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RURAL WORKS COMPONENT

AGRICULTURE SECTOR SUPPORT PROJECT

306-0204

Submitted to:

AID/Representative for Afghanistan
C/O American Embassy
Islamabad, Pakistan

Submitted by:

Volunteers in Technical Assistance
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9. Plastering.

1. Cement Plaster on walls: per 100 square meters.

Proportion of Mortar	12mm Thick 1.44 cu.m (wet)		15mm Thick 1.72 cu.m (wet)		20mm Thick 2.24 cu.m (wet)	
	Cement Kg	Sand cu.m	Cement Kg	Sand cu.m	Cement Kg	Sand cu.m
1:2	979	1.371	1170	1.638	1524	2.132
1:3	734	1.541	877	1.842	1142	2.390
1:4	547	1.532	654	1.831	851	2.383
1:5	446	1.516	533	1.812	694	2.360
1:6	360	1.512	430	1.806	560	2.352
Extra Mortar	20 per cent		15 per cent		12 per cent	

a. Extra mortar needed for filling the joints for ceiling and some other wastage.

b. Finishing with floating coat of neat cement needs:
220 Kg. per 100m² extra cement.

c. For ceiling at 6mm thick take half of 12mm thick on walls.

2. Cement - lime - sand plaster on walls per 100m²:

Proportion of Mortar	12mm Thick			15mm Thick		
	Cement Kg	Lime cu.m	Sand cu.m	Cement Kg	Lime cu.m	Sand cu.m
1:1:6	360	0.25	1.50	430	0.30	1.80
1:1:7	317	0.22	1.54	378	0.26	1.83
1:1:8	274	0.19	1.52	327	0.23	1.82

3. Lime plaster walls, 12mm thick per 100m²:

a. 1:2 Dry Mix with:

Lime : 0.69 cu.m

Sand : 1.36 cu.m

b. 1:1 Dry Mix with:

Lime : 1.00 cu.m

Sand : 1.00 cu.m

Labour cost per 100m² of plaster (average):Skilled : 8 M/Day/100m²Unskilled : 14 M/Day/100m²For scaffolding of ceiling work, take 10 skilled labour per 100m².4. Mud plaster on walls - 25mm thick per 100m²:

Mud : 3.0 cu.m

Straw: 100 Kg.

Labour: Skilled 4 M/Day/100m²Unskilled 7 M/Day/100m²10. Mortar.

The quantities of cement and dry sand per cu.m of wet mortar for various types of work is as follows:

Mix Proportion	Cement in Kg.	Sand in cu.m
1:1	1020	0.71
1:2	680	0.85
1:3	510	1.05
1:4	380	1.05
1:5	360	1.05
1:6	250	1.05
1:7	220	1.05
1:8	200	1.05

Executive Summary

- 1) This paper describes an amendment to VITA's existing project, which provides goods and services to the agricultural sector of Free Afghanistan. The amendment is designed to add a rural works component onto existing activities to complement and support the agricultural sector.
- 2) VITA in its present project currently works on two Tracks. Track I involves work with the Seven Party Alliance of Afghan Mujahideen, and the Afghan Agricultural Project (AAP). Track I represents the institution building component of the VITA Project. Track II involves work through the private sector, and with PVDs. Tracks I and II are discussed on pp 1-3.
- 3) Rural Works for the purposes of this paper are defined to include such things as karez cleaning and minor irrigation improvements, roads and track construction and improvement, and area development schemes. Area development schemes will generally include such things as road or track improvements and work with small irrigation systems, together with the provision of such additional essentials as oxen, flour mills, seeds and fertilizer.
- 4) Three illustrative case studies have been prepared as part of this paper. These case studies describe:
 - o an area development scheme (p. 6)
 - o a typical tertiary road (p. 8)
 - o minor irrigation schemes and karez improvements (p.13)
- 5) Allocation and ownership issues are always sensitive in any development project, and this is doubly so in Afghanistan today. These issues and the ways which VITA proposes to deal with them are discussed on pp. 17-19.
- 6) Staffing for Track III is critical. For the head of the Rural Works Division, VITA plans to use Engineer Mir Moh'd Sediq, who was President of the Rural Development Department of the Government of Afghanistan before the war. (Engineer Sediq's curriculum vitae is given in Appendix II.) Other key staff for the new Division are also coming from the old Rural Development Department. For a partial listing of the

organizational capability which exists to implement this project see 'Organizational Capabilities' pp. 22-24.

- 7) Cost. No new money is currently requested for the activities involved in the creation of Track III. VITA plans to redeploy existing resources within the present contract to initiate limited rural works activities over the next six months. Program costs for limited activities are expected to cost no more than \$200,000. If these initial rural works activities are deemed to be successful, VITA would plan to add approximately \$2 million over and above its current activities. For a discussion of costs, see pp. 21-22.
- 8) A work plan for the next six months is given on pp. 25-26.
- 9) An organizational chart for the Rural Works Division is given on p. 30.

Issues

Three issues need to be emphasized in order to place this project into its proper context.

1. Staffing

Mohammed Sediq is virtually a condition precedent to the future success of this project. It is important that AID/Washington move as quickly as possible to authorize his return to Pakistan. Engineer Sediq worked for the Rural Development Department in the Prime Ministry of the Government of Afghanistan for more than a decade prior to the war. For five years from 1973 to 1975 he was the President of the Department. He has approximately two decades of practical experience in virtually all aspects of rural development. He is a proven negotiator and administrator, who has spent the last three months working as a consultant with VITA to help design the attached package of activities, and at the same time generate support for these activities among the various Afghan political parties. The new Rural Works Division which is described in this paper is explicitly structured around his expertise and experience in working in rural development in Afghanistan, Yemen, Lesotho, and other countries. It is important to move immediately to process the necessary papers in Washington and Islamabad in order to assure that Mr. Sediq will be available to direct the Rural Works Division.

2. Limited Initial Activities

This paper describes a limited set of activities which is being initiated over the next six months. These planned activities will cost a total of slightly more than \$200,000 which will come out of existing funds. It is important to note that this represents a first step. Our plan is to generate a rural works capability over the next six months, which can be expanded in the future, provided that money from the US Congress is available to fund such activities. If no authorized funds are forthcoming, we will use the existing obligated funds more quickly, spending in two years what otherwise would be spent in three.

3. Tracks I, II, and III

This project has been designed to be implemented on three parallel tracks, called, respectively Tracks I, II, and III. These three tracks are meant to complement and supplement one

with the GOP, or among themselves. An office has been rented to house the AAP. As of the date of the drafting of this paper, the Council has provisionally designated several areas inside Afghanistan where they propose to begin work. Over the last six months, however, the Council has not proven itself adept at grappling with substantive or procedural issues. Their principal accomplishment to date has been the fact that they continue to meet on a weekly basis, to talk about what they might do. This is an important step forward for the Alliance, but it is not enough.

Over the next few weeks, the Council may designate some appropriately qualified senior staff to direct the organization in Peshawar, and some appropriate junior staff to serve as agricultural extension agents working in various places inside Afghanistan. Once this has happened, it may become possible to begin to deliver agriculturally related goods and services to some areas inside Afghanistan along Track I.

The experience to date working with the Agricultural Council has been mixed. The role of the Council at a symbolic level is significant. At the same time it is important to note that the differences between and among the political parties are serious and far reaching. These differences divide them along geographical, regional, ethnic, linguistic, sectarian, personal, and political grounds. These far reaching divisions preclude the Council from making quick, efficient, or practical decisions, and make it hard for them to provide meaningful policy direction for the Afghan Agricultural Project.

These difficulties with the Agricultural Council have been thoroughly explored in a series of recent meetings with high ranking Government of Pakistan officials. The GOP is in a position to help redress matters with the Agricultural Council and USAID believes that this will happen. Meanwhile, USAID and VITA await the results of this effort.

A. Track II

VITA at the time of designing its current project (November-December, 1986) also created Track II. Track II is an alternative vehicle to Track I. Working through Track II, VITA is authorized to channel money and resources through private sector businessmen and Private and Voluntary Agencies (PVOs) to assist the agricultural sector of Afghanistan. Track II is meant to complement and supplement the activities of Track I. It is also meant to serve as a mechanism for encouraging responsible behavior on the part of the Agricultural Council, and the AAP, because resources which might not be utilized effectively by Track I can be diverted to Track II. Track II creates additional program options for VITA's project management staff and gives them a lever to facilitate work with Track I.

Generally Track II has been utilized successfully, working as it was designed. Because of the existence of Track II, VITA to date has been able to subsidize the export of nearly 7 million rupees (\$400,000) worth of agricultural machinery to Afghanistan. This machinery has consisted of approximately 350 pumps and engines, and nearly 100 grain threshers which have been sent to approximately six of the provinces of Afghanistan. These items are generally too big and bulky to be sent via Mujahadeen channels. Instead, they have been sent through existing open commercial channels. Afghan businessmen have imported them to Kabul, where they have been offered for sale at subsidized rates. These subsidies have been established at a rate of 20%. These subsidies have been prepaid in Pakistan, and passed on to prospective purchasers in the form of lower prices in Kabul. This process is carefully monitored. To date these subsidies have cost a total of 1,343,200 rupees, or approximately \$77,000 US.

