

FINAL REPORT

MAURITANIA RURAL ROADS PROJECT

(BOGHE - KAEDI - M'BOUT - SELIBABI)

PROJECT NO. 682-0214

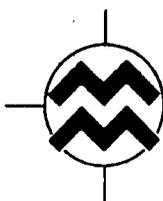
CONTRACT NO. AFR-0214-C-3045-00

FOR

USAID NOUAKCHOTT

ISLAMIC REPUBLIC OF MAURITANIA

DECEMBER 1986



MORRISON-MAIERLE, INC.

CONSULTING ENGINEERS

AND

OVERSEAS CONSULTANT SERVICES, INC.

FINAL REPORT

**MAURITANIA RURAL ROADS PROJECT
(Boghe * Kaedi * M'bout * Selibabi)**

**Project No. 682-0214
Contract No. AFR-0214-C-3045-00**

for

**USAID Nouakchott
Islamic Republic of Mauritania**

December 1986

by

**Morrison-Maierle, Inc.
Consulting Engineers
910 Helena Avenue
Helena, MT 59601**

**In
Association
with**

**Overseas Consultant
Services, Inc.
800 W. Madison Street
Mt. Pleasant, IA 52641**

M-M Project No. 1427-05-04(47)

TABLE OF CONTENTS

SECTION 1 - PROJECT DESCRIPTION.....	1
1.01 - Project Objective.....	1
1.02 - Technical Assistance Contract Actions.....	1
1.03 - Project Map.....	1
SECTION 2 - PROJECT ACCOMPLISHMENTS.....	4
2.01 - Existing Conditions.....	4
2.02 - M'Bout Camp Improvements.....	5
2.03 - Road Construction.....	5
2.04 - Equipment Maintenance.....	9
2.05 - Roadway Maintenance During Construction.....	10
2.06 - Procurement.....	10
2.07 - Project Staffing.....	11
2.08 - Training.....	12
SECTION 3 - CURRENT MATERIAL AND EQUIPMENT STATUS.....	13
3.01 - Spare Parts/Supplies.....	13
3.02 - Equipment Status.....	14
3.03 - Inventory.....	14
SECTION 4 - ROAD MAINTENANCE PROGRAM.....	14
4.01 - General.....	14
4.02 - Minimum Equipment.....	15
4.03 - Maintenance Work.....	15
SECTION 5 - REPORTS.....	15
5.01 - Reports Prepared.....	15
5.02 - As-Built Plans.....	15
APPENDIX.....	17

SECTION 1 - PROJECT DESCRIPTION

1.01 Project Objective

The project objective is to provide a year round farm to market road network in the potentially high food production (Guidimaka/Gorgol) area of Southern Mauritania.

Utilizing a force account project construction brigade, some 333 Km of road between Boghe-Kaedi-M'Bout-Selibabi was improved to near all-weather standards (improved track, gravel surface with drainage) to make the area more accessible to commercial and social services.

1.02 Technical Assistance Contract Actions

The technical assistance contract between USAID and Morrison-Maierle, Inc. in association with their sub-contractor, Overseas Consulting Services, Inc. (M-M/OCS) was effective 2 May 1983. During the course of the contract there were five contract modifications. The most significant of these were modification No. 2 which extended the TA Contract for 18 months and deleted the Selibabi-Gouraye road segment (46 Km), and modification No. 4 which added the Boghe-Kaedi road segment (108 Km). The termination date of the TA Contract is December 31, 1986, with funding budgeted through November 30, 1986.

1.03 Project Map

The Project Map on the following page shows the project roads in relationship to Nouakchott (330 Km by paved road to Boghe), the World Bank Black Gorgol Irrigation Project at Fom Gleita and the USAID Dirol Plain Project at Kaedi.

Work accomplished on the Project roads can be summarized as follows:

Boghe-Kaedi	-	100 Km	Major Maintenance westerly 66 Km; Improve easterly 34 Km to Improved Track (Gravel Surface w/o Drainage Improvements) Standards
Kaedi-M'Bout	-	117 Km	Improved Track, Gravel Surface w/Drainage Improvements Standard
M'Bout-Km 70	-	70 Km	Construction by UNDP, Maintained by Project; Improved Track, Gravel Surface w/Drainage Improvements Standards

