard definition	X	X		2 weeks	3 weeks		
2	Winter Maintenance Standards				0.5 weeks	0.5 weeks		
2.1	Review existing standards		X		1 week	1 week		
2.2	Recommendation of standard definition		X	X	2 weeks	3 weeks		
2.3	Recommendation of required service level			X	0.5 weeks	0.5 weeks		
3	Pavement Management System							
3.1	Adjustment of PMS to local condition	X	X		3 weeks	4 weeks		
3.2	Incorporate PMS in Mainten. by Contract	X	X		2 week	4 weeks		
4	Tender Documents							
4.1	Contract forms for Routine Maintenance		X		4 weeks	4 week		
4.2	Standard Bill of Quantities	X	X		2 week	2 week		
4.3	Bid evaluation model		X	X	1 week	1 week		
5	Organisation, Management a. Resources							
5.1	Review present situation							
5.2	Proposal for the future organisation				1 week	1 week		
5.3	Manuals and guidelines for internal routines		X	X	2 weeks	2 weeks		
5.4	Quality Assurance (QA)				1 week	1 week		
5.5	Legislation		X		1 week	4 weeks		
6	Pilot Study Planning							
6.1	Selection of the pilot sections	X			0.5 weeks	0.5 weeks		
6.2	Inventory of the pilot section		X		2 weeks	4 weeks		
6.3	Work Programme for the pilot section		X		2 weeks	2 week		
6.4	Bill of Quantity for the pilot section		X	X	1 week	1 week		
6.5	Preliminary Tender Documents for the pilot section		X	X	2 weeks	1 week		
		TOTAL			31.5 weeks	40.5 weeks		

Appendix H - Work Proposal for Phase 2 and 3

**SERVICE TO THE ARMENIAN ROAD MAINTENANCE SUB-PROJECT
UNDER TECHNICAL ASSISTANCE CONTRACT, ADDENDUM NO. 1 TO
TRACEA PROJECT: IMPLEMENTATION OF PAVEMENT
MANAGEMENT SYSTEMS**

**ASSISTANCE TO THE ARMENIAN ROAD
DIRECTORATE IN THE DEVELOPMENT OF
A ROUTINE MAINTENANCE CONTRACT
SYSTEM.**

**APPENDIX H TO INCEPTION REPORT –
PROPOSAL FOR PART 2 AND 3 - PILOT
STUDY**

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List of abbreviations

ARD	Armenian Road Department
EBRD	European Bank
FSU	Former Soviet Union
LFA	Logical Framework Approach
PIU	Project Implementation Unit
QA	Quality Assurance
RMCS	Road Maintenance Contract System
TACIS	Technical Assistance to CIS Countries
TRACECA	Transport Corridor Europe Caucasus Asia
VOC	Vehicle Operating Costs
WB	World Bank

Background

In most countries, Governments own forces execute maintenance of roads and bridges. During the last decade, a number of countries around the world have revised their policies towards using more contractors. The forms for contracting out works vary from country to country. Some countries limit the contracting to certain well-defined activities, such as pavement overlays, major bridge repairs or rehabilitation of road pavements. Others, among them Sweden, have starting contracting out the total responsibility for routine road and bridge maintenance in a specified road network.

The mere introduction of competition results in substantial reductions compared with the force account alternative. However, important issues such as technical specifications, quality and measurement of works, traffic safety and environment have to be considered in the process of change. The Armenian Road Directorate, ARD, is presently contracting out periodic road maintenance to the 18 Road Construction Enterprises, emanating from the former state road construction units. The next, planned step is to do also routine maintenance by contract.

There is no general solution which is suitable to all countries, but the administrative homogeneity in the former Soviet union (FSU) countries opens the possibility for multiplication effect of a Routine Maintenance Contract System (RMCS) developed for Armenia in some other FSU countries with similar climatic conditions. The transition between force account and contracting and the development of appropriate RMCS should be made with due consideration of the local conditions. This is probably best done by first developing RMCS in the form of a pilot project.

