

649-037

DECONTROLLED PER MEMORANDUM TO
REFERENCE CENTER FROM FLOYD R.
SPEARS, AFR/EMS DATED AUG. 2,
1977. (SEE ENCLOSED MEMO.)

UNITED STATES GOVERNMENT

Memorandum

TO : Reference Center, Ms. Joanne Paskar

DATE: August 2, 1977

FROM : AFR/EMS, *Floyd R. Spears*
Floyd R. Spears

SUBJECT: Declassification of A.I.D. Documents

This memorandum addresses the following A.I.D. documents:

- a. Measles Control and Smallpox Eradication Program dated Jan. 5, 1970
- b. CAP on Trans-Cameroon Railroad (Phase II)
- c. Mali -- Proposal and Recommendations on Veterinary Laboratory
- d. CAP -- Liberia -- Improvements of Roberts International Airport, Phase II (Construction)
- e. CAP -- Swaziland -- Agricultural Development Loan
- f. CAP -- Ethiopia -- Malaria Eradication -- Phase I
- g. CAP -- Somalia -- Mogadiscio Water Supply
- h. CAP -- Tanzania -- Agricultural Projects Support
- i. CAP -- TANZAM Highway Phase III
- j. CAP -- Uganda -- Livestock Development

The above listed documents have been reviewed by appropriate staff personnel assigned to Africa Bureau to determine if these documents should be declassified. Based on this review, no justifications have been identified for the continued classification of these documents. Therefore, this memorandum hereby authorizes the declassification of all documents listed.



5010-110

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

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AID-DLC/P-569
June 5, 1967 ✓

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Somali Republic: Mogadiscio Water Supply

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$8,500,000 to an autonomous water authority to assist in financing the foreign exchange and local costs of goods and services for the Mogadiscio Water Supply Project.

This loan proposal is scheduled for consideration by the Development Loan Staff Committee at a meeting on Monday, June 12, 1967.

Rachel C. Rogers
Assistant Secretary
Development Loan Committee

Attachments:
Summary and Recommendations
Project Analysis
ANNEXES I-V

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SOMALI REPUBLIC - MOGADISCIO WATER SUPPLY

June 5, 1967

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June 5, 1967

SOMALI REPUBLIC - MOGADISCIO WATER SUPPLY

SUMMARY AND RECOMMENDATIONS

1. BORROWER: The autonomous Mogadiscio Waterworks Agency (AMWA), an independent municipal utility entity to be established.
2. AMOUNT OF LOAN: \$8,500,000.
3. TERMS: A. Terms to AMWA
 1. Interest: $3\frac{1}{2}\%$ per annum.
 2. Maturity: 30 years, including a 5-year grace period.
 3. Repayment: Principal and interest to be repaid to GSR in Somali shillings.B. Terms to GSR
 1. Interest: 1% per annum for the first ten years; $2\frac{1}{2}\%$ per annum thereafter.
 2. Maturity: 40 years, including a 10-year grace period.
 3. Repayment: Principal and interest to be repaid to A.I.D. in U.S. dollars.
4. TOTAL COST OF PROJECT:

Proposed A.I.D. Loan	\$8,500,000
Proposed A.I.D. Grant	650,000
GSR Contribution	945,000
	<hr/>
	\$10,095,000
5. PROJECT DESCRIPTION: The project consists of (i) engineering services required to design and equip transmission mains, storage reservoirs, distribution system, and to drill and develop the production well field, and undertake exploratory drilling for system reserves, (ii) construction of all utility transmission, treatment, distribution facilities, and completion of well field facilities, and (iii) management services during the establishment and initial operations of the AMWA, and training for Somalis to operate, maintain and manage the system.
6. PURPOSE OF LOAN: To finance the U.S. costs and a portion of the local costs of the required engineering, construction, and technical services.

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7. **BACKGROUND:** A.I.D. and the GSR have been discussing the construction of a potable water supply for the city of Mogadiscio since 1960. A feasibility study recently completed by Hydrotechnic Corporation established that a potable ground water supply system for the city is both economically and technically feasible.
8. **VIEWS OF MISSION:** The Country Team strongly endorses the GSR request.
9. **EXPORT-IMPORT BANK CLEARANCE:** Original clearance received October 6, 1964; recleared June 8, 1967.
10. **STATUTORY CRITERIA:** Have been met. See Annex I.
11. **RECOMMENDATIONS:** Authorization of a loan to the GSR for an amount not to exceed \$8,500,000 in accordance with the terms set forth in the proposed Loan Authorization attached as Annex II.