Km 70 - Selibaby - 46 Km

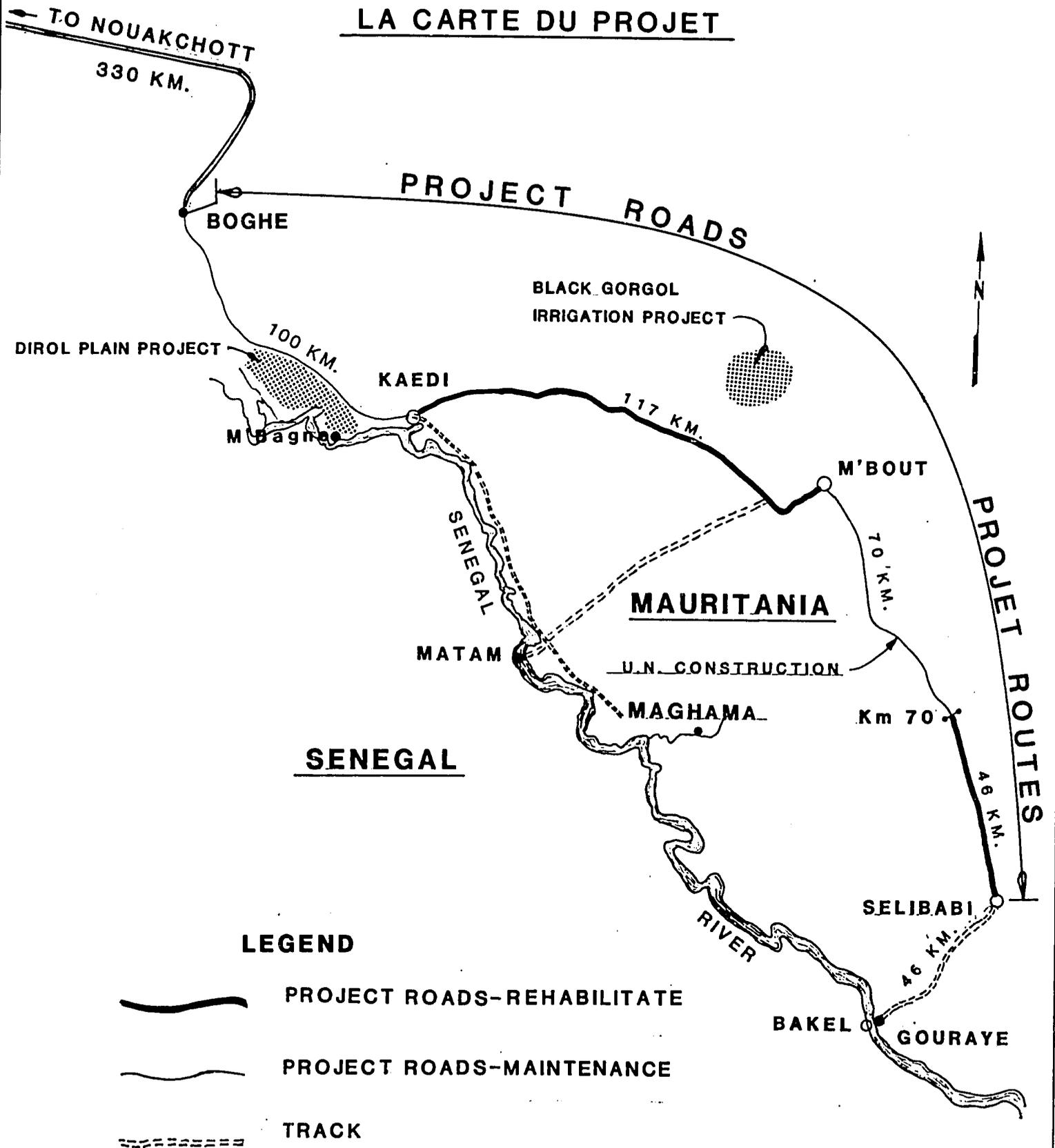
Improved Track, Gravel Surface,
w/Drainage Improvements Standard

Total Km Improved 333 Km
and/or Maintained.

Selibabi-Gouraye 46 Km

Deleted from project after re-
vised construction cost estimates
were completed in December 1984.

PROJECT MAP
LA CARTE DU PROJET



SECTION 2 - PROJECT ACCOMPLISHMENTS

2.01 Existing Conditions

A. UNDP Project

USAID Project No. 682-0214 was the completion a road rehabilitation project started under UNDP sponsorship in May 1981. UNDP acquired construction equipment, let a TA Contract to a German firm, established a work camp location in M'Bout, the center of the project area, and completed construction of approximately 70 Km of road from M'Bout toward Selibabi. The force account Construction Brigade was organized by UNDP separately from Travaux Publics (TP), although some TP personnel (mechanics and operators) were seconded to the brigade.

When the M-M/OCS team arrived for project start-up (June 1, 1983), the M'Bout camp consisted of 6 trailers (4-housing, 1-office, 1-mess hall), an inadequate open air 30 ft. x 20 ft. maintenance shop, and several containers of uncatelogued parts. Construction equipment consisted of 7-Mack Dump Trucks (including 1-cannibalized) 2-TD20 Bulldozers, 2-IH End Loaders, 2-Champion Graders, 1-Mack Fuel Truck and 3-Mack Water Trucks, 1-Dynapac Rubber Tired Roller, 1-Rex Vibratory Roller, 1-IH Backhoe, 1-Mack Tractor Lowboy Trailer, 1-Mack Lub Truck and miscellaneous support (generators, etc) equipment. The majority of the equipment was inoperative (tires, batteries, brakes, lubrication and filters, engine overhauls, etc).