A prerequisite for a pilot project, as well as for a full scale maintenance by contract system, is a functioning road financing system, which can guarantee that funds are available for multi-annual contracts. Important is also efficient supply of imported and local road maintenance material.

A Tentative Vision of the Future

It is important to spend sufficient time and efforts on clarifying the ultimate objectives of the projects. As a base for the discussion and analysis could serve a vision of the future based on facts, intuition and imagination. Among factors considered could be the culture and characteristics of Armenia and comparisons with countries, which are more, experienced in the ongoing evolution of the public sector, especially the road sector.

When the present situation is compared with an ambitious vision of a distant future one might find that some realistic limitations has to be applied to the vision to make it sufficiently ambitious and focused on the roads. This could result in a vision for ARD, and serve as a base for the formulation of adjusted and detailed objectives for the project and the development of ARD. Based on the tentative vision and an evaluation of the present situation in Armenia, including a comparison of organisation and resources between Armenia and European countries, a detailed vision for a 5 to 10 years period will be done and serve as a base for a new strategy.

The following is an example.

- The road network in Armenia is available for road users all the year round.
- Normal speed, 70 - 90 km/h can be used except during extreme weather conditions. During the thaw-period, however, there could be load restrictions for heavy traffic and reduced speed for other vehicles.
- The standards for routine maintenance are described in measurable terms, possible to control.
- The ARD is a client organisation with competence to buy routine maintenance. ARD has a QA-system with well-defined routines,
 - to produce tender documents,
 - to evaluate the bids and choose the best contractor and
 - to follow up that the standard requirements are fulfilled
- There are several competent contractors with efficient organisations for routine maintenance. They have QA-systems that ensure that the road users get a road standard according to the tender documents.
- Alternative forms of contract for routine maintenance are used in order to take advantage of the present market situation and to give the contractors an incentive for development and efficiency.
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A New Strategy - A Process of Change

The transformation of the present organisation towards an ambitious vision of the future can hardly be done in one step – it probably requires many small and tedious steps in a more or less continuous process of change. The vision will very likely change on the way through this process. A strategy and a plan for development has to be worked out and adopted in the ARD, and known and accepted by all involved.

To achieve the vision for the road network, it is initially necessary to separate the “client” and “supplier” functions and to manage routine road maintenance according to commercial principles. Suppliers will be the newly established cadre of Construction Enterprises. The process is suggested to be done in steps of different duration and include the organisation as a whole.

- Step 1. Separate the “client” and “supplier” functions of road maintenance (including both periodic and routine maintenance). Establish a buyer-seller relation within the ARD but keep skills for work management and supervision in the client’s organisation. Buy routine maintenance as well specified activities on a short-term basis like periodic maintenance. This means that the major risks remains with the client. There is an ARD-owned plant pool, which could remain temporarily during this intermediate stage.
- Step 2. Increase the contents and extend the time of the contracts. Contractors to do all supervision. The client should reduce resources for work management and supervision. The suppliers should be fully responsible for plant and equipment. Tendering procedures are used and private contractors could be competing with the ARD “suppliers” in a pilot region.
- Step 3. Procure routine maintenance for a specific road network during 2-4 years. The contracts include both standard requirements and specific activities to be carried out. Contractors should own plant and equipment.

Step 4. Procure routine maintenance with service level standard requirements only, for a period of 4-6 years.

The step by step solution makes it possible to:

- start from a known position,
- include the entire organisation in the development of the new ideas for managing road maintenance. This is important in order to get common acceptance for the changes.
- avoid big mistakes that could jeopardise good long term solutions,
- get time to develop new standards and methods to control the achieved results

Once the process has started and all regions are “on the train”, it is possible to choose a pilot region to be “a step ahead”. During the process, it can be decided when it is suitable to divest supplier functions from the ARD. This can be done when the supplier entities have the right skills and can be independent from the ARD regarding plant and equipment.