B. Track III

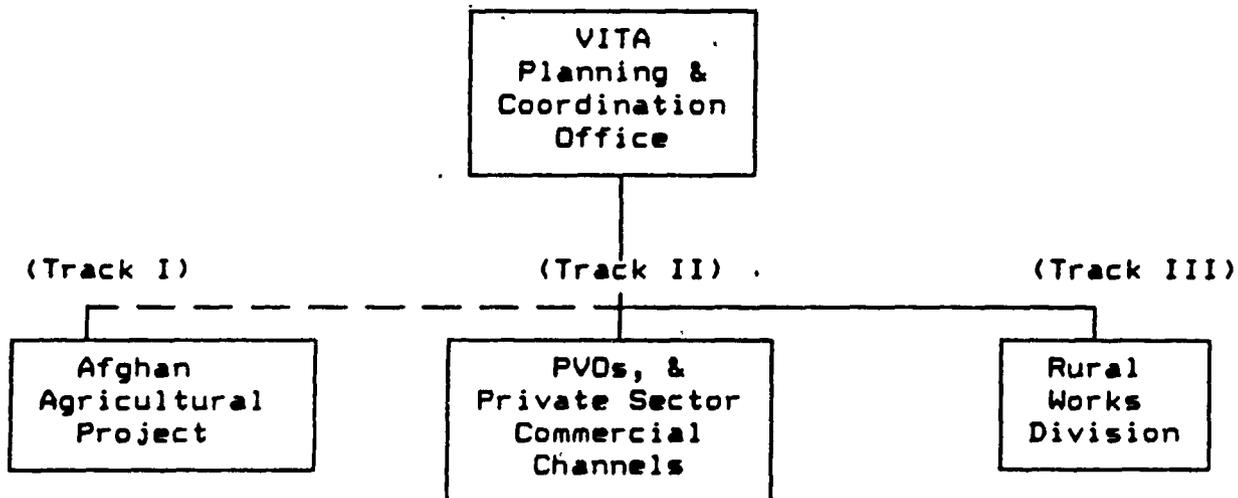
We are now moving to create another component of an overall development strategy and that is Rural Works. Rural Works is a necessary part of development. Agriculture cannot succeed unless there is an adequate supply of water. Water systems need diversions, intakes, ditches and other related structures all of which are engineering jobs and have to be done by a competently staffed technical organization. Similarly digging or cleaning karezes which irrigate an appreciable percentage of lands in Afghanistan fall under a rural works program. Access roads and wash crossings are another facility without which an overall development program cannot be implemented.

In addition to fulfilling an important need of development, this project will provide a third track for delivering goods and services inside Afghanistan. Track III will become the Rural Works Division, which will operate as an additional arm of the VITA core office.

We regard it as exceedingly important that this additional program option be added to the possible avenues available for delivering goods and services inside Afghanistan. At the present time we are dealing with a war situation while trying to work inside Afghanistan. The provision of agricultural equipment, supplies and related infrastructure is literally a matter of life and death for people in some of the rural areas of Afghanistan. We cannot wait indefinitely for the Agricultural Council and the Afghan political parties to agree to a unified course of action which accommodates the myriad ideological issues which currently divide them.

In the short-term, it is imperative that we begin to create a viable service delivery vehicle to facilitate the provision of equipment and supplies to the rural sector as quickly as possible. To accomplish this, we are moving to create the Rural Works Division, which is designed to augment the role of Track I and II.

With the inclusion of a rural works component, VITA's project will be structured as follows:



The new Rural Works Division will be modeled in part on the old Rural Development Department (RDD) which used to be part of the Government of Afghanistan before the war. The Division will be staffed by some of the same engineers, technical staff, and administrators who used to staff the RDD. The Division's mandate will also be similar to the work of the RDD. It is being designed to implement rural works projects which support Afghan agriculture. This generally will mean activities focussing on agriculture, irrigation, and rural transportation.

An organizational chart for a proposed Rural Works Division is given in Appendix III. Staffing for the RWD is a key issue, which must be handled with considerable discretion. The RWD is designed to work in conjunction with Track I. However the proposed RWD will not work under the direct auspices of the Agricultural Council. The Agricultural Council is fully occupied in its attempts to provide direction for the Afghan Agricultural Project. Instead, the top seven staff of the RWD (not including

the director who will be an international hire Afghan*) will constitute an informal Advisory Group. These senior staff positions are being carefully vetted with the individual parties. The key offices will be appropriately allocated so that all seven parties -- or as many as may choose to participate -- will be appropriately represented among the leadership of the Division. Through this mechanism, the Division will have an easy formalized mechanism for liaison with the parties.

II. ACTIVITIES OF THE RURAL WORKS DIVISION

Rural development in a context as heterogeneous as rural Afghanistan can become an all inclusive labor. The intent of this paper is to define a realistic package of activities which can be undertaken by a small group of engineers and technicians working under war-time conditions. To this end, we propose to start with three types of activities. These are:

- o area development schemes (ADS)
- o roads and transportation schemes
- o minor irrigation schemes including karez improvements

Because the rural sector of Afghanistan is diverse, and somewhat hard to visualize from afar, three case studies have been prepared, one for each of the three different types of interventions which are planned. A schedule of activities for the first six months for each of the three different types of interventions has also been prepared. Two of the three case studies are based on actual examples of rural sub-projects. For these cases --area development schemes and roads--VITA staff have talked to commanders and other local representatives to develop a profile of possible interventions. For the third case study--involving karezes -- we have prepared a consolidated composite description, drawing on the corporate experience of VITA staff.

* There will be one uniquely qualified Afghan engineer presiding above the senior staff of the RWD. This man is Engineer Mir Moh'd Sediq. He will have overall responsibility for directing the Rural Works Division. Engineer Sediq was President of the Rural Development Department before the war. He has subsequently worked on a series of USAID contracts dealing with various aspects of rural development around the world. For the last five years until May, 1987 he was the Chief of Party on a \$24 million dollar rural infrastructure project building potable water systems for Yemeni villagers. For the last three months he has been a consultant working with VITA in Pakistan to design this amendment creating the Rural Works Division. His complete curriculum vitae is given in Appendix II.

The case studies have been chosen to give a balanced picture of the various different kinds of interventions which will be undertaken by the Rural Works Division. They have been chosen from various pre-feasibility reports which VITA staff in Peshawar have prepared. The case studies look at various different kinds of interventions and various different ways of channelling assistance. They represent different models for working with the parties, commanders, and local people. The case studies and the models which they represent are illustrative of possible administrative, financial, and organizational arrangements. They are not meant to be exclusive or exhaustive.

III. CASE STUDIES

A. Case Study #1: An Area Development Scheme

During the first six months of project activity we will undertake a survey of four possible area development schemes, and begin limited activities on the two which appear to be most feasible. Surveys for each proposed scheme are estimated to take approximately two months each, and will cost approximately \$5,000 apiece. A survey team will consist of three Afghans: one engineer, one senior technician, and one junior technician.

Limited implementation over the first six months will cost an estimated \$25,000 per scheme. Limited implementation will consist of such things as the provision of oxen, flour mills, panjar drills*, and -- to the extent that it is feasible -- seeds and fertilizer. Total estimated costs for area development schemes for six months under the initial stages of project activities will be as follows:

Surveys (4) @ \$5,000 each	\$20,000
Limited implementation (2) @ \$25,000	50,000

TOTAL	\$70,000

The project area for a typical representative area development scheme is located in a quiet corner of Nooristan. Work will concentrate on assistance to a cluster of about 15 villages, which are collectively sustained by two principal irrigation canal systems. The people of the area are one tribe, speaking one common language, and with a common sense of culture, history, and purpose. The fifteen villages proposed for

* Panjar drills - gasoline driven pneumatic jack hammers which do not require a compressor. They are used for various aspects of construction such as cleaning karezes and construction of pack animal tracks.

assistance had a pre-war population of approximately 3,500 families, or perhaps 20,000 individuals. During the war the area has been heavily bombed several times, and large numbers of people have been forced to leave and become temporary refugees in Pakistan. Most of these refugee families are now living in other nearby villages or in Pakistan. They want to return home.

This proposed cluster of villages appears to be a good potential area to work in because:

- o access is relatively good
- o transportation costs are not astronomical
- o the people want to stay in the area, or return to it
- o the area is now defensible
- o the social structure is relatively homogeneous, and the people are relatively easy to work with
- o the villages of the impact area are relatively close together and form an integrated unit
- o there are two principal irrigation canals which sustain agriculture and tie the proposed villages together socially and economically
- o the kinds of inputs required to assist the area appear reasonable and within the scope of the project.

To begin to implement this area development scheme, three Afghan staff, (an engineer, a senior technician and a junior technician) will conduct a further and more detailed survey of the area, building on the preliminary reconnaissance data which has already been collected. The primary focus of the staff over the first several months would be to work with the local people to get two main irrigation canals back into service. In one case this reportedly involves the reconstruction of an intake, using locally available materials. In the case of the second irrigation canal, an aqueduct/wash crossing needs to be reconstructed. In both cases, most work will involve primarily the use of local materials.

Resources would be sent into the project area with the technicians who would work under the authority of the commander. The commander of this particular area appears to hold a position somewhat comparable to that of a sub-district governor before the war. The technicians will work with the commander and his senior administrative staff. (In this case two former school teachers.) Workers will be paid in cash for work on the canals, at an appropriate daily wage which will be determined at the site. Local people will contribute locally available materials such as timber, stones, sand, or gravel. The project will pay for any manufactured materials, and appropriate transportation costs.

Other items necessary for an area development scheme will be carefully allocated and distributed in ways which reflect Afghan rural village sociology, and the prevailing economic conditions.

(For a discussion of these issues, see pages 17-29 of the original VITA action memorandum, and also pages 17-19 of this paper.