B. Project Roads

With the exception of the UN Constructed Road, and Boghe to Kaedi, the project roads were unimproved tracks generally following the path of least resistance between population centers. The following summarizes conditions in May 1983.

Boghe-Kaedi

The westerly 75 % of the road had been improved (grading and surfacing) in 1979 or 1980. No drainage structures were constructed, and the project ran out of funds prior to completing the earthwork and surfacing for the remaining 35 to 40 Km to Kaedi. This road was being maintained by the contractor constructing Fom Gleita dam, but by 1983 was rapidly deteriorating as construction at the dam was winding down.

Kaedi-M'Bout

This road was constructed by the French in the early 60's and traces of surfacing still remained over much of the route. Drainage structures (box culverts) had been constructed across most of the major drainages near M'Bout, though they were inade-

quate due to increased run-off as vegetation was denuded due to overgrazing or dying from the drought, plus increased siltation. The westerly 2/3 of this road had also been maintained by the dam contractor.

M'Bout-Km70

The U.N. constructed road followed ridge lines (very curvilinear) and was constructed with a minimum of earth work. Gravel surfacing was often times placed on grade after blading vegetation off the alignment, and culverts installed for cross drainage (60 to 80 cm in diameter) were subject to plugging. Several of the major radiers (fords) have problems, including the one at Oued Garfa which will only be solved by construction of a bridge.

Km70 - Selibabi

The existing track showed little evidence of previous construction activity, and followed the path of least resistance from Km 70 to the paved access road connecting the Selibabi airport to the town.

Selibabi to Gouraye

Some drainage structures (small bridges and radiers) existed, though their construction appeared to be pre-World-War II. The road was basically an unimproved track.

2.02 M'Bout Camp Improvements

Based on the Project Work Plan and schedule submitted in June 1983, USAID financed the construction of a permanent maintenance shop (designed by a local architect and constructed by a local contractor under competitive procurement), purchased and erected a metal building (surplus from the Foum Gleita dam contractor) for a parts warehouse, as well as 4-porta-camps for use at work camp sites and/or M'Bout for TDY personnel and visitors.

The major maintenance required to keep equipment operational could not have been accomplished without these improved facilities, which will be turned over to TP for use as a maintenance center serving the area.

2.03 Road Construction

A. Added Construction Equipment

Based on the road standards, time restraints and earthwork required to construct the project roads, the M-M/OCS team recom-

mended that existing project equipment be augmented with Caterpillar 621B Scrapers, D-7 push-cats and other equipment owned by TP. This equipment, inoperable at the time the project was started was repaired by the local Caterpillar dealer using project supplied parts. While it took about 1-year to obtain parts and repair 2-scrappers and almost 18 months for the third, the project could not have been completed without this augmentation.

As the project continued, additional equipment on deadline in the TP central motor pool was requisitioned, repaired and used on the project. Generally, Caterpillar equipment was overhauled by the Caterpillar dealer, and Mack trucks were overhauled in the M-M/OCS M'Bout shop.

Additional equipment (tanks, concrete mixers, water and fuel trailers, truck tractors and lowboys, flat bed trucks etc.) was requisitioned through AID Excess Property Channels. Often this equipment required considerable overhaul, which was accomplished in the M'Bout shops.

B. Engineering Design Considerations and Construction Methods

Roads were constructed to improved track standards, which approach all weather standard roads with gravel surfacing and drainage improvements. Since fords (radiers) are used the cross major drainages, travel may be interrupted up to several days during major storms. Storms may delay traffic on the M'Bout-Kaedi and Km70-Selibaby road segments up to two days. On the UN constructed road, delays of a week or two are common at Garfa, and at Niabina on the Boghe-Kaedi road, delays of several days are not uncommon.

Road widths varied from 5.5 meters to 11.0 meters, with the larger widths utilized on the Boghe-Kaedi road maintenance work. The roads east of Kaedi were constructed to about a 6-meter width. The roads, with the exception of the Wawa pass, met longitudinal grading criteria. USAID financed roads, with one or two exceptions also met horizontal alignment criteria; portions of the U.N. constructed road do not.

Criteria called for the road to be constructed 0.60 meter above natural terrain and at least 0.75 meter above the highwater level. This criteria was again generally adhered to with exceptions made on segments of the Kaedi-Leqceiba road where sheet flows and lack of defined drainages made this requirement impracticable.

Compaction criteria was consistent with low volume earth embankment roads (90 % standard proctor) and was achieved using "dry compaction" methods.

The most difficult problem was drainage design, and the final construction was the result of compromises between the TA firm, USAID and GIRM. GIRM wanted the highest standards possible, including bridges. AID, considering projected traffic

volumes versus cost, financed standards appropriate with the low traffic volume road being constructed.