CAPITAL ASSISTANCE COMMITTEE:

Capital Development Officer:	Owen Cylke
Desk Officer:	Frank Scordato
Engineer:	Robert Rose
Counsel :	Willis Jourdin

AFR/CDF, OCylke/RRose:lmg : mac:5/22/67

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June 5, 1967

CAPITAL ASSISTANCE PAPER

SOMALI REPUBLIC - MOGADISCIO WATER SUPPLY

SECTION I - INTRODUCTION

A. Background. As early as 1958, the Government of the Somali Republic (GSR) had indicated interest in U.S. assistance for a municipal water supply in Mogadiscio, the capital city of the country. The city does not now have a potable water supply. Formal discussions between the GSR and the International Cooperation Administration (ICA) were initiated in 1960, and an ICA technician was assigned to investigate potential water sources. That first report indicated ground water as probably the most economic source. On that basis, A.I.D. then signed a reconnaissance contract with a consultant specifically to explore the feasibility of a ground water supply. The initial review was completed in 1962.

The Prime Minister of the GSR discussed the progress of the project with Secretary Rusk after discussions with President Kennedy on a trip to the United States in November 1962. The Secretary reaffirmed the interest of the United States in the project, but was careful to indicate that A.I.D. would require formal studies to confirm both the sources for and feasibility of the proposed project.

Hydrotechnic Corporation of New York, New York was selected to undertake the formal studies in January 1963. Their initial recommendations indicated that additional work would be required to confirm the ground water source. That second phase was not completed until August 1965, complicated by lengthy negotiations, delayed delivery of equipment and the necessity to drill more wells than anticipated. The second phase report was followed by a Hydrotechnic compendium, completed in May 1966, which included all of the company's previous findings in one volume.

In September 1964, the Development Financing Review Committee (DFRC) of the Africa Bureau put the project under Intensive Review. The DFRC recommended that the GSR establish an autonomous water supply authority to operate the proposed system on a sound managerial and fiscal basis. The DFRC further recommended that the authority receive and disburse all revenues from the system and be designated Borrower for loan transactions. It was also recommended and agreed that A.I.D. would consider a GSR contribution of 10% of total project costs, rather than the usual 20% borrower contribution in recognition of the critical Somali budget situation. The GSR was advised of this decision.

To assist the GSR establish a water authority, A.I.D. agreed to grant-finance a contract with the Minneapolis management consulting firm of Orr-Schelen-Mayeron (OSM) and Associates, Inc. The firm was asked to detail the procedures precedent to establishing an authority and to review such water supply legislation as the GSR might submit. The contract was signed in February 1966.

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GSR officials had indicated as early as 1964 their willingness to establish an autonomous water authority under national law. No action was taken to establish an authority, however, during the period the OSM report was being prepared. In June 1966, the GSR Ministry of Foreign Affairs sent a "Note Verbale" proposing that responsibility for the Mogadiscio system be placed with the Municipal Government rather than with an autonomous authority. Its reasoning was clear - "the financial balance of the city is based upon it." The proposal was not accepted by A.I.D.

A.I.D. remained firm that the system be operated on principles of fiscal and operating integrity. A.I.D. did indicate, however, that some alternate organizational scheme would be considered as long as the principles cited above were maintained. In August 1966, A.I.D. officials discussed the problem with representatives of the GSR in Mogadiscio. As a result of the meetings, the GSR accepted the principle of autonomy but proposed that the Municipality enact the appropriate legislation rather than the national Parliament. The necessary legislation was drafted in September 1966 and further reviewed in Mogadiscio by an AID/W representative with officials of the Municipality and GSR. A new draft was prepared on the basis of these discussions. It lacks certain details but is a substantial improvement over the earlier draft. On the basis of the revised draft, A.I.D. is prepared to proceed with the proposed loan.

B. Relation of the Somali Republic to A.I.D. Strategy. The revised U.S. economic assistance policy for Africa, approved in November 1966, provides that in the future the U.S. will furnish economic assistance on a bi-lateral basis only to certain countries which have the best development prospects on a national scale, and that such assistance will be planned and administered to the greatest extent possible in a strengthened multi-lateral framework under international agency leadership. Development assistance to other parts of Africa is to be provided on a regional or multi-donor basis, except for a small Self-Help Fund in each country financed from Technical Assistance Funds.