B. Case Study #2: A Tertiary Road

Initial activities for roads would consist of technical surveys for two possible roads. (One road is in Bamiyan Province, and a second road is in Logar Province.) A roads survey will require a three person team consisting of one engineer, one senior technician, and one junior technician. Each survey -- including travel time to and from the site -- will require approximately three months. Each survey will cost approximately \$5,000. For the more attractive or the more feasible of one of the two roads, we plan to begin track improvement activities. Pack animal track improvements under the initial phase of rural works will facilitate future roadway alignment and sub-grade improvement when the project proceeds to a subsequent phase of full scale implementation.

Initial costs for the first six months are estimated as follows:

Surveys, (2) @ \$5,000 each	\$10,000
Gabion ford/wash crossing, (1)	10,000
Pack animal track improvement 10km @ \$1,000/km	10,000
TOTAL	<u>\$30,000</u>

Following an initial six month period, the rural works program plans to move to a full implementation phase if funding permits. (See p.21_ for a discussion of Costs.) Some narrative is given below which describes in illustrative fashion how road construction would proceed during a full implementation phase. This narrative is designed to convey some of the flavour and atmosphere of constructing a road in rural Afghanistan, and also to indicate the administrative procedures which would be followed. (It should be noted that this is the type of work which the old Rural Development Department typically performed before the war, and at that time there were well established standards and procedures for constructing rural roads. Some of the same staff who used to supervise rural road construction before the war will be utilized for constructing new roads today. Most of the same well established administrative systems will also be utilized. See Appendix IV for typical forms which have been prepared.)

Now we proceed to describe a representative and typical rural road. This particular road runs from the Province of Wardak to the Province of Bamiyan. It has already had a

preliminary pre-feasibility reconnaissance survey performed by two of the parties collaborating together.

The road is a potentially important road of approximately 20 kilometers, linking parts of northern Afghanistan with southern Afghanistan. Currently there is a rough animal track where the road will eventually go. This animal track represents a major impediment to the smooth flow of goods by vehicle from the South and East to the North. Currently, Mujahadeen from the south bring agricultural produce, equipment, and other commodities to the southern terminus of the road by truck. Here they off-load whatever they are transporting onto donkeys and mules, and carry items for 20 kilometers over the existing trails. Then at the northern terminus of the existing roads' network, they reload items onto lorries.

This stretch is a potentially important link road for Afghanistan both in peace as well as in war. Agricultural equipment and supplies currently can be sent by road as far as Bamiyan, but they cannot be sent on to the North. Conversely, agricultural produce from the North cannot be sent via this route to the South and East. The improvement of this current trail up to the standards of a motorable road will substantially reduce time and transportation costs for items moving along the road.*

Construction of the roadway has other economic consequences in addition to reducing travel time and transportation costs. Even now the area of the proposed road is relatively peaceful and is securely under the control of the Mujahadeen. Unlike some areas of rural Afghanistan, most of the civilian population is currently still in place. Work on the proposed road represents a major incentive for many of these people, and encourages them to remain in place. They are available to work, and they need the potential income.

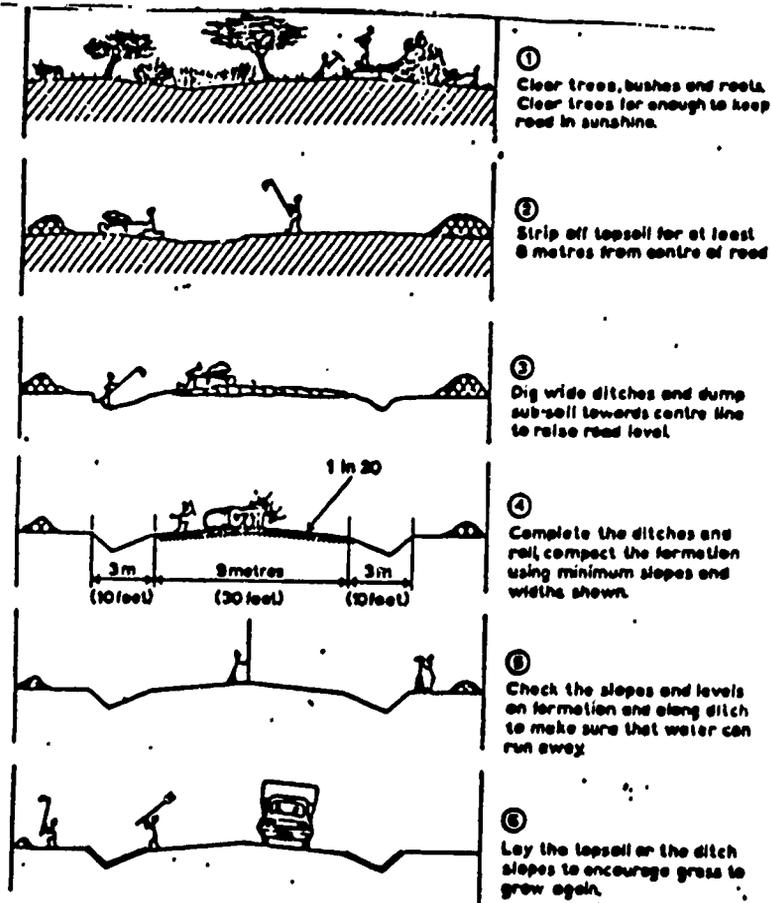
Based on preliminary reconnaissance data, this road appears to be feasible, and not impossibly difficult to construct. The current trail goes through terrain which is generally characterized as "rolling, with some stretches which are "mountainous". No major bridges would be required.

* The economic utility of an improved roads network applies equally well to whatever items might be transported, be they military or civilian goods. Based on present information, we believe that this road has important economic benefits for the civilian population of the area as well as for the Mujahideen. This fact would need to be adequately substantiated and documented during the technical surveys, in order to justify proceeding to a formal construction stage.

Approximately three gabion* wash crossings (also called fords or Irish "saddle" bridges) would be required. Each of these would be less than 50 meters long.

The proposed road will be built to a standard which the Afghans classify as a Class III road. (See Figure 1 for a diagrammatic sketch of the components of a Class III road.) The road will be approximately six meters wide, with drainage ditches on either side as necessary. There will be approximately ten culverts per kilometer. Culverts will be made of prefabricated corrugated metal pipe, which will be bolted together. Culverts, gabions, and other relevant construction materials can be transported to the southern terminus of the existing roads network by truck.

Figure 1



* Gabion baskets or blankets are wire cages made of galvanized wire, which are tied together and filled with rocks at the site, and used for the construction of such things as wing walls, retaining structures along river banks, and wash crossings. They represent an optimum technology for a country like Afghanistan which is well supplied with rocks and which is also prone to flashfloods.

The equipment necessary to construct this road is estimated as follows:

1. Compressors, small	2
2. Panjar drills	15
3. Corrugated pipe (for wash crossings & culverts)	220 units
4. Back hoes and front end loaders	2
5. Gabions	500 m3
6. Tractors*	--
7. Hand rollers	5
8. Hand tools (picks, shovels, spades, crowbars, wheel barrows, etc)	\$2,000 worth

TOTAL	\$200,000

Construction of the road is estimated to take approximately four to six months, depending on the number of workers available, the time of year, availability of equipment, etc. It is estimated very roughly that construction will require approximately 3500 man weeks. Initial reports suggest that laborers in this quantity are available, and that they will appreciate the employment opportunities, at least at appropriate times of year. (i.e. when work does not conflict with key agricultural demands for labor).

Scheduling of the work is an important component, which will need be carefully assessed. Work can be done on most stretches of the road up until December, and starting again in March. For some stretches at lower elevations or in protected pockets, work might continue through January and February. Work will initially commence at approximately four different places along the 20 km length of the proposed roadway.

Work along the road will be divided into sections, with different stretches constructed according to different systems. Some stretches might be constructed by "contractors", who would bid for a stretch of road to be constructed for a given amount of money. In effect these stretches would be constructed by "contracted" labor gangs on a task basis.

"Contractor" in the sense that we are using the word refers to labor contractor who contract to provide a given number of laborers, or agree for a fixed price to move a carefully estimated volume of material using a certain number of laborers to accomplish the task. This represents a well established

* Tractors provided for the area will also be used for agricultural purposes before or after construction of the road.

system with which the RDD engineers and traditional Afghan villagers are both familiar. Other stretches of the road might be done by laborers who were recruited by the participating parties and hired by the project. Wash crossings, require closer supervision than cut and fill pick and shovel work. As such, wash crossing would generally be constructed by project laborers, working under the supervision of project technicians and the senior engineer in charge of overall road construction.

Administration and supervision of the work will require the following project staff, who will generally be at the site, or in transit back and forth to Peshawar.

- o one senior engineer
- o two senior technicians
- o four junior technicians
- o four labor foremen
- o one administrative officer
- o five store keepers*
- o three drivers
- o two mechanics
- o two courier/messengers

TOTAL: 23 persons

On balance, this project appears attractive for the following reasons:

1. Two major parties are already collaborating together on preliminary surveys for the route.
2. It is located in a remote area of Free Afghanistan.
3. The people of the area have not left to go to Iran or Pakistan, and are available to provide a work force.
4. The road work represents an important potential employment opportunity for people of the area. Employment encourages them to stay where they are, which further strengthens the jihad.
5. The road will continue to be an important economic artery after the end of the war, serving as a major link road tying different parts of the country together.

* Construction will begin on the road in approximately four separate areas. This means that there needs to be one main storehouse/go-down, and four smaller go-downs. Each storehouse will require its own separate storekeeper.