Drainage reports, based on estimated 25 year storms, served as the basis for drainage construction. The design report recommendations were modified to meet field conditions, and generally provide less than a 25 year design. All culverts under 1.5 meter size were replaced with small fords (radiers). Radiers across oueds and marigots are gravel/rock surfaced with gabion protection for erosion on the downstream edge. (Some major crossings were also installed with gabion protection on the upstream edge, if in the judgment of the field engineer, this was desirable). Radiers in sandy areas used "Geoweb" to stabilize the sand. (This corps of Engineers developed product was originally designed for stabilization of sandy beach roads subject to heavy military loads under tactical conditions and is installed using manual labor).

The Project Paper contemplated reinforced concrete radiers. These were not constructed because of cost. In addition to the initial cost factor, engineering the radiers to proper size was also a consideration. Because of unstable and shifting channels, high sediment loads in runoff, etc., it was more effective to construct a low-cost radier, modify it if channel conditions change, and then pave it in the future after traffic increases and channel conditions stabilize.

A somewhat similar condition exists where culverts are installed. Upstream conditions (sediment and debris) are changing which may result in future changes requiring additional culvert installation. A stock of 1.5 meter culverts have been left to provide additional drainage when washouts occur, and also to upgrade drainage on the U.N. constructed road.

Construction methods varied from the typical "side borrow" methods employed in the states. First, "dry compaction" methods using in-site moisture in the soil and vibratory compaction was used to construct the initial embankment. This required borrowing a select earth layer generally found about 30 cm below the overlying topsoil or sand. Soil properties and moisture content in the layer were sufficient to properly construct the embankment. The pits where embankment material was borrowed collect rainwater and provide watering holes for stock along the route for several months after the rain ends. Depth of borrow pits varied due to thickness of the layer and length of haul.

C. Road Construction Schedule

Road construction started in November 1983, about 5-months after the arrival of the TA team. The delays were due to repairing equipment, repairing the Boghe-Kaedi-M'Bout road so supplies could reach camp, and establishing a work site at Km77 on the M'Bout-Selibabi road. Another factor is the radier at Garfa on the U.N. constructed road which severely restricts access on the route during the rainy season.

Road construction proceeded southerly toward Selibabi through May 1984. Embankment was completed (without installation of drainage structures as culvert materials were not received until January 1985) between Km 0 and Km 46 at Selibabi. (Km 0 is at Km 70 on the U.N. constructed road, 70 Km south of M'bout.) The second lift (select granular surface) was completed from Km 46 at Selibabi back toward M'bout for 21 Km to Km 24 + 736. At this stage, the construction force was directed to begin the construction on the M'Bout - Kaedi Section, starting at M'bout.

The decision to start AID-financed construction on M'Bout Selibaby was political. It was recognized by the TA team and AID as out of sequence and more costly because supplies were being delivered to camp over unrehabilitated roads. However, GIRM placed a higher priority on M'Bout-Selibabi-Gouraye than on Kaedi-M'Bout (evidently due to maintenance efforts by the dam construction contractor).

In May 1984 the first of the scrapers became available. Because work could be continued on M'Bout-Kaedi throughout the rainy season, work on M'Bout-Selibaby was suspended and scheduled to resume in the fall of 1985. However, by fall, it was evident that if the project was to continue being supplied, earth work and surfacing on M'Bout-Kaedi should be completed before resuming work to the south. Work continued westerly toward Kaedi (with interruptions to provide periodic maintenance on existing roads after heavy storms) from June 1984 thru December 1985.

In January 1986, earthwork crews returned to the Km77 to Selibabi segments, completing earthwork and surfacing in March 1986. Drainage work (culvert installation) was accomplished on Km77 - Selibabi in the spring of 1985 and in April 1986. Radier construction started in May 1986 with a chantier working north from M'Bout to Selibabi. This chantier continued working through the rainy season, installing both radiers and additional culverts, with the drainage work completed in November 1986.

With the approval of Contract Modification No. 4, major earthwork rehabilitation started on the Kaedi-Boghe road, with 34 Km of embankment and surfacing constructed between 4 June 86 and 29 September 86. (Drainage structures on this segment will be constructed under a Kuwait fund project currently in the planning/specification phase). Modification No. 4 also required the project to maintain the balance of the road, and routine (blading and shaping) and periodic (repair washouts and some resurfacing) maintenance was done on the balance of the route.

Radier construction on M'Bout-Kaedi started in June 1986 with a chantier working toward Kaedi. A third crew was organized in Oct. 1986 after completion of the Boghe road work and started working from Kaedi to M'Bout. Work at critical radiers was substantially complete by November 30, 1986, with only minor clean-up work left at some of the radiers.