A prerequisite for the development in this direction is that funds for maintenance are secured for several years ahead. Only then is it possible to sign maintenance contracts which run for several years. In order for the Contractor to establish himself properly and survive and to get competitive prices, it is necessary to make the contracts cover several years. A development of an independent Road Fund based on Road User Charges or something similar is necessary.

The five development stages to a client – supplier relation entirely based on service level standard requirements will take some time. The pace will be decided in the process of the Project. A tentative timetable for the first 3 stages, which is likely to be the most realistic ambition for the Project is:

Preparations	Month 0: 6 weeks (consultant) + 4 months (work within ARD) + 6 weeks (consultant). This will correspond to the present contract ending December 1997.
Stage 1 and 2	Month 6: Start of preparations for Pilot Project (In new contract)
Evaluation 1	Month 20: winter maintenance
Evaluation 2	Month 26: summer maintenance
Stage 3	Tender procedure for a network in a pilot region during month 8-12 Start of contract for 2-4 years 12 months after project start
Evaluation 3	Month 24: Tender procedure for other regions 18 - 24 months after project start
(Final evaluation	Month 30)

During the Project the following issues have to be discussed and decided on by ARD or other relevant Government level. A number of Seminars and Workshops will be arranged for the purpose. Several of these subjects will be dealt with during Part 1, partly as a beginning of an iterative process, continuing throughout the Project.

1. Road and Bridge Maintenance Standards
2. Quality
3. Rationalisation
4. Commercialisation
5. Contracts
6. Bill of Quantities
7. Evaluation of Bids

8. Pilot study management
9. Weather Information Systems
10. Manuals and Guidelines
11. Road Sector Finance
12. Legislation

A preliminary Work Programme, is attached as Appendix 1. The development of the project documentary output is a consultative and iterative process carried out closely with Armenian counterparts from the ARD. The Consultants will base their activities largely in Armenia, although some home-office time for preparation of documents and responding to requests for guidance between assignments might be required.

The follow-up of winter maintenance operations and summer maintenance respectively in the pilot project has to coincide with the seasons of the year, which means that they has to be done at different occasions. A longer period than just one year is probably required to arrive at relevant and final conclusions about the pilot project. A further extension of the project might be required for this. This can be brought up in the Final Report of part 1, when some more details are known.

Objectives

The main objective is to assist the Armenian Road Directorate of Ministry of Transport and Communications in the Republic of Armenia in the development of a system whereby routine road and bridge maintenance will be carried out by contract.

The present contract between TRACECA and KOCKS CONSULT GMBH is ending 7 December 1997. The project is designed to consist of three parts, of which the first part is contained in the present contract. Remaining parts will have to be negotiated as new contracts. Each part is designed as a project of itself, as independent as possible of any succeeding part.

The assistance is ultimately aiming at a pilot project in such a way that the results will be sustainable in Armenia and possible to transfer to other countries with similar conditions. A successful and sustainable project requires the pilot project to be carried out in close co-operation between the consultant and the ARD. Part 2 and 3 are suggested new projects in 1998 and 1999 to continue the development of a functioning system for routine maintenance by contract, as shown below.

Project	Main Content	Suggested Timing
Part 1 (present contract)	Pre-study and Detailed Plan for Routine Maintenance by Contract Pilot Project	15 September – 7 December 1997
Part 2 (new)	Tender Procedure for Pilot Project	January – September 1998
Part 3 (new)	Implementation and Follow-up of Pilot Project	October 1998 – October 1999

A preliminary outline of the possible content of Part 2 and 3 is presented below.

Expected Results

The results of Part 2 will be finalisation of the work on Summer Routine Maintenance and Winter Maintenance started during Part 1. There will also be a continued input and discussion with ARD about their organisational and institutional development with respect to Routine Maintenance. The situation about applicable legislation for the privatisation process will be checked. Finally, the details about the Pilot Study will be scrutinised and the Tender Procedure and evaluation of bids will be presented as material for the award of the Pilot Study Contract.