Initial costs for 20 km of road are estimated as follows:

1. Direct construction costs per km, (labor, excavation, cutting and filling, etc. are estimated at	< \$10,000/km
2. Capital costs, including machinery and equipment:	10,000/km

TOTAL	\$400,000

C. Case Study #3: Minor Irrigation Schemes and Karez Improvement

Most of rural Afghanistan survives through water conveyed through various traditional irrigation systems, many of which are hundreds of years old. The entire rural social structure of many Afghan villages revolve around the operation, maintenance, repair, and reconstruction of these systems. Except for a very limited number of modern irrigation systems (in Helmand, Kandahar, Nangarhar, and parts of Kunduz) almost all the irrigation systems throughout the country are traditional ones.

Speaking very broadly, there are two kinds of traditional irrigation systems: canals, and karezes. Canals require an intake from a river, which in turn leads the water from the river via a channel to irrigable land. Because of the terrain in Afghanistan, such canals frequently cross dry washes (arroyos) which require simple village aqueducts to convey the water across the wash.

Such irrigation canals in certain parts of Afghanistan may range from one or two miles in length to as much as 15 or 20 miles. They may provide irrigation water for a few families, or in some cases for a few hundred families. In olden times a few traditional irrigation canals provided water for thousands of families, and irrigated hundreds if not thousands of acres of land.

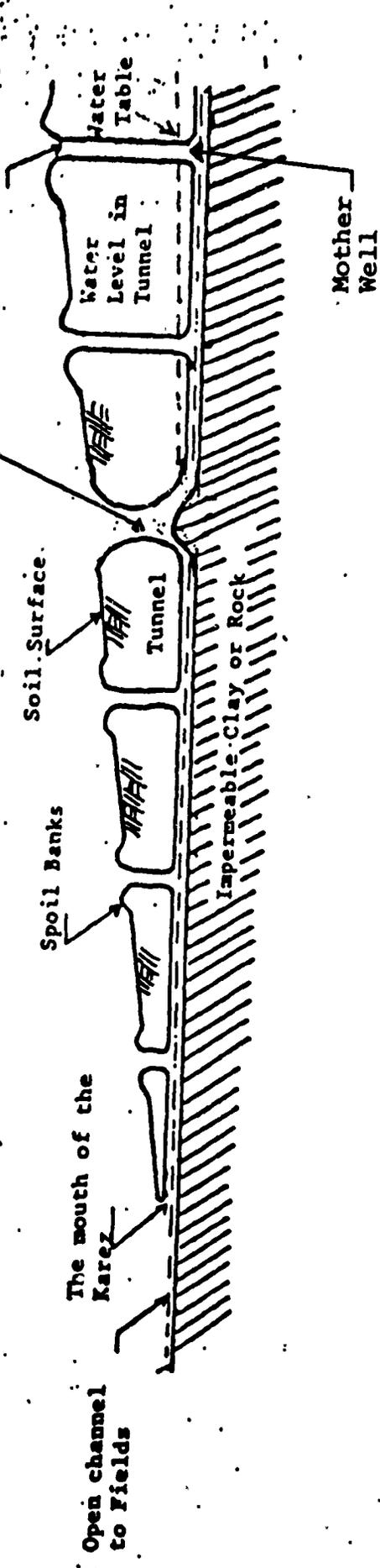
Karezes, (also sometimes called qanats) are the second broad class of traditional irrigation system. These are also an ancient and traditional irrigation-system. (Figure 2 details in schematic form the operation of a karez.) A karez is an underground tunnel typically dug perpendicular to the mountains, which taps into the upper layer of an aquifer, and drains a small quantity of water through a horizontal tunnel onto irrigable land. The underground tunnel is ventilated by a series of wells, which provide access, light, air, and a place to remove the spoil from the tunnel to the surface.

FIGURE 2

BASIC COMPONENTS OF A KAREZ

Cross section of typical older well, showing spoil in the tunnel, blocking proper flow of the water

Shaft for Removing Soil & Stones from Tunnel



Water seeps into the tunnel below the water surfaces and through seepage faces of the tunnel, flows through the tunnel by gravity and is used to irrigate fields lying at lower elevations. The typical size of the horizontal tunnel is about 3 feet in diameter. Older wells may be as much as 20 or 30 feet across. (See cross section of a typical older well, above.)

Karezes generally are found on the Southern side of the Hindu Kush in Afghanistan in various provinces from Kabul to Herat.* No one knows the total number of karezes in Afghanistan. However, there were several thousand before the war. For purposes of this case study, we have assumed we are working in an area somewhere near Kabul Province.

In Kabul Province the water table ranges from 15-60 meters deep. Typically the mother well in a typical karez is 60 meters deep. Wells in a typical karez are located about 50 meters apart, and an average karez has between 40-50 wells. A normal karez is 1.5-2.0 km long. Water from an average karez is owned by 20-30 families, who take turns using it. Families own shares in the karez, and these shares are allocated in terms of hours or minutes. The family is entitled to use whatever amount of water is available during their share of time.

The water from a typical representative karez is sufficient to irrigate 60 jeribs, or 30 acres. (Irrigable land under command of the karez is 120 jeribs or 60 acres; however only half of this is irrigated in any one year. The balance is left fallow, and only used in alternate years.) An average family on a representative karez owns 4.8 jeribs of land, or 2.4 acres.

Before the war, the karezes were normally cleaned each year, or every other year. Cleaning the karezes tends to be a labor intensive and somewhat dangerous task. The danger comes from working down in a relatively deep well, or -- even more seriously -- from working in the underground tunnel which connects the wells and permits the necessary flow or irrigation water. (The tunnels are not normally lined or shored up with timber or bracing, and hence with the passage of time they are subject to collapsing.) Typically karezes can be worked on for approximately nine months of the year in summer, fall, or winter. Karezes cannot generally be cleaned in the spring when the snow melts because the ground is too soft and the karez tunnel is subjected to cave-ins. Cleaning karezes is a task which generally becomes more difficult and more expensive as the karez becomes older. Some of the karezes are hundreds of years old. Maintenance on these karezes sometimes becomes an almost year round task.

Because of the war, and the resultant dislocations, labor shortages, bombings, and other difficulties, many karezes have not been cleaned for periods ranging from 3-7 years. Other

* Karezes generally are not found on the Northern side of the Hindu Kush because of differences in geology and geography, and because in many of the northern provinces there is sufficient surface water without recourse to karezes (Kunduz, Baglan, Takhar, Badakhshan) or because people rely on dry land "lalmi" irrigation (Faryab, Samangan, Badghis).

karezes have been abandoned all together, because maintenance has become impossible. Tunnels have collapsed, and wells have filled in. Generally cleaning an average karez takes between two to three months using three crews of three laborers each.

To clean or rehabilitate an existing karez is estimated to cost an average of \$1,500. (For planning purposes, a minor irrigation scheme -- such as improving an intake structure, or rebuilding a traditional aqueduct -- is also estimated to take an equivalent amount of time and cost an equal amount of money.)

We plan under the first phase of project activities to work on approximately 75 minor irrigation schemes, and/or karez cleaning and improvement activities. An estimated 80% of this work would be karez improvements, (for a total of approximately 60 karezes) with the balance (15) being irrigation canal intake reconstructions, aqueducts, or related irrigation structures.

Cost estimates for minor irrigation schemes and karez improvements for the first six months are estimated as follows:

75 projects @ \$1,500 each = \$112,500

The social and traditional management systems for cleaning karezes are well established and have been in use for centuries. The senior Rural Works Division staff are familiar with the systems and procedures which the old Rural Development Department developed for supporting these types of activities. Building on these well established traditional systems, work with individual karezes would proceed approximately as follows:

1. A village council working in conjunction with and under the auspices of a local commander would nominate several possible candidate karezes for cleaning. This council would help insure that designated karezes had a broad and appropriate ownership base within the community, and appropriate leadership in the form of water masters (mirabs) etc.
2. The commander of the area would confirm and sanction the nominations of the Village Council.
3. The VITA Rural Works Project technician at the site would conduct a quick visual survey of each proposed karez, to confirm the cost estimates for cleaning or rehabilitating a particular karez. The technician would check the length, assess the magnitude of damages, and prepare a standard project agreement form. This form would be signed by representatives of the village, the commander, and the RWD technician.

4. After the project agreement form is signed, a general letter of intent would be signed by RWD/Peshawar, authorizing the project to proceed.
5. Normally, karez cleaning operations would be authorized by RWD/Peshawar in batches of 10 to 20 karezes at one time. These karezes would be in the same general area, to facilitate supervision by the RWD supervisors.
6. The RWD supervisor/technician, after receiving the Letter of Intent, would release an advance payment of up to 33% of the estimated cost of cleaning a specific karez, and turn this money (not to exceed \$1,000) over to a designated village representative. This could be the mirab or saresta (water master) who is responsible for supervising the operations of the karez; or it could be the village mallick (a semi official semi elective representative of the village who helps the village to deal with outsiders), or other official representatives of the community. This person, or these persons would become responsible for handling the finances of cleaning. The owners of the karez would be responsible for supplying the laborers.
7. The RWD technician would monitor the progress of the work, and when the first 33% of the karez had been successfully cleaned, a second tranche of money would be advanced to the responsible parties.

IV. ALLOCATION AND OWNERSHIP ISSUES

The allocation and distribution of development assistance is an issue which has to be handled carefully under the present conditions prevailing in Afghanistan. Prior to the war, it was somewhat easier for the Rural Development Department to deal with such matters. In effect, there was an established policy for such matters. The general approach of the Department before the war was to channel assistance towards community owned facilities. As a matter of departmental policy, this usually meant rural roads, public bridges, and community owned irrigation systems. These were 'owned' either by the state in the case of roads, bridges, and wash crossings or they were 'owned' by a substantial number of people in the community in the case of karezes, intakes, aqueducts, or other irrigation systems. There was also a strong egalitarian bias on the part of the professional staff of the Rural Development Department, and projects which would potentially benefit only one man or one family were routinely excluded from consideration.