2.04 Equipment Maintenance

Equipment maintenance was an on-going effort, and at project closeout, considering the age of the fleet and severe working conditions (heat and dust) most operational units are in good or above average condition. The status of Equipment in November, 1986, is shown in Appendix A at the end of this report.

The period June 1983-May 1984 was the most difficult period of equipment maintenance as construction started with selected equipment and vehicles made ready through the questionable process of cannibalization. The erection of a suitable warehouse, construction of a functional workshop facility and generation of a flow of spare parts and supplies took a year to achieve.

The second year was the turnaround period as the rebuilt (primarily by the Cat dealer) 3-621B scrapers, 2-D7 Bulldozers, 2-Motor Graders and surplus equipment came on line. Additionally, the inherited UNDP fleet was passing through a rebuild/rehabilitation period and substantial spare parts were flowing into the project.

The third year, June 85-November 86 was a highly productive and cost effective period from the standpoint of equipment availability which was maintained in the range of 75% to 90%. The preventative maintenance program was functioning smoothly and units went through the workshop on a routine basis. Engine rebuild was accomplished on site, and three additional dump trucks were obtained from TP in March 1986, engines rebuilt and made operational for radier and surfacing construction.

High equipment availability was only possible through the cooperation and dedication of M-M/OCS TA staff, USAID and Mauritanian staff. All put in long hours to insure parts availability and to repair equipment on the receipt of parts. The decision by USAID and M-M/OCS to utilize airfreight shipments for urgently required spare parts rather than trying to forecast and purchase spare parts for one or two years forward has been, we believe, cost effective and saved funds in the long run.

Equipment is now averaging 5 to 8 years in age, which is perhaps equal to 10 to 12 years in an environment less harsh than Mauritania. Equipment availability has only been possible because of a rigid and effective maintenance program. For example, the Cat 85 Kw generator has operated continuously in excess of 10,000 hours with oil consumption less than 1-liter between oil changes every 250 hours.

As the fleet transfers from road construction to maintenance or units are transferred to other projects, the high availability factor can only be maintained thru an effective preventative maintenance program with speedy repairs when required. This will require a high level of supervision by TP staff.

2.05 Roadway Maintenance During Construction

Roadway maintenance during construction consisted of routine maintenance (blading and shaping of road surfaces, dragging, cleaning culverts, etc.) and periodic maintenance (primarily repair of washouts and removal of sand or other debris from radiers). Maintenance efforts were higher during and immediately after the rainy season, and more routine during the dry season.

Depending on the quality of the aggregate surfacing, roads begin to corduroy after 30 to 90 days. The maintenance program proposed in Section 4 will if adhered to, keep roads in satisfactory riding condition.

2.06 Procurement

All procurement in the project, with the exception of emergency supplies, purchased by M-M/OCS with USAID authorization, were purchased thru USAID Nouakchott channels on receipt of requisitions from the project

A. Local Purchases

Local purchases (as well as preparation of the local project payroll) was accomplished by the UNDP staff in Nouakchott, with AID staff providing guidance and advice with respect to construction materials and equipment spare parts purchased locally. UNDP adhered to the appropriate AID regulations.

B. Off-shore Procurement

Off-shore procurement (primarily excess property and spare parts for all construction equipment) was done by USAID using a combination of methods including direct federal agreements, procurement agents and where appropriate competitively advertised procurement.

C. Transport to M'Bout

Transport of commodities, with the exception of fuel, and major containerized shipments of culverts and gabions, was generally by project vehicles. Project vehicles used included the projects flatbed trucks, and the two truck-tractor/lowboy units.

Mauritanian commercial transport was used for the commodities not transported by the project.

D. Recommendations

The system worked well because of dedication and desire on the part of USAID staff personnel to support the project and make the system work. Although split responsibilities are not always desirable, there is no doubt that AID's knowledge of procurement and access to knowledgeable purchasing agents facilitated procurement.

The only recommendation of the M-M/OCS team would be to improve project communications through the use of radio-teletype equipment. This would have speeded up communications and avoided errors in transmission and reception of voice messages.

2.07 PROJECT STAFFING

A. Local Construction Brigade

The local construction brigade was hired locally on a UNDP project payroll. It was not a part of GIRM Travaux Publics, although some mechanics, operators and one foreman were seconded to the project by TP.

During the second half of the project, TP provided a counterpart to the M-M/OCS Chief of Party. A significant part of his duties related to personnel matters.

Permanent (non-temporary) staff averaged between 80-100 when the project was in full production. Temporary (day laborers) employees were added when needed, primarily for drainage construction.

B. Technical Assistance (TA) Staffing

TA staffing varied during the project. Original contract staffing was an engineer/Chief of Party, Construction Superintendent and two mechanics. After a year into the project, a 5th field team member (combination warehouse/mechanic supervisor) was added, and remained with the project during the peak construction periods (June 1984 - May 1986) TA staff were phased out on a scheduled basis between May 1986 and November 1986 until only one field team member remained.