Part 3 consist of the one year Pilot Study, which will be checked half-way through the contract and followed up and evaluated at the end of the study period. Necessary changes and steps for the further development will be proposed.

Plan of Work

Part 2 consists of a preparation, tender procedure and evaluation of bids for a Pilot Study of Routine Maintenance by Contract, and a detailed plan for the pilot project. Part 3 consists of the Pilot Study, follow up and evaluation.

Organisation and Timing

The project shall be carried out in co-operation between the consultant and an RMCS Committee, which will be composed of members of the PIU and based in Armenia. The ARD have assigned a local Project Manager to assist and advice the consultant generally, and to lead the implementation and local components of the work. In addition, the ARD will assign a legal consultant to provide occasional briefings, opinions and reviews of output.

Part 2

The Consultants input is organised in two visits during part 2. Between the visits, the Project Committee and other local staff assigned to the Project will carry out specific tasks, and the Consultant will prepare material for the second visit at his home office.

A Work Programme for part 2 and 3, showing the activities and the manning is presented in Appendix 1. Reports and other Milestones are indicated in the Schedule. The consultants input is planned to 25 man-weeks in Armenia during this part 2, during the period 15 Mars to 31 August 1998.

Part 3

The Consultants input is organised in four visits during part 3. Between the visits, the Project Committee and other local staff assigned to the Project will carry out specific tasks, and the Consultant will prepare material for the following visit at his home office.

A Work Programme for part 2 and 3, showing the activities and the manning is presented in Appendix 1. Reports and other Milestones are indicated in the Schedule. The consultants input is planned to 15 man-weeks in Armenia during this part 3, during the period 1 October 1998 to 31 October 1999.

Client Participation

The participation of the Client (ARD) cannot be over-emphasised. The Consultant's role is to propose and inspire new approaches and solutions, assist and support the Client. Consequently, it is the Clients responsibility through the RMCS Committee to

- Manage the project
- Make the required decisions
- Collect and process data needed for the project
- Organise and manage the Pilot Project

Team of Consultants

A team of consultants will carry out the work. The names and the tasks are summarised as follows:

1. FRANK GRANBERG - Project Manager.
Mr. Granberg will be responsible for the planning and implementation of the different project activities. He will pay special attention to the preparation and presentation of the different reports of the study.
2. SVEN ODÉN - Senior Road Engineer and Maintenance Management Expert
Mr. Odén will assist the Project Manager in his work and assume the overall responsibility for all technical aspects of the study.
3. KURT AHRLING - Road Engineer and Road Maintenance Expert
Mr. Ahrling will be responsible for the road inventory work as well as all other field activities. Mr. Ahrling will be stationed in Yerevan for most of the study period
4. WINRICH F. WEIMERT - Road Engineer and Contract Supervision Expert
Mr. Weimert will be responsible for parts of the field work during Phase 2 and will be responsible for control of works during Phase 2 together with Mr. Ahrling.

Related Projects

Collaborate liaison will be required with several concurrent projects, including

Azerbaijan Road Project	TACIS
Turkmenistan Road Improvement Project	EBRD/TACIS
Georgia Highway Project	WB/TRACECA
Yerevan – Batoumi Road Study, Armenia and Georgia	TACIS/PCP
Transport Legal Reform	TRACECA
Pavement Management Systems	TRACECA

The consultants will co-ordinate their work closely with all related activities within the TRACECA region.

The Consultants shall be responsible for arranging necessary living accommodation, international and local transportation, telecommunications, equipment, investigations, document reproduction, printing, secretarial services, interpretation, translation, office space and all other input required for the purpose of the work.