Another significant variable in the allocation of resources in the past was the potential degree of interest shown by local

beneficiaries, as manifested through their willingness to contribute to the cost of a potential project. These contributions could be in the form of volunteer labor, or they might be contributions in kind. For example, villages normally would contribute sand, stone, gravel, and timber, while the Department would contribute manufactured items such as steel and cement.

Today the situation is substantially more complex, because the needs are greater, the resources are fewer, and the social fabric which used to bind communities together has been badly torn apart. Nevertheless, certain types of potential projects remain relatively simple in terms of allocation or ownership. Roads and wash crossings, for example, remain substantially in the public domain. Anyone can use them. In the case of the project described here, proposed roads, wash crossings, minor irrigation schemes and karez improvements would still continue to be collectively owned by a substantial number of individuals living within a community. Karezes or canals owned by one man or one family would be excluded.

Other types of potential inputs become more complex. Oxen, for example, cannot realistically be given collectively to an Afghan community. Neither can flour mills. Such items have a requirement for proper operations and maintenance built into them. Oxen need to be fed and watered. Traditional Afghan villages do not collectively feed and water cows, sheep, goats, or oxen. Individual owners take responsibility for livestock. A similar principal holds true for flour mills. These items generally need to be individually owned. Such items would need to be allocated on a case by case basis within a community. (See the original VITA Action Memorandum for additional discussions of issues relating to the allocation, distribution and ownership of assorted possible inputs.)

For oxen, we believe these generally should be supplied on a replacement basis for oxen which have been killed through acts of war. The allocation and distribution of oxen would be done collaboratively working with the commander of an area and an informal village council. This process would be monitored through the early phases of project implementation while we seek systems which work effectively. Those systems which work would be replicated. Those which do not work will be discarded.

Flour mills would generally be given (or occasionally sold on a subsidized basis) to millers whose mills have been bombed or otherwise destroyed through acts of war. Preliminary information from Konar, for example, suggests that the destruction of flour mills is one of several serious obstacles which makes it difficult for refugees to return to their villages. Draft animals have been killed so farmers can't plow their fields; the

irrigation networks have failed so they can't grow crops; and their mills have been destroyed so they can't grind grain.

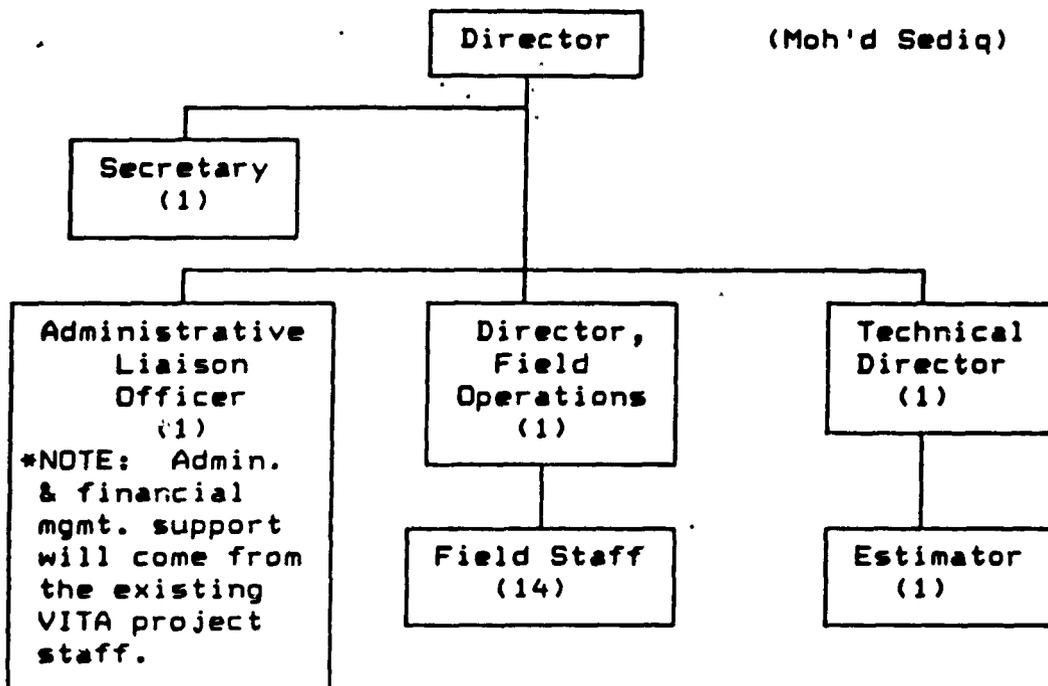
A further observation needs to be made about the structure of Afghan villages, as this relates to questions of the ownership of potential inputs. Villagers exist in a symbiotic relationship with one another. There are egalitarian or democratic currents which flow through Afghan rural culture, even as there are authoritarian, feudal, and modernizing currents. The miller grinds the grain, and is paid in kind at a rate of approximately 1:14. The miller helps support the community, at the same time that the community helps to support him. The same element of symbiosis is evident for most other members of the community, including farmers, storekeepers, blacksmiths, karez cleaners, etc.

Further, there is a measure of 'community' ownership for certain items through the mechanism of the extended family. Oxen, for example, which might nominally be given to individual families, would also be used by brothers, nephews, or cousins, to the extent that time, weather, cropping patterns and the bullock's strength permits. The same quality of shared ownership is true for other items which might need to be sent in to Afghanistan to help with village rehabilitation.

V. STAFFING CONSIDERATIONS

A. Local Staff

A Rural Works Division will initially require approximately 19 local staff, organized as follows:



Of these 19 proposed local staff, 7* have already been recruited and are presently working with VITA. Two or three more candidates have been prospectively identified. Approximately 10 additional local staff still need to be recruited. It should be noted that the proposed Rural Works Division (RWD) is designed to be integrated fully with the existing VITA staff. The expanded activities will be housed together in the same building. The RWD will be given administrative support, and financial supervision from the existing administrative and financial staff of VITA. Monitoring will also be carried out by the same monitors to the extent that this proves to be feasible.

* Recruited staff include the Administrative Officer, the Technical Director, the Secretary, the Estimator (an engineer) and three of the Field Operations staff, including one engineer and two senior technicians.

The field operations staff will be composed as follows:

Road group:	2 teams with 1 engineer, 1 senior technician, and 1 junior technician	6
Karez Groups:	3 senior technicians	3
Area Development Schemes:	2 teams with 1 engineer, 1 senior technician, and 1 junior technician	6

	TOTAL	15

VI. COSTS

The needs of the rural sector of Afghanistan are immense. The absorptive capacity under present conditions is unknown. A package of activities such as the one described for this paper will depend on the availability of funds, and the service delivery capacity which might be created under VITA and Afghan auspices.

To suggest the magnitude for a possible program, however, we have prepared one estimate, as follows:

1. Area development schemes		
10 @ \$100,000 each		\$1,000,000
2. Karezes		
400 @ \$1,500 each		600,000
3. Roads systems		
20 km @ \$20,000/km		400,000

TOTAL		\$2,000,000

Our plan for the next six months, is to use currently available funds currently allocated for the agricultural sector, "reprogramming" these monies for use on Track III. For the first six months, the total direct program costs for the three types of proposed activities for Track III would be as follows:

Area development schemes	\$ 70,000
Roads	30,000
Karezes and irrigation works	112,500

TOTAL	\$212,500

For a further discussion of the trade offs between and among Tracks I, II, and III, see the issues section of this paper, pp iii-iv.

VII. SUBSEQUENT STEPS

VITA plans to establish a rural development service delivery capability over the next several months, using existing program resources. These resources are currently authorized and allocated for the agricultural sector. Because the work of rural development is formally designed to support agriculture and because we are working under the framework of a Rolling Design, this additional work will require no formal change in our presently authorized scope of work.

However, the work will require an amendment in our present contract, authorizing an expanded level of technical assistance. To proceed further with the development of a Rural Works Division, we need the services and expertise of Engineer Mir Moh'd Sediq, who will head up the proposed Division described in this paper.

We plan to experiment with implementing the various sub-projects described in this paper over the next six months, and report back to the office of the AID Representative on the results of these experiments. As indicated in the case studies, the various sub-projects will explore different models in different parts of the country, using different kinds of financial and administrative arrangements.

Based on the results of these experiments, we plan to return to USAID after six months with more comprehensive recommendations for an expanded program. These recommendations will be contingent upon the availability of funding and the broader political developments which govern the further evolution of this project.

VIII. ORGANIZATIONAL CAPABILITY

Several individuals who are currently in place contribute substantially to the capability which exists to implement the project described in this paper. Selected key personnel are briefly described below:

Albert J. Nehoda, Project Manager, USAID. Mr. Nehoda is the officer in charge of supervising the VITA project from the USAID side. Mr. Nehoda has lived for more than 12 years in Afghanistan, and has approximately two decades of experience in the Middle East. He has lived in Mazar Sharif and Kandahar, as

well as in Kabul. He has also worked in Libya, Yemen, and Oman. He has traveled extensively to all provinces of Afghanistan. He worked with the USAID funded Demographic survey (1973-1976) and with the Rural Development Department (1976-1977) both of which required extensive travel to remote areas of rural Afghanistan. His work with the old Rural Development Department provides invaluable perspective on the establishment of a new Rural Works Division. Mr. Nehoda has the fluency of a native speaker in Dari, and an FSI 3+ in Pushto.