TDY support consisted of several drainage engineers plus home office management visits throughout the course of the contract. Three consultants were employed, two local hire expatriates and one U.S. hire expatriate. Two of the consultants provided added TA during the construction of the radiers, with the third providing additional assistance in the maintenance shop during the last month of the contract to insure as close to 100 % equipment availability at project closeout as possible.

The TA staff provided the following:

POSITION	PERSON-MONTH
Engineer/Chief of Party	33.7
Construction Superintendent/COP	34.5
Mechanics (field and shop)	78.6
Warehouse/Mechanic	28.9
	<hr/>
Sub-Total Field	175.7
Consultants	8.9
TDY - Drainage	25.5
TDY - Home Office Mgmt	12.4
Home Office Support	
Professional	27.4
Technical	17.0
Procurement	4.3
	<hr/>
Total Effort (person-months)	271.2

2.08 TRAINING

A combination of on-the-job training and informal class instructions was given to the local work force covering mechanical maintenance and road construction and maintenance.

SECTION 3 - CURRENT MATERIAL AND EQUIPMENT STATUS

3.01 Spare Parts/Supplies

A. High Mortality

There is currently approximately \$ 150,000.00 of high mortality parts at the project site and for the most part, warehoused in sea-shipment containers, as follows:

Tires (all size).....	\$ 70,000
Filters (all units).....	\$ 44,000
Cutting edges, teeth, Mack spare springs, spring hangers and brake drums.....	\$ 31,000
Other.....	\$ 5,000
	<u>\$ 150,000</u>

Although there is an excess of certain filters elements, we believe that at least 95 % of the above inventory will be utilized if the equipment remains operational on this or another project.

B. Basic Inventory

The Kardex system in place and functioning is basically a record of receipts and issues by manufacture and part number. An inventory control system showing maximum and minimum inventory has not been implemented, however we feel there is now sufficient parts consumption history to include this information on individual parts Kardex cards.

Although there are a few items such as Mack transmission parts that appear excessive, there is very little dead or redundant stock. Total basic inventory is estimated at \$ 200,000 and 85 to 90% of these parts will be utilized during the next two years of road maintenance activity.

C. Disposition of Parts/Supplies

Once the equipment has been selected for the road maintenance fleet, an audit should be made of the basic warehouse and the high mortality parts currently stored in containers. Parts/supplies for equipment units no longer at the project site and parts/supplies which appear in excess of 2000 hours of operations could be returned to the public works central warehouse in Nouakchott. These parts should be identified (tagged) before packing and return and the Kardex file cards should accompany the transfer.

D. Used Parts

There is a substantial quantity and value of used parts and components including crankshafts (grind undersize) and the like. The parts and assemblies should be disassembled if required, inspected and transferred to Nouakchott and inventoried as "used parts" and inventoried on separate Kardex file cards as such. We also believe that all high mortality used parts such as tires, battery casings, cutting edge steel, and the like should be inspected before disposal.

E. Tools and Shop Equipment

The central shop in M'Bout is well equipped with above average shop tools and support equipment. There is a modest amount of new hand tools (\$3,000 to \$5,000) locked up in the tool crib and a wide range of precision and special tools.

3.02 Equipment Status

The status of equipment at project completion is summarized in Appendix A.

3.03 Inventory

A complete inventory of project supplies and equipment was made during the period April to July 1986 and transferred to GIRM. A copy of the inventory is available from USAID Nouakchott.

SECTION 4 - ROAD MAINTENANCE PROGRAM

4.01 General

Project Implementation Letter Nbr. 11 concerns the financing of maintenance for the 333 Km between Boghe and Selibabi. The letter provides for a fixed amount reimbursement agreement for the road and equipment maintenance, two years on Boghe-Kaedi, and three years on the Kaedi-Selibabi roads.

The implementation letter was adapted from the maintenance plan developed by the TA team.

4.02 Minimum Equipment

The agreement specifies the following equipment:

Required Maintenance Equipment

- 2 - D-7 Bulldozers (or equivalent)
- 4 - 120 G Motor Graders (or equivalent)
- 4 - Mack Dump Trucks, including two equipped with grader blades
- 2 - Hough Loaders (or equivalent)
- 1 - Mack Service Vehicle
- 1 - Low Boy
- 1 - Water Truck
- 2 - Rollers
- 3 - Pickups
- 3 - Agriculture Tractors with drags

4.03 Maintenance Work

The agreement provides for reimbursement for the following work items:

Surface Replacement	Cubic Meter
Riprap installation	Cubic Meter
Blading (by grader)	8 times/yr Boghe-Kaedi 7 times/yr Kaedi-Selibabi
Truck Blading/dragging	9 times/yr
Gabion installation	Cubic Meter
Technical Assistance	Lump Sum
Warehouse and Camp Improvements	Lump Sum

SECTION 5 - REPORTS

5.01 Reports Prepared

The following reports were prepared by the M-M/OCS team during the course of the project.