Accommodation and Logistics

The ARD has offered to provide at no charge basis furnished office accommodation to the consultant, but the adequacy or otherwise of this accommodation for carrying out the study remains the responsibility of the consultant.

Reports and Control Stations

The following reports will be submitted in Part 2 and 3. Their co-ordination with the work schedule is illustrated in the Work Programme Appendix 1.

Inception Report

An Inception Report will be issued within one month of the commencement of the Part 2. It will summarise initial findings and actions and propose modifications to the Work Programme as discussed and agreed with the Client.

Project Progress Reports

There will be one Progress Reports at the end of Part 2 of the Project (end of August 1998), and another in May 1999, half way through the Pilot Project.

Final Report

The Draft Final Report will be issued at the end of October 1999. TACIS Brussels will comment on the Draft Final Report within six weeks of the receipt of the report. The Final Report, incorporating any modifications will be issued by the Consultant one month thereafter.

All reports and deliverables will be provided in the numbers, languages and locations as follows:

	Bound		Loose-leaf		Diskette
	English	Russian	English	Russian	English and Russian
TACIS Brussels	5	1	1	1	2
PIU Armenia	5	10	1	1	1

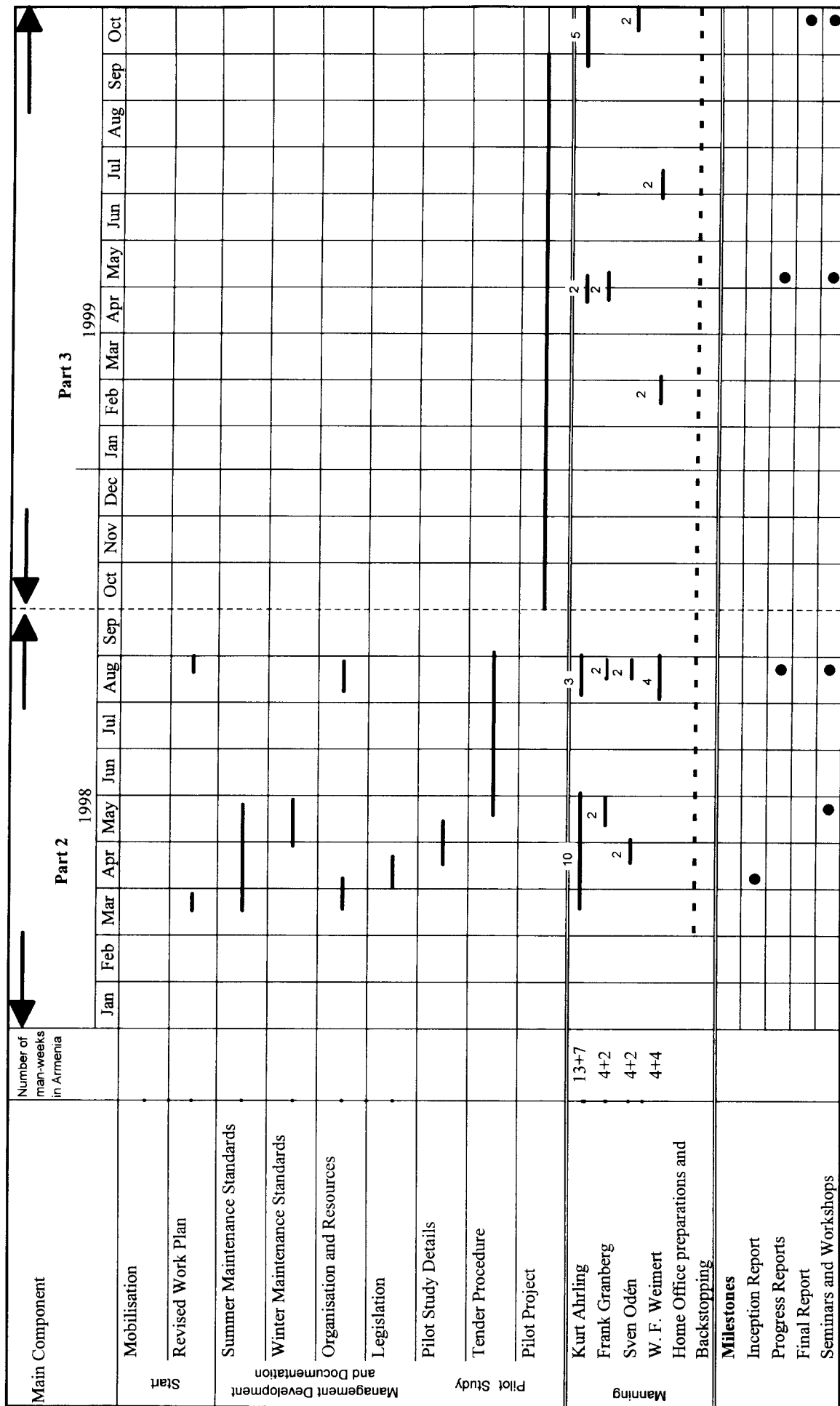
Reports and deliverables will be in accordance with TACIS Guidelines and prefaced by an Executive Summary