The Somali Republic is not one of the countries which will continue to receive U.S. development support on a country basis under the revised policy. However, the policy further provides for the successful completion of current loan and technical assistance projects in the countries which will not receive assistance in the future on a bi-lateral basis, and for going forward with projects on which there has been such advance discussions and planning with the country that it would be wasteful and harmful to our broader interests to drop the project. In view of the extended period of time during which discussions have been held with the Somali Republic concerning possible U.S. financing of the project, and in view of the considerable sums already invested in preliminary studies and surveys, this loan is considered to be one of those with which A.I.D. should proceed on a bi-lateral basis. For these reasons, the Somali Republic was included in the President's Determination of January 5, 1967, listing countries to which development loans will be made in FY 1967.

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SECTION II - THE BORROWER

A. Autonomous Mogadiscio Waterworks Agency. The A.I.D. loan will be made directly to the AMWA, with repayment on a dual basis. AMWA will repay the GSR in Somali shillings, the GSR to the U.S. in dollars. The Loan Agreement will be conditioned upon establishment of the AMWA in a form acceptable to A.I.D. In the meantime, the Municipality will act on behalf of the AMWA for the purpose of initiating contract procedures for engineering services.

The Municipal Council of Mogadiscio submitted a draft Resolution and Special Regulations providing for the Autonomous Mogadiscio Waterworks Agency in September 1966. The draft was reviewed by A.I.D. and an OSM representative. Particular areas of concern to both organizations were the statutory authority for the proposed agency, provisions in the draft indicating that the agency would not be completely autonomous, some loopholes allowing excessive diversion of revenues to the Municipality, the absence of principles for later development of an equitable rate structure, and certain arrangements for loan repayment.

When established, the Departments of the Agency will include Offices of the Administrative Board, the President of the Agency, the Director, the Technical Adviser and the Audit Board. The President, Director, Administrative Commissioners and members of the Audit Board will be appointed by the Municipal Council for specified terms. The Technical Adviser will be appointed by the Administrative Board.

B. Management Assistance. A.I.D. will provide management assistance under an existing A.I.D. task order as necessary initially to assist and advise in the establishment of the AMWA, to assist in the review and evaluation of engineering proposals, to assist in the review and award of the engineering services contract, to assist in the preparation of a request for management services, and to be available for any other short term requirements prior to the establishment of the AMWA and contract award for long term management services.

In early 1968, a Resident Management Consultant will be contracted to assist the AMWA. The Consultant will work closely with the Director in recruiting personnel for the Agency; establishing procedures, policies, and by-laws, and supervising the engineering services. It is also anticipated that the AMWA will select two persons for advanced technical, operations, and management training in the U.S. during this period. Both the consultant and Somali participants will be grant financed.

In 1969, the Resident Consultant will be supplemented by another consultant to assist the Technical Advisor in establishing technical and fiscal operations of the Agency. By early 1970 a full consultant staff will be provided and such short term specialists as may be required. Two additional

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Somali participants will be sent to the U.S. for training at this time. The AMWA will also complete its initial recruiting for pump men, mechanics, chemists, accountants, meter repairmen, and customer service personnel. During the design stage, the rate structure will be established based upon up-to-date construction costs.

By the time the system is operational, all operating and technical staff will be recruited and training will be undertaken by the management consultants and contractor personnel. It is anticipated that the water system will commence initial service in 1971, and that management consultant services will be required on the job during the early operational years.

SECTION III - ECONOMIC ANALYSIS

A. Existing Water Supply. Mogadiscio has two independent municipal water supply systems, a fresh-water system and a brackish-water system. The two municipal systems are operated within the administration of the Municipality, and the tariffs charged are an important source of revenue to Mogadiscio. The fresh-water supply is obtained from three wells having an estimated 1962 total capacity of 230,000 gallons per day (gpd). Allowing for losses and unaccounted water, it is estimated that 161,000 gpd of fresh-water were consumed in 1962. Service connection records indicate that this system has been servicing approximately 50 household and industrial outlets. There are also water points on the system at which water is sold to middlemen who then resell the water to donkey cart vendors at a higher price. These vendors sell to the consumers at an even higher price, equivalent to \$5.33 per 1,000 gallons. The entire fresh-water system is in danger of going saline because of salt water intrusion. The Hydrotechnic analysis indicated serious chloride and sulphate pollution between 1962 and 1963.