A. Monthly Reports

June 1983 thru November 1986.

B. Work Plans

Project Work Plan and Schedule	June 1983
Revised Project Work Plan and Schedule	29 June 1984
Updated Project Work Plan and Schedule	December 1984
Modified Project Work Plan and Schedule	May 1986

C. Special Reports

Project Appraisal	July 1984
Drainage Structure Report Km 70 - Selibabi	November 1983
Drainage Structure Report UN Constructed Road M'bout Km 70	August 1984
Drainage Structure Report Kaedi - M'bout	July 1985
Review of Drainage Structure Report Kaedi - M'bout	November 1985
Project Appraisal	July 1984
Road Maintenance Plan (Preliminary)	December 1984
Road Maintenance Plan (Update)	March 1986

5.02 As-Built Plans

As-built plans were prepared for Kaedi-M'Bout and Km 77-Selibabi. The original tracings and 5 prints were furnished to USAID Nouakchott for transmittal to GIRM. Plans were prepared in accordance with a letter dated 10/21/85 and approved by AID Nouakchott.

No plans were prepared for the Boghe-Kaedi route as the work was classified as "Major Maintenance", or for the UN Road, that being the responsibility of the UNDP contractor.

APPENDIX A

INVENTORY OF CONSTRUCTION EQUIPMENT
 ASSIGNED TO USAID 682-0214
 MAURITANIA RURAL ROADS IMPROVEMENT PROJECT

PROJECT NUMBER	MAKE	MODEL	DESCRIPTION	SERIAL NUMBER	LICENSE PLATE	CONDITION
6000-1	IHC	TD-20E	BULLDOZER	4460006U032542	SG-3831	OPERATIONAL - GOOD
6000-2	IHC	TD-20E	BULLDOZER	4460005U032543	SG-3832	OPERATIONAL - GOOD
6000-3	CAT	D7F	BULLDOZER	94N1755	N/A	OPERATIONAL - FAIR
6000-4	CAT	D7F	BULLDOZER	94N1758	N/A	OPERATIONAL - FAIR
6001-1	CHMP	710	MOTOR GRADER	710640214624	SG-3837	OPERATIONAL - FAIR
6001-2	CHMP	710	MOTOR GRADER	710640214623	SG-3838	OPERATIONAL - FAIR
6001-3	CAT	120	MOTOR GRADER	10R1274	SG-1219	OPERATIONAL - FAIR
6001-4	CAT	120G	MOTOR GRADER	82V764/S028, P, 30009	N/A	OPERATIONAL - GOOD
6002-1	IHC	530	FRONT-END LOADER	347053U0002456	SG-3833	OPERATIONAL - GOOD
6002-2	IHC	530	FRONT-END LOADER	347053U0002452	SG-3834	OPERATIONAL - GOOD
6002-3	KOMATSU	W-70	FRONT-END LOADER			OPERATIONAL - GOOD
6002-4	KOMATSU	W-170	FRONT-END LOADER			OPERATIONAL - GOOD
6003-1	CAT	621B	SCRAPER	45P1284	N/A	OPERATIONAL - GOOD
6003-2	CAT	621B	SCRAPER	45P1379	N/A	OPERATIONAL - GOOD
6003-3	CAT	621B	SCRAPER	45P1383	N/A	OPERATIONAL - GOOD
6004-1	MACK	R685-ST	DUMP TRUCK	83216	SG-3851	OPERATIONAL - FAIR
6004-4	MACK	R685-ST	DUMP TRUCK	83213 A687	SG-3849	OPERATIONAL - FAIR
6004-5	MACK	R685-ST	DUMP TRUCK	83213 A674	SG-3853	OPERATIONAL - FAIR
6004-6	MACK	R685-ST	DUMP TRUCK	83215	SG-3848	OPERATIONAL - FAIR
6004-7	MACK	R685-ST	DUMP TRUCK	83211	N/A	OPERATIONAL - FAIR
6004-8	MACK	1M2N161Y	DUMP TRUCK	6CA087133	SG-4186	OPERATIONAL - GOOD
6004-9	MACK	1M2N161Y	DUMP TRUCK	8CA087134	SG-4185	OPERATIONAL - GOOD
6004-10	MACK	1M2N161Y	DUMP TRUCK	5CA087138	SG-4181	OPERATIONAL - GOOD
6005-1	MACK	R685-ST/WATER	TANKER TRUCK	83210	SG-3843	OPERATIONAL - FAIR
6005-2	MACK	R685-ST	CRANE TRUCK	83209	SG-3844	OPERATIONAL - FAIR
6005-3	MACK	R685-ST/WATER	TANKER TRUCK	83208	SG-3845	OPERATIONAL - GOOD
6006-1	MACK	R685-ST/FUEL	TANKER TRUCK	83207	SG-3846	OPERATIONAL - GOOD
6006-2	AMC	M49A2C/FUEL	TANKER TRUCK	10495	SG-4473	OPERATIONAL - FAIR
6008	MACK	RM6854X	LUBE TRUCK	1361	SG-3842	OPERATIONAL - GOOD
6009	MET	MOBILE SHOP	EQUIPMENT TRAILER	778	SG-3842	OPERATIONAL - GOOD
6012-1	REX	SP 910	COMPACTOR	91HX826	SG-3839	OPERATIONAL - FAIR
6012-2	DYNA	CP-22	COMPACTOR	695B167	N/A	OPERATIONAL - GOOD
6012-3	DYNA	CA-25-2	COMPACTOR	4971178	N/A	OPERATIONAL - GOOD
6012-4	WAKR	SMALL/BS60Y	COMPACTOR	501310603	N/A	OPERATIONAL - GOOD