David Altus Garner, Chief of Party, VITA. Mr. Garner has approximately 20 years experience in various aspects of rural development. He has lived and worked for nearly four years in Afghanistan. From 1973 to 1976 he was a senior management advisor to the Rural Development Department in the Prime Ministry of the Government of Afghanistan. He assisted in the design and implementation of a USAID funded assistance package to the this Department. His work as a development planner required extensive travel to all provinces of Afghanistan. Mr. Garner has also worked in Yemen where he designed and managed a \$24 million rural works project building potable water systems for Yemeni villages. He has also worked in Nepal, Pakistan, and Somalia.

Engineer Mir Moh'd Sediq, was senior staff of the Rural Development Department, an office in the Prime Ministry of the Government of Afghanistan for 10 years. For five years, from 1973 to 1978 he was President of this Department. Engineer Sediq has approximately two decades of experience in various aspects of rural development. For two years he was the Chief Rural Roads Engineer for the Government of Lesotho. For five years he was Chief of Party for a rural works project in the Yemen building potable water systems in approximately 170 Yemeni villages, benefiting nearly 200,000 people. He has also performed consultancy assignments in rural development in Jamaica, Malaysia, and Pakistan.

Dr. Abdul Wakil, (PhD) is an Afghan horticulturalist who has been trained in England. He is sometimes called by his fellow Afghans, 'The father of scientific agriculture'. He was Minister of State and Minister of Agriculture (1970-1973). Before this time he was a Member of Parliament, a private businessman specializing in horticultural development, and prior to this he was President of the Helmand Argandab Valley Authority (HAVA), a Regional Development organization modeled after the Tennessee Valley Authority. He also served as Governor of Helmand Province.

John E. Soden, is a lawyer and accountant (CPA) and former US Government auditor, with nearly 20 years international development experience including four years experience in Afghanistan working with the Ministry of Finance. In Afghanistan he lived both in Kabul and in Kandahar. In Kandahar he worked with Public Administration Services (PAS) on a revenue enhancement program. Mr. Soden is the Chief Financial Officer for the VITA project, overseeing financial aspects of Tracks I, II, and III. Mr. Soden is also the Chief Financial Officer for the University of Nebraska's Education Project. Mr. Soden had an FSI 3+ in Dari at the completion of his tour in Kandahar. Prior to assuming his post of assignment in Peshawar, he served for four years as the Controller for the Ministry of Works in the Government of Lesotho on an OPEX (operational expert) contract. He has also worked with various Public Utilities in Ethiopia and the Philippines.

Dassim Balooch, Engineer Balooch has a B.S. degree in Engineering from Kabul University. In addition, under a USAID fellowship he was sent to the United States for one year of practical training in engineering, working with the Bureau of Reclamation. Mr. Balooch was one of the most senior field engineers with the old Rural Development Department, where he was responsible for supervising the survey, design and construction of roads, bridges, and assorted irrigation projects in more than half the provinces of Afghanistan. Mr. Balooch will be the Director of Field Operations in the Rural Works Division with responsibility for planning, and supervising all field activities.

Engineer Poyinda Moh'd, has a Bachelors degree in Engineering from Kabul University. He has more than 12 years of practical engineering experience in Afghanistan and Pakistan. As a senior engineer with the Rural Development Department Engineer Poyinda Moh'd supervised various infrastructure projects in six provinces of Afghanistan. Since coming to Pakistan four years ago, he has supervised various engineering projects in several of the tribal agencies. Mr. Poyinda Moh'd will be the Director of Technical affairs for the Rural Works Division with responsibilities for survey, design, and estimation of future projects.

Major Masood Khan, is a graduate of the Pakistan Military Academy, and has more than 23 years experience working in various logistics positions with the Pakistani Military. Major Masood is currently VITA's Executive Officer, with responsibilities for administration, logistics, and liaison with the Government of Pakistan.

Appendix I

WORKPLAN FOR RURAL WORKS DIVISION

(September 1987 to February 1988)

	Sept	Oct	Nov	Dec	Jan	Feb
1. Appt. of Personnel	(1)					
2. Ordering Commodities, and Procurement	(2)	----->				
3. Transportation	(3)					
4. Liaison with Parties	(4)	—————>				
5. Nomination of Proposed Projects to RWD from Parties	(5)	—————>				
6. Preliminary Reconnaissance and Surveys		(6)	----->			
7. Technical Surveys		(7)				
a. ADS*		[1]	[1]	[1]	[1]	
b. Roads		[1]			[1]	
c. Karezes		----->				
8. Design and Estimation			(8)	----->		
9. Execution			(9)			
a. Karezes			[15]	[20]	[20]	[20]
b. Roads				[1]	—————>	
c. ADS			[1]	—————>		
10. Inspect and Evaluate					(10)	->
11. Monitoring			(11)	----->		

* Area Development Schemes (ADS)

—————> = Continuous function

-----> = Intermittent function

Notes on the Work Plan

1. Appointment of personnel has already begun. The 19 individual positions would be completed by mid-September.
2. Commodities would be ordered according to the following schedule:
 - a. gabions and panjar drills: purchased in September
 - b. corrugated metal pipe
 - c. reinforcing steel
 - d. irrigation and dewatering pumps
 - e. construction equipment and tools
 - f. engineering supplies

} ordered in Sept.
3. Transportation:
 - a. 8 vehicles are on order through for the present VITA project
 - b. additional vehicles will be leased as necessary during the pilot phase
4. Liaison with parties would be on-going throughout the life of the project.
5. Submission of possible projects from parties' liaison office started in July, and remains on-going on an intermittent basis throughout the life of the project.
6. Preliminary surveys and reconnaissance will start in late September.
7. Technical surveys will start in early October and continue according to the schedule given in the square brackets in the workplan.
8. Design and estimation will start in October and continue on an intermittent basis over the life of the project.
9. Execution of the projects will be carried out according to the schedule shown in the workplan.
10. Inspection and evaluation will start in mid-January, 1988, and continue over the life of the project.
11. Monitoring will start in November and continue over the life of the project.

Appendix II

Curriculum Vitae: Mir Mohammed Sediq

GENERAL

Mr. Sediq has had a total of 20 years experience in rural development highlighted by his work as President of the Rural Development Department in Afghanistan, together with his work as Chief of Party on a major infrastructure development project in the Yemen Arab Republic. He has also served as the Chief Engineer to the Roads Department for the Government of Lesotho.

Most recently he served as Team Leader for a \$24 million rural water supply project, supervising nearly 100 staff stationed in several different regions through Yemen Arab Republic.

His technical background includes experience in planning, design, evaluation and construction supervision of major engineering and rural development projects, as well as project evaluations based on engineering and socioeconomic considerations.

EXPERIENCE WITH YEMEN RURAL WATER SUPPLY PROJECT

1982-1987

From August 1982 until Spring of 1987, Mr. Sediq was Chief of Party for a \$24 million portable water supply project. As Chief of Party, he supervised approximately 100 employees, including 20 American and German Peace Corps Volunteers.

He also supervised 11 long term technical assistance staff stationed in four different regions in the Yemen Arab Republic. The project was designed to assist the Rural Water Supply Department of the Ministry of Public Works to construct up to 160 rural water supply projects through the active participation of local communities. The project was designed to benefit approximately 200,000 people. In addition to the physical construction, the project also had a significant institution building component.

PREVIOUS POSITIONS

1980-1982

Chief Rural Roads Engineer, Ministry of Rural Development, Government of Lesotho, on Opex Contract. (Opex: Operational Executive, meaning staff working with government of Lesotho Civil Service, with salary topping from USAID.) Responsibilities in this position included planning, budgeting, engineering,

construction and maintenance of all roads in rural areas. Mr. Sediq had responsibility for all field operations relating to rural roads. He assisted the Permanent Secretary for the Ministry of Rural Development to improve management and operations of the rural roads branch. He also coordinated with the Ministry of Public Works on related infrastructure activities.

1979-1980

Chief Engineer, TransCentury/Washington. Assisted with preparation of various competitive proposals and project designs.

1973-1978

President, Rural Development Department (RDD), in Prime Ministry of Government of Afghanistan. As President of RDD, he held the rank of Deputy Minister, reported directly to the President of the country, and supervised staff of 1,600 men working in 23 of the 26 provinces. Primary activities of RDD included roads, bridges, irrigation structures (intakes and aqueducts), flood control projects, water systems, and government buildings. As President of RDD, he supervised up to 18 field teams and saw that they were provided with all necessary administrative support. He had extensive experience in institution building, rural development project design, selection, evaluation, cost benefit analysis, planning, scheduling, budgeting, training, and village negotiations and liaison.

1971-1973

Vice President of RDD.

1970-1971

Director General of Technical Board (in charge of field engineering) RDD.

1966-1970

Field Grade Engineer, RDD. Also completed graduate studies (1968-1970) in the United States.

EDUCATION AND TRAINING

Masters degree and additional graduate study towards doctorate, Civil Engineering, University of Tennessee, 1968-1970. This work was done while holding a Fulbright scholarship.