The other municipal system provides only brackish-water and is divided into three distribution areas which service various parts of the city. This system has some thirty-five working wells which served 2,311 metered consumers in 1962. Municipal water sales records indicate that 560,000 gpd of brackish-water were consumed in 1962. The brackish system is in very bad condition and is rapidly approaching the end of its useful life. Piping is deteriorating, breaking and leaking; and it is quite common for the system to be out of service for several days at a time.

In addition to the municipal systems described above, there are more than 200 private wells, each of which is in itself a small water company. The owners of these wells most often sell water to donkey cart vendors who retail the water to consumers, although some of the private wells serve only one house or small group of associated houses (compound). Hydrotechnic estimated total 1962 consumption from the wells at 212,000 gpd. The Hydrotechnic Report also recommended that the private wells not be connected to the new system because of the poor quality of the water. In fact, the Report recommends that the wells be closed to human consumption.

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The present water supply systems of Mogadiscio are inadequate and the poor installations, together with the methods used for operation, maintenance and administration of the systems, result in the delivery of insufficient quantities of water at prohibitive costs. Further, the water is extremely poor in quality and definitely non-potable by modern health standards. Wells, pumps, piping and associated equipment are in such bad condition that they are essentially beyond repair.

B. Population. The design of a completely new water utility in Mogadiscio must be premised upon a rational per capita consumption profile (including industry), which, in turn, must be premised upon reasonable population estimates.

The population of Mogadiscio has been the subject of numerous demographic surveys; all unreliable for one reason or another. However, sufficient data exists from which a population base can be extrapolated for purposes of estimating the demand for water. Municipal census figures are available for 1958-1962, but are not credible since they are based on voluntary registration of vital statistics. Assorted counts from 1950 through 1962 are available from other sources. Hydrotechnic Corporation developed population data during their 1963-65 feasibility studies, and preliminary results are available from a 1965 study by the Demographic and Social Statistical Branch of the United Nations.

1. 1963 Hydrotechnic Study. The 1963 study was made by Hunting Survey Corporation of Toronto, Canada for Hydrotechnic Corporation. Based on aerial photos, the city was divided into zones, the zones measured, and an estimate made of the number of structures within each zone. An actual count of structures was made in low density areas. In high density zones, house counts in sample measured areas were made and then multiplied by the area of the entire zone to obtain the total count.

The survey data indicates that 76% of the total population lives in seven high density areas. This figure was developed from per capita assumptions for each family unit, and family unit assumptions per structure. The Hunting Survey estimated four persons per family unit and three family units per structure. Projecting these estimates on the information developed from the aerial photos results in 288,144 persons for the seven zones.

Mr. T.C.J. Young, a UN statistician in Mogadiscio, suspected major errors in the basic Hunting assumptions in the high density areas and recommended, in February 1964, that a limited field survey check the family unit per structure estimates. The common living structure in the high density area is a three room "arish". An "arish" is an oblong wood and wattle building (approximately 15 feet x 40 feet) which exists singly or in pairs with a narrow living space in between. The Hunting Survey estimated three family units per structure, and the UN statistician suggested that a more modest estimate of family units per structure would be appropriate. Because of the high density in older areas, a slight misjudgment in basic assumptions can skew the final population estimate.

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The remaining twenty-nine zones of the city were estimated to contain 37,150 persons, for a total city estimate of 325,294.

2. 1965 Revision to Hydrotechnic Estimates. The original population estimates were revised by Hydrotechnic, however, after discussions with another UN demographer conducting a population survey in Mogadiscio in 1965. The demographer, a Mr. Choudhary, had completed an independent survey and in one high density area found significant discrepancies with the earlier Hunting Survey. In that area, Mr. Choudhary confirmed the Hunting estimate of family size, but challenged the assumption of family units per structure. The Hunting Survey had estimated that three families per unit were found in the area, while the detailed UN estimate was but 1.67 (based on a building count 70% higher than found by Hunting). In fact, the detailed UN survey indicated that the entire zone had been misread by Hunting, and suggested a population figure of 25,814 as opposed to the Hunting estimate of 52,800.