APPENDIX A

INVENTORY OF CONSTRUCTION EQUIPMENT
 ASSIGNED TO USAID 682-0214
 MAURITANIA RURAL ROADS IMPROVEMENT PROJECT

PROJECT NUMBER	MAKE	MODEL	DESCRIPTION	SERIAL NUMBER	LICENSE PLATE	CONDITION
6012-5	WAKR	SMALL/BS60Y	COMPACTOR	501310570	N/A	*NOT OPERATIONAL-FAIR
6015-1	DAVY	4M250RBU	COMPRESSOR	5D15512423	N/A	OPERATIONAL - FAIR
6015-2	QUNY	AIR 120CFM	COMPRESSOR	34754701	N/A	OPERATIONAL - GOOD
6016-7	CAT	37.5 KW	GENERATOR	50TH588	N/A	OPERATIONAL - GOOD
6016-8	CAT	37.5 KW	GENERATOR	50TH589	N/A	OPERATIONAL - FAIR
6016-9	KATO	17W/PERKINS	GENERATOR	85620	N/A	*NOT OPERATIONAL-GOOD
6016-10	CAT	3304/85 KW	GENERATOR	50A05482	N/A	OPERATIONAL - GOOD
6024-9	ISZU	PICKUP	PASS. TRUCK	4780-224	SG-4459	OPERATIONAL - GOOD
6024-10	PGT	404 PICKUP	PASS. TRUCK	9958284	SG-3943	*NOT OPERATIONAL-POOR
6024-12	AMC	CHEROKEE CHIEF	PASS. TRUCK	026554	SG-4441	OPERATIONAL - GOOD
6024-14	AMC	JEEP WAGONEER	PASS. TRUCK	1JECM18UXDT045844	SG-4407	OPERATIONAL - GOOD
6024-15	ISZU	PICKUP/DOUBLE	PASS. TRUCK	4780-234	SG-4691	OPERATIONAL - GOOD
6024-16	ISZU	PICKUP/SINGLE	PASS. TRUCK	6548-302	SG-4690	OPERATIONAL - GOOD
6027-1	MACK	R685-ST	TRACTOR	83218	SG-3836	OPERATIONAL - GOOD
6027-2	MACK	MILITARY	TRACTOR	653861	SG-4472	OPERATIONAL - FAIR
6027-3	AMC	W/18' FLAT BED	FLAT BED TRUCK	1079983	SG-4483	OPERATIONAL - FAIR
6028-1	BIRM	LOW BOY	TRAILER	IBM3V3130	SG-3822	OPERATIONAL - FAIR
6028-2	CROS	LOW BOY	TRAILER	7318-5	SG-4485	OPERATIONAL - FAIR
6028-3	SWST	HIGH BOY	TRAILER	M127A2C-7318-5	SG-4484	OPERATIONAL - FAIR
6028-4	TKFT	WATER/5500 GAL	TANK TRAILER	TT65-189	N/A	**OPERATIONAL - POOR
6028-5	STNS	WATER/700 GAL	TANK TRAILER	1155	N/A	OPERATIONAL - FAIR
6030	IHC	260	LOADER/BACKHOE	260271013B201781X	SG-3835	OPERATIONAL - POOR
6032-1	REX	16 CUBIC FOOT	CEMENT MIXER	HBG-1822	N/A	OPERATIONAL - AVG
6032-2	REX	16 CUBIC FOOT	CEMENT MIXER	HBG-1819	N/A	OPERATIONAL - AVG
6033-1	MLLR	BIG BLUE 400D	WELDING MACHINE	JB584352	N/A	OPERATIONAL - GOOD
6034-1	JENY	2100C	STEAM CLEANER	1487	N/A	OPERATIONAL - POOR
6034-2	JENY	TW2000	PRESSURE CLEANER	407	N/A	OPERATIONAL - FAIR

* Parts on Order for Repair

** Cracked Tank