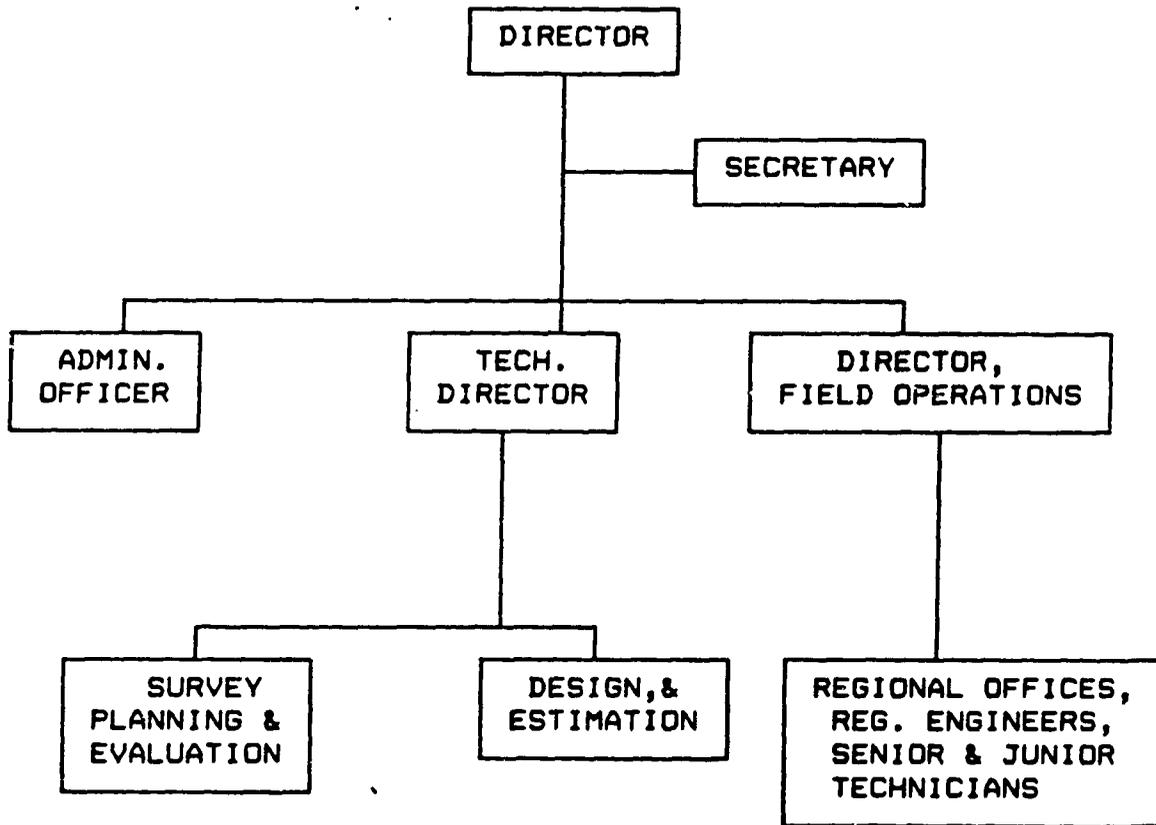
BS Degree, Civil Engineering, Kabul University, 1966.

Participated in the Economic Development Institute of the World Bank, 1975 for an intensive training program designed for rural development projects.

Appendix III

ORGANIZATION CHART OF RWD

RURAL WORK DIVISION



Survey form

IRRIGATION PROJECTS:

Project Type.

- a. Rehabilitation of Stream or Jui _____
- b. Intake _____
- c. Flume _____
- d. Washcorssin or Syphone _____
- e. Retaining Wall _____
- f. Kariz _____
- g. Tunnel _____
- h. Spring _____
- i. Well _____
- j. Others _____

Data Required.

- a. Length of Project _____
- b. Width of the section _____
- c. Normal water level in stream, river, Jui, Kariz, etc. _____

- d. Maximum flood level _____
- e. Amount of water required _____
- f. Difference of elevation between River, Stream and Jui _____
- g. Height of structure _____
- h. Aproximate slope of river, Jui, Karis, etc. _____
- i. Type of bed material for river and washes (silt type) _____

Profile and crossection if possible (free hand)

Water Supply Project:

Type.

- a. Spring _____
- b. Wells _____
- c. Other sources _____
- _____

DATA.

- a. Length _____
- b. Water required _____
- c. Distance from village _____
- d. Number of wells _____
- e. Slope (or difference of elevation) _____
- f. Depth of well _____
- g. Number of wells destroyed _____
- h. Other damage or problem _____
- i. Soil type _____

Profile and crosssection of a project if possible

FEEDER ROAD CONSTRUCTION AND REHABILITATION:

Project Type.

- a. New road _____
- b. Rehabilitation of old road _____
- c. Culverts if any and their respected sizes _____
- d. Retaining walls _____
- e. Irish Bridge (saddle bridge) _____
- f. Bridge _____

Data Required.

Length of Project _____
Width of Section _____
Height of section _____
Approximate slope _____
Road formation _____
Cutting H..... W DL
Filling H..... W DL
Availability of material gravel, sand, boulders, others. _____

Type of Terrain.

Plain _____
Rolling _____
Hilly _____
Mountain _____
Others _____

Approximate profile and section of project _____

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MAS: August 1987

RWP - T0010

PRE-CONSTRUCTION REPORT

Summary.

Date prepared _____ By _____

Project Name _____ Project No. _____

Province _____ Holuswali _____ Village _____

Description of improvement.

Estimated Cost: : _____
Plus (10 - 20%) contingency : _____
Grand total estimated cost : _____

34'

PART I.

General Information:

Project Name and Type : _____

Province : _____

Woluswali : _____

Village (location) : _____

Date of survey : _____

Surveyor's name : _____

Project Description : _____

Location map of project (approx.)

Crosssection (at least one)

Soil Type:

- a. Rock
- b. Conglomerate (hard sand and gravel)
- c. Compacted hard clay
- d. Medium soil or clay
- e. Soft clay
- f. Loose sand

Available Resources:

- 1. Local Material.
 - a. Stone
 - b. Sand and gravel
 - c. Woods (log, if any)
 - d. Etcetera

PART II.

Design Criteria.

The following criteria have been used for designing the system.

PART III.

PRE-CONSTRUCTION COST ESTIMATES

A. Project Cost.

1. Cement	:-----bags	-----
2. Steel	:-----tons	-----
3. Gabions	:-----	-----
4. Timber	:----- m ³	-----
5. Equipment (pump, mixer, vibrator, compressor, etc.)		
a. -----	:-----	-----
b. -----	:-----	-----
c. -----	:-----	-----
6. Contract Labour.		
a. Skilled	:-----	-----
b. Semi skilled	:-----	-----
c. Unskilled	:-----	-----
7. Oil & Fuel	:-----	-----
8. Others	:-----	-----
	Sub-Total	-----

B. Community Contribution.

1. Stone	:-----	-----
2. Sand	:-----	-----
3. Gravel	:-----	-----
4. Water	:-----	-----
5. Labour	:-----	-----
	Sub-Total	-----

C. Transportation.

a. -----	:-----	-----
b. -----	:-----	-----
	Sub-Total	-----

23

	Total Cost	-----
(10 - 20%)	Contingencies	-----
Grand total	estimated cost	-----
Village contribution	cost	-----

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VITA Flaming Unit
Rural Works Project

MP J 0020

پروژه های تحت ساختن
Project under Construction.

س.ن.م. شماره	Project Name اسم پروژه	Job No. جانب نمبر	Province ولایت	Zeluswali ولسوالی	Village قره	Starting Time انفار کار	Population نفسوس	Construction Schedule برنامه ساختن	Remarks ملاحظات

Commodities used:

A. Contribution by RWP (Rural Works Project):

a. _____

b. _____

c. _____

d. _____

B. Community Contributions:

Local Material.

a. _____

b. _____

c. _____

Transportation

Equipment

Fuel and Oil if any

a. _____

b. _____

c. _____

Others:

Cost.

A. Project Construction

B. Local community (local material, labour, etc.).

Sub - Total:

Conclusion:

یونٹ پلان گذاری ویتا
VITA Planning Unit

Rural Works Project
بروزہ مسلمان دہات
Future Projects

بروزہ ملی اینڈ دہ

R/W- 10040

Project Name اسم پروژه	Province ولایت	Moluswali ولسوالی	Village قریہ	beneficiaries Villages دہات مستفید شونده	Number of proposed projects تعداد بروزہ های در خواست شده	Remarks ملاحظات

SUB-PROJECT AGREEMENT

1. Sub-Project Name: _____

2. No: _____

3. District: _____

4. Province: _____

5. Description of Work: _____

6. Date of Agreement: _____

7. Implementation Date: _____

8. This agreement is made between the Tanseem Representative, Rural Works, Project Director and the Village Representative at the area of Village _____ Woleswali _____ Governorate _____.

The village, or area, of District _____

Province _____ agrees to provide the following:

I. Materials

Description	Quantity	Estimated
		Cost
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

II. Labour

III. Others

Sub-Total: _____

Contingency: _____

Total Estimated Contribution: _____

CONDITIONS OF AGREEMENT

1. This agreement is subject to termination should the work be stopped or delayed due to a lack of participation by the village(s) in providing their contribution, whatever the reason.
2. Rural Works Project/VITA assume no responsibility for any physical damage or personal injury resulting from the implementation of this project.

This agreement becomes effective upon the signature of the parties listed below:

1. Village Representative:

Name: _____

Signature: _____

Date: _____

2. Tanzania Representative:

Name: _____

Signature: _____

Date: _____

3. Rural Works Division/VITA - Pakistan

Name: _____

Signature: _____

Date: _____

رکارد یومیہ تعداد نفرات و مواد مصرفیہ

DAILY MAN-POWER AND MATERIAL UTILIZATION
RECORD.