After discussions, Hydrotechnic Corporation accepted the UN data and revised their population estimate for the particular zone in question. The high family per structure ratio was reduced in that area, but maintained in others, and actually increased in apartment areas in accordance with other suggestions from Mr. Choudhary. The over-all revisions resulted in net reduction of less than 7% to the original population estimate. The new figure was 301,132 with 270,702 (80%) now said to live in the same high density areas and a single apartment area.

3. United Nations Study. In April 1966, A.I.D. received a "statistical abstract" of the 1965 census developed for Mogadiscio by the Demographic and Social Statistical Branch of the United Nations. This study placed the 1965 population of Mogadiscio at 172,117. Unfortunately the study provided limited background data to permit analysis or comparison with the earlier figures in the Hydrotechnic reports.

The UN study did not include foreigners, the military units near the city, nor persons outside the census area who obtain water from the city systems.

4. "Population Base" for Estimating Water Demand. Based on the limited data available, it is difficult to reconcile the various population estimates. Nevertheless, we have attempted to marry the recent UN survey with the 1965 Hydrotechnic feasibility study to develop a "population base" for the purpose of calculating total area water demands.

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The UN demographers identified significant discrepancies in the Hunting estimate. The most significant difference, as expected, is found in the early estimates of family units per structure. The over-all UN estimate of 2.11 family units per structure is in striking contrast to the over-all Hydrotechnic estimate of 4.00. We have re-estimated the 1962 population on the basis of the original Hunting house count and the more reliable UN estimates of family units per structure. Our estimate of the 1962 population is 205,204, located as follows:

Apartment Houses	11,680
Commercial Shops, Government Areas*	5,775
Single Residences, High Value, Expatriate Areas*	26,514
New Planned Areas of "arishes"	76,052
"Beehive" Compounds	9,420
Old Dense "Arish" Areas	68,304
Existing Port Area*	400
Army, Post, Police*	5,520
Hospitals*	1,539
Total	205,204

*Areas having High Water Use Potential

The 1965 UN estimate of 172,117 discounted at a growth rate of 3% to 1962 would indicate 158,096 persons. As noted earlier, the UN did not include the environs of Mogadiscio, the army post, foreigners or transient peoples. To accommodate that deficiency, the estimate must be increased as follows:

Satellite Compounds	9,420
Foreigners	15,238
Army Post	2,100
Total	26,758

The UN estimate of population for 1962, then, would be 184,844, or 20,860 fewer than our revised estimate of 205,204. We assume that the 20,860 figure offers a conservative estimate of transient persons. In 1964, for example, an estimated 20,000 to 30,000 persons entered a single area of the city to escape from famine areas inland. Our population estimate of 205,204 includes transient persons.

Composite population figures are not sufficient for defining a "population base" for estimating water demand. The composition of that population must be determined. For this purpose we have divided the population into four discrete groups. The figures given are for 1962. See Table 1.

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TABLE I

Year	HIGH USE POTENTIAL GROUP I		LIMITED USE POTENTIAL				TOTAL			
	Growth Rate	Estimated Population	GROUP II Growth Rate	Estimated Population	GROUP III Growth Rate	Estimated Population	GROUP IV Growth Rate	Estimated Population	Growth Rate	Estimated Population
1962		39,748		87,732		68,304		9,420		205,204
1965		47,340		99,224	Static	68,304	Static	9,420		224,288
1970		63,358		118,911	Static	68,304	Static	9,420		259,993
1975	6%	84,782	2½%	125,461	Static	68,304	15%	22,898	3%	301,445
1980		113,441		144,614	Static	68,304	Static	22,898		349,257
1985		151,837		162,034		68,304	Static	22,898		405,073
1990		203,192		175,113		68,304		22,898		469,507

GROUP I - population has access to modern plumbing (service conn.) GSR, FAC, police barracks, comm. est. indiv. homes, etc.

GROUP II - population in new planned med. density arish areas (stand-pipes).

GROUP III - population located in saturated downtown areas (vendors or stand-pipes) dense, apartment areas and "arishes"

GROUP IV - population in "beehive" compounds (vendor or stand-pipes) - satellite dairy villages, compounds of huts

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Group I. (39,478 persons). This population includes those in government quarters, foreigners, commercial establishments, persons in single dwellings and small apartment houses, army post, police barracks, and hospitals all having access to modern plumbing and presently served by individual service connections. This estimate is very close to the revised 1963 Hydrotechnic report for the group (37,150) and probably is very close to accurate because of the reliability of the house count, the discrete nature of this population component, and the careful UN analysis of its largest segment. Both persons per family unit and family unit per structure assumptions are more refined for those peoples than those found in the more dense areas of the city.