Project Budget

A tentative draft budget in ECU for the project Part 2 and for Part 3 is presented in Appendix 2 and Appendix 3

Appendices**Appendix 1 – Outline work Programme****Appendix 2 – Project Budget Part 2****Appendix 3 – Project Budget Part 3**

Appendix 1 - Outline Work Programme. Pilot Study - Part 2 and 3 (rough timing for activities)



LEGEND

- Actual Activity
- Milestone

Appendix 2 - Project Budget Part 2

Below is a tentative draft budget in ECU for the project described above, as a basis for budget discussions.

Fee	Item	Quantity	Rate, ECU	Total, ECU
	1 Senior engineers, 8 weeks in Armenia, including planning and preparation	8	3,300	26,400
	2 Engineer, 13 weeks in Armenia, including planning and preparation	13	3,300	42,900
	3 Backstopping, 3 weeks	3	3,300	9,900
	Subtotal Fee			79,200
	Reimbursable			
Item		Quantity	Rate, ECU	Total, ECU
1	International travel, Europe - Armenia, 7 return tickets (excursion)	7	2,200	15,400
2	Daily allowances, 171 days*ECU 75	171	75	12,825
3	Car Rental and driver services in Armenia, 3.5 months	3.5	800	2,800
4	Translator and secretarial services in Armenia	78	25	1,950
5	Production of workshop material and literature			850
6	Printing of reports			2,000
7	Consumables and freight			1,000
8	Telecommunication	24	200	4,800
9	Contingencies,			1,000
	Subtotal Reimbursable			42,625
	Total			121,825

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 Service for the Armenian Road Maintenance Sub-project under Technical Assistance Contract

Appendix 3 - Project Budget Part 3

Below is a tentative draft budget in ECU for the project described above, as a basis for budget discussions.

Fee	Quantity	Rate, ECU	Total, ECU
Item			
1 Senior engineers, 8 weeks in Armenia, including planning and preparation	8	3,500	28,000
2 Engineer, 7 weeks in Armenia, including planning and preparation	7	3,500	24,500
3 Backstopping, 3 weeks	3	3,500	10,500
Subtotal Fee			63,000
Reimbursable			
Item			
1 International travel, Europe - Armenia, 6 return tickets (excursion)	6	1,400	8,400
2 Daily allowances, 101 days*ECU 75	101	75	7,575
3 Car Rental and driver services in Armenia, 3 months	3	800	2,400
4 Translator and secretarial services in Armenia	49	25	1,225
5 Production of workshop material and literature			850
6 Printing of reports			2,000
7 Consumables and freight			1,000
8 Telecommunication	18	200	3,600
9 Contingencies			1,000
Subtotal Reimbursable			28,050
Total			91,050