Project Name	: -----	نام پروژہ
Project Number	: -----	نمبر پروژہ
Supervisor Name	: -----	امرنعالت
Date	: .	تاریخ

I. Skilled Labour:

1. -----
2. -----
3. -----

I. کسبہ کار
----- ۱
----- ۲
----- ۳

II. Unskilled Labour:

1. -----
2. -----

II. مرد کار
----- ۱
----- ۲

III. Material:

1. Coment. ----- + bags خریدہ
2. Steel Bar.
 - a. ----- Kg.
 - b. ----- Kg.
 - c. ----- Kg.
 - d. ----- Kg.
 - e. ----- Kg.

III. مواد مصرفیہ
----- ۱
----- ۲
الف
ب
ج
د
ه

3. Wood.

- a. -----
- b. -----

----- ۲
الف
ب

4. Gabion.

- a. -----
- b. -----
- c. -----

----- ۴
الف
ب

5. Others.

- a. -----
- b. -----

ج

الف
ب

IV. Oil and Fuel:

1. -----
2. -----

IV. محروقات و روغنات
----- ۱
----- ۲

PRODUCTIVITY NORMS FOR RURAL WORKS PROJECT

For measuring and estimating of earth work in project construction of RWP, the following norms are used. The norms for excavation of Karis and other associated task, in this particular circumstance, is higher in labouring output calculation because of the high risk involved in the executing and implementing this particular phenomenon and work. The risk analysis involved is indirectly substituted for compensation in terms of labour charges and added to the work output for fair handling of the task:

1. KARIZ.

A. Excavation.

Man-power required for excavation of 1 linear of Karis Tunnel or $0.5m^3$ of hard material is as follows:

Skilled Labour	0.5/Man/Day
Unskilled Labour	1.5/Man/Day

B. Rehabilitation.

Clearing and cleaning of Karis Tunnel is as follows:

Filled material cleaning or removal $0.75m^3$ /M/D
or 10 linear meters/M/D.

2. WELL EXCAVATION AND CLEANING.

The average well excavation and cleaning for $1.2m^3$ of earth, one skilled and one unskilled labours are needed.

3. JUI.

A. Rehabilitation of Jui (cleaning).

- Soft clay and dry or normally wet cleaning and leading out is $3m^3$ /M/D.
- Soft clay and mud soil saturated with water is $2m^3$ /M/D.

B. New Construction of Jui.

- Trench excavation with 1.5m deep in ordinary soil is $2.5m^3$ /M/D.
- Trench excavation with 1.5m deep in hard earth or soft moorum is $2.00m^3$ /M.D.
- Trench excavation with 1.5m deep in compact hard earth or hard moorum requires $1.0m^3$ /M/D.
- Digging in soft rock or conglomerate earth is $0.55m^3$ /M/D.
- Removing of material upto 50m run and depositing is $2.5m^3$ /M/D.

4. FOUNDATION.

For digging the foundation of buildings, walls, etc., the same norms for Jui digging can be used.

5. ROAD CONSTRUCTION AND REHABILITATION.

- a. Surface digging for ordinary soil and getting out the soil with 15m is $2.5m^3/M/D$.
- b. Filling in ramming (including watering) in layers 15cm thick is $6.0m^3/M/D$.
- c. Forming, embankment, watering and ramming in 15cm layers thick is $4m^3/M/D$.
- d. Removing earth in baskets at distance of 50m run and deposit is $2.5m^3/M/D$.
- e. Lifting and load through one meter height is equal to the traveling a horizontal distance of 1cm.

NOTES.

1. Excavation of the following soil under above condition will be:
 - a. In hard earth $2.0m^3/M/D$.
 - b. Very hard earth or hard moorum $1.0m^3/M/D$.
 - c. In soft rock or hard sand and gravel (conglomerate) is $0.55m^3/M/D$.
 - d. In hard rock $0.25m^3/M/D$.
2. The above quantities can be raised from 5 to 15 per cent in some specific cases.

PRODUCTIVITY NORMS

The following norms were derived from the codes of Asian countries who practice the labour intensive techniques for implementing those projects involving man-power in the task:

A. Excavation and Cleaning.

1. Ordinary soil $2.5m^3$ /M/Day upto 1.5m depth.
2. Burrow-pits $3.0m^3$ /M/Day upto 15m lead.
3. Surface digging $15m^3$ /M/Day upto 15cm depth and 15m lead.
4. Filling (Compaction) $6.5m^3$ /M/Day.
5. Forming Embankments $4.0m^3$ /M/Day at 15cm layers.
6. Removing $2.5m^3$ /M/Day/50m distance.

Labour involved in lifting a load through one meter height is taken equal to traveling a horizontal distance of ten meters.

Excavation in the following soil under above conditions will be:

1. In hard earth $2.0m^3$
2. In hard moorum $1.0m^3$
3. In soft rock $0.55m^3$
4. In hard rock $0.25m^3$

Earth when dug from a pit increases in bulk by about 25%, sand and gravel 10%, sand 20%, chalk 30%.

Soil type.

Hard Clay: That must be excavated with a pick and can not be remoulded in fingers.

Medium Clay: Can be excavated with spade and remoulded with difficulty.

Soft Clay : Can be excavated with shovel and easily remoulded in fingers.

D. Estimating Quantities.

1. Cement concrete (plain concrete)

Quantities of material and labour for various mixes for one cubic meter of concrete is as follows:

MIXTURE RATIO	CEMENT IN KILO GRAMM				DRY SAND CU.M.	AGGREGATE AVERAGE 12 TO 25 MM. CU.M.
	Machine Mix		Hand Mix			
	Shingle Gravel	Broken stone	Gravel	Broken Stone (crush)		
1:2:3	360	380	371	390	0.44	0.88
1:2:4	290	310	300	320	0.45	0.90
1:3:6	190	210	200	220	0.46	0.92
1:4:8	140	160	150	170	0.47	0.94

Labour Charge:

Skilled $\frac{1}{2}$ M/D/Cu.m.

Unskilled 2 M/D/Cu.m.

2. Foundation.

For one cu.m. of finished concrete requires:

Skilled $\frac{1}{2}$ M/D/Cu.m.

Unskilled $2\frac{1}{2}$ M/D/Cu.m.

3. Reinforced Concrete.

The labours for slabs and beams are the same as plain concrete.

For column 10% of above to be added.

For cutting and bending of Bars extra labours needed.

4. Cutting and Bending.

For 6 mm to 10 mm diameter, 120 Kg. one man per day

for 12 mm to 14 mm " 150 Kg. " "

for 16 mm and above 220 Kg. " "

The binding wire 16 gauge may be taken, and 2 to 4 Kg. of wire requires for one ton of bars.

5. Brick Work.

The number of bricks, the quantity of mortar and the labour required depend upon the size of bricks, thickness of the wall, joint, etc.,

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Material and labour required for one cu.m of brick work including wastage is as follows:

Bricks : 500 nos. for both I.S. and 9" bricks.

Lime Mortar : 0.325 cu.m for I.S. bricks
0.350 cu.m for 9" bricks

Mud Mortar : 0.375 cu.m for I.S. bricks
0.400 cu.m for 9" bricks

Cement Mortar: 0.23 cu.m for I.S. bricks
0.25 cu.m for 9" bricks

Quantities of cement and sand requires per cu.m of brick work with cement mortar:

Mortar proportion	1:2	1:3	1:4	1:5	1:6	1:7
Cement in Kg. for (I.S. Bricks)	.156	117	87	71	58	51
Sand in cu.m for (I.S. Bricks)	0.220	0.243	0.243	0.243	0.243	0.243
Cement in Kg. for (9" Bricks)	170	128	95	78	63	55
Sand in cu. m for (9" Bricks)	0.238	0.275	0.275	0.275	0.275	0.275

Quantities of lime and sand requires per cu.m of brick work with lime mortar:

Mortar Proportion	1:1	1:2	1:3
Lime in cu.m for I.S. Brick	0.228	0.154	0.116
Sand in cu.m for I.S. Brick	0.228	0.309	0.348
Lime in cu.m for 9" Brick	0.245	0.166	0.125

Labour for brick work: One cu.m of brick work can be done by: .

In foundation and plain :

Skilled Labour 4/5 M/Day/cu.m

Unskilled Labour 4/3 M/Day/cu.m

In super structure :

Skilled Labour 9/10 M/Day/cu.m

Unskilled Labour 5/3 M/Day/cu.m

- a. For arch work with uncourt bricks, mortar will be 10% more and labour $1\frac{1}{2}$ times required for simple work.
- b. For half brick work mortar will be 2.5 cu.m per 100 sq.m.

6. Stone Masonary:

Estimating as per cu.m of finished work.

1. Boulder filling dry hand packed, as in pitching:

Stone : 1.05 cu.m

Skilled : 1/3 M/Day/cu.m

Unskilled : 1/3 M/Day/cu.m

2. Dry masonry in super structure.

Stone : 1.20 cu.m

Skilled Labour : 1/2 M/Day/cu.m

Unskilled Labour: One M/Day/cu.m

3. Uncoursed random rubble walling laid in mortar in super structure:

Stone : 1.20 cu.m

Mortar : 0.3 to 0.35 cu.m

Skilled Labour : 1.2 M/Day/cu.m

Unskilled Labour: 1.7 M/Day/cu.m

4. Course rubble walling laid in mortar in super structure:

Stone : 1.25 cu.m

Mortar : 0.30 cu.m

Skilled Labour : 1.5 M/Day/cu.m

Unskilled Labour: 2.2 M/Day/cu.m

5. Ashlar Masonary in super structure:

Stone : 1.30 cu.m (undressed)

Mortar : 0.20 cu.m.

Skilled Labour : 2.8 M/Day/cu.m

Unskilled Labour: 3.2 M/Day/cu.m

NOTES:

1. In foundation work labour will be 15% less than above requirements.
2. Stone measured in loose stock.