A rate of 6% has been assumed to represent the internal growth of this portion of the permanent population able to use water, although only a 3% rate is assumed for the over-all city growth. A higher growth rate was assigned to this population component because the growth rate will include not only natural population increase, but will also be reflected by increased prosperity and meter growth.

Group II. (87,732 persons). This group is comprised of persons living in new well-planned "arish" areas. The zones are medium to large areas, laid out on a square plan with relatively homogeneous density and quality of construction. The area is presently served with water by donkey cart vendors, but can be adapted to stand-pipe service so long as the areas maintain their relative openness.

A rate of growth of $2\frac{1}{2}\%$ was assumed to represent the internal growth of this portion of the permanent population. It is not anticipated that the area will grow any faster than natural increase (estimated at 3%), and any influx of persons from other areas of the city will be balanced by an exodus of both physical persons or water source users from the area. The latter trend is correlated to the gains noted for Group I.

Group III. (68,304 persons). This group is comprised of those persons living in dense old "arish" areas. The zones included in this Group make up the "downtown" section of Mogadiscio and comprise many shops and apartment houses. Water is supplied to the populations of these areas from the donkey cart vendors. The dense crowded nature of the areas will probably retard the introduction of plumbing, service connections or stand-pipes. The method of service in these areas can only be determined from detailed engineering conducted during early phases of the project.

Group IV. (9,420 persons). The fourth population component is made up of dairying suburbs, or satellite areas, of temporary thatch or "beehive huts," of which one to three are circled by a thornbush hedge into a compound for people and animals. The areas are small. It is anticipated that these compounds will grow at a fantastic rate for a number of years following the sudden availability of potable water and then will remain relatively constant.

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5. Summary. We have estimated the 1962 Mogadiscio population at 205,204 and have further refined that estimate into four components. According to municipal records, Group I consumed an average 540,000 gpd or an average 16.2 gallons per person. The remaining three groups consumed 293,000 gpd or an average 1.9 gallons per person.

If our estimates for the 80% of the population found in Groups II, III, and IV are miscalculated by even 100%, the impact of the miscalculation on the total water system demand would still be less than 40%. It is of major importance to note that the system will be designed for the estimated needs of 1980. Excess capacity necessarily installed for future use is available for short-term needs and as further protection against significant changes in the composition or size of the Mogadiscio water using population. Such changes will affect the timing of expansion only.

C. Estimated Demand. There is practically no information available on industrial developments in Mogadiscio which will require significant quantities of relatively high quality water. There are, however, a variety of industrial water using projects now in the talking stages which could develop into major water consumers. These projects include a meat cannery which will produce 22 metric tons per day, a factory for processing hides and skins now going into operation which will use 1,200 gpd, a soft drink factory using another 1,200 gpd and proposed food processing industries. In addition, the planned development of a new port capable of berthing deep sea vessels, for which the IBRD has recently financed a feasibility study, will require substantial quantities of water.

Mogadiscio as the capital and largest city in the Somali Republic, can also expect to attract water consuming industries, during the next 20-year period in the course of its normal development, which have not been put forward in project form. The availability of a potable water supply will also encourage some industries to establish themselves in Mogadiscio where the lack of a system now inhibits such development. The Development Section of Credito Somalo presently must finance private water supplies for each of its projects at a substantial cost for unreliable and poor quality water.

No specific provision has been made in the initial design capacity for existing or future industrial demands. Industrial demands have been included in the over-all capita consumption profile.

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Often it is possible to draw general assumptions from existing records even when severe use restrictions on the over-all system have always been in force. No accurate method exists for estimating the future per capita water consumption in Mogadiscio. In Mogadiscio there is presently no system at all. For the purpose of developing an estimate of over-all use, per capita use figures have been developed for the various population components based on similar cities and our experience in similar environments.

Per capita demands are estimated at:

		<u>Estimate of Future Demand</u>	<u>Existing -Demand</u>
Group I	High Potential	25.0 gpd	16.0 gpd
Group II	Medium Potential (New Planned Areas)	10.0 gpd*	1.9 gpd
Group III	Low Potential (Apartment Areas)	5.0 gpd*	1.9 gpd
Group IV	Low Potential	3.0 gpd*	1.9 gpd

*Groups II, III, and IV together average 7 gallons per day corresponding to the population components outlined and summarized in Table I.

Group I demand will be met by individual service connections to houses, shops, government quarters, new apartments, etc. The Group II demands will occur in new, planned areas of "arishes" and will be met by public fountains spaced to provide minimum walking distance, and serving an established population per fountain. Groups III and IV may also be served from stand-pipes, although engineering design may provide for continuation of vendor carts similar to those now used in these areas.

It is difficult to estimate the numbers of transient persons found in Mogadiscio, the effect of these people on a municipal water supply, or more important the effect of a reliable water supply on the decision of such people to enter Mogadiscio or remain. The nature of the population and their consumption profile, however, indicates that mere numbers will not have a significant impact on the requirements of the system. In 1975, for instance, doubling the estimated population in Groups III and IV increases the total estimated demand and capacity for the new system only 10%.

The estimated average daily demand is summarized in Table II for the years 1962 through 1990. Figures for 1962 reflect existing usage. Figures for 1970 indicate the probable demand if a system were in existence at the time. Diagram I shows the estimated system water demands as well as the required capacity and the proposed installed capacity for the project.

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ESTIMATED AVERAGE DAILY DEMAND
WELL FIELD CAPACITIES 1967 - 1990

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Year	Population Group	Estimated Population	Estimated Per Capita Daily Demand (US Gal)	Estimated Ave Daily Consumption	Average Daily Production Requirements	Required Capacity of Well Field 133% of Av. Day
1962	I	39,748	16.2	640		
	II					
	III	165,456	1.9	293		
	IV					
	Totals	<u>205,204</u>	<u>4.8 (av)</u>	<u>993</u> mgd		
1970	I	63,358	25	1,584		
	II	118,911	10	1,189		
	III	68,304	5	341		
	IV	<u>9,420</u>	<u>3</u>	<u>28</u>		
	Totals	<u>259,993</u>	<u>12.1 (av)</u>	<u>3,142</u> mgd	3.770 mgd	5.014 mgd
1975	I	84,782	25	2,120		
	II	125,461	10	1,255		
	III	68,804	5	341		
	IV	<u>22,898</u>	<u>3</u>	<u>69</u>		
	Totals	<u>301,445</u>	<u>12.6(av)</u>	<u>3,785</u> mgd	4.542 mgd	6.041 mgd
1980	I	113,441	25	2,836		
	II	144,614	10	1,446		
	III	68,304	5	341		
	IV	<u>22,898</u>	<u>3</u>	<u>69</u>		
	Totals	<u>349,257</u>	<u>13.4(av)</u>	<u>4,692</u>	5.360 mgd	7.488 mgd
1985	I	151,837	25	3,796		
	II	162,034	10	1,620		
	III	68,304	5	341		
	IV	<u>22,898</u>	<u>3</u>	<u>69</u>		
	Totals	<u>405,073</u>	<u>14.4(av)</u>	<u>5,826</u> mgd	6.991 mgd	9.298 mgd
1990	I	203,192	25	5,080		
	II	175,113	10	1,751		
	III	68,304	5	341		
	IV	<u>22,898</u>	<u>3</u>	<u>69</u>		
	Totals	<u>469,507</u>	<u>15.4(av)</u>	<u>7,241</u> mgd	6.889 mgd	11.556 mgd

Notes:

Column 4: Estimated per capita demand includes allowance for industrial use.

Column 6: Av. Daily Prod. Rate includes an allowance of 20% for "Unaccounted for" water.

Column 7: Well field capacity must provide for maximum daily demand estimated at 33% above average.

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D. Required Capacity. As noted earlier, total demand in Mogadiscio must be estimated as a function of the population and the consumption profile described above. The demand will be satisfied from (i) individual service connections; (ii) stand-pipe; and perhaps (iii) some continued public consumption from vendors. Composite yearly production requirements estimates are:

1970	3.7 million gallons/day (mgd)
1975	4.5 mgd
1980	5.6 mgd
1985	6.9 mgd
1990	8.6 mgd

The proposed system will be built to meet anticipated demand in 1980. The above figures include a 20% factor to account for system losses. To accommodate peak system demands, the well field capacity is 33% greater than the average daily production requirements, or 7.4 mgd in 1980. Estimated average daily demand figures are summarized in Diagram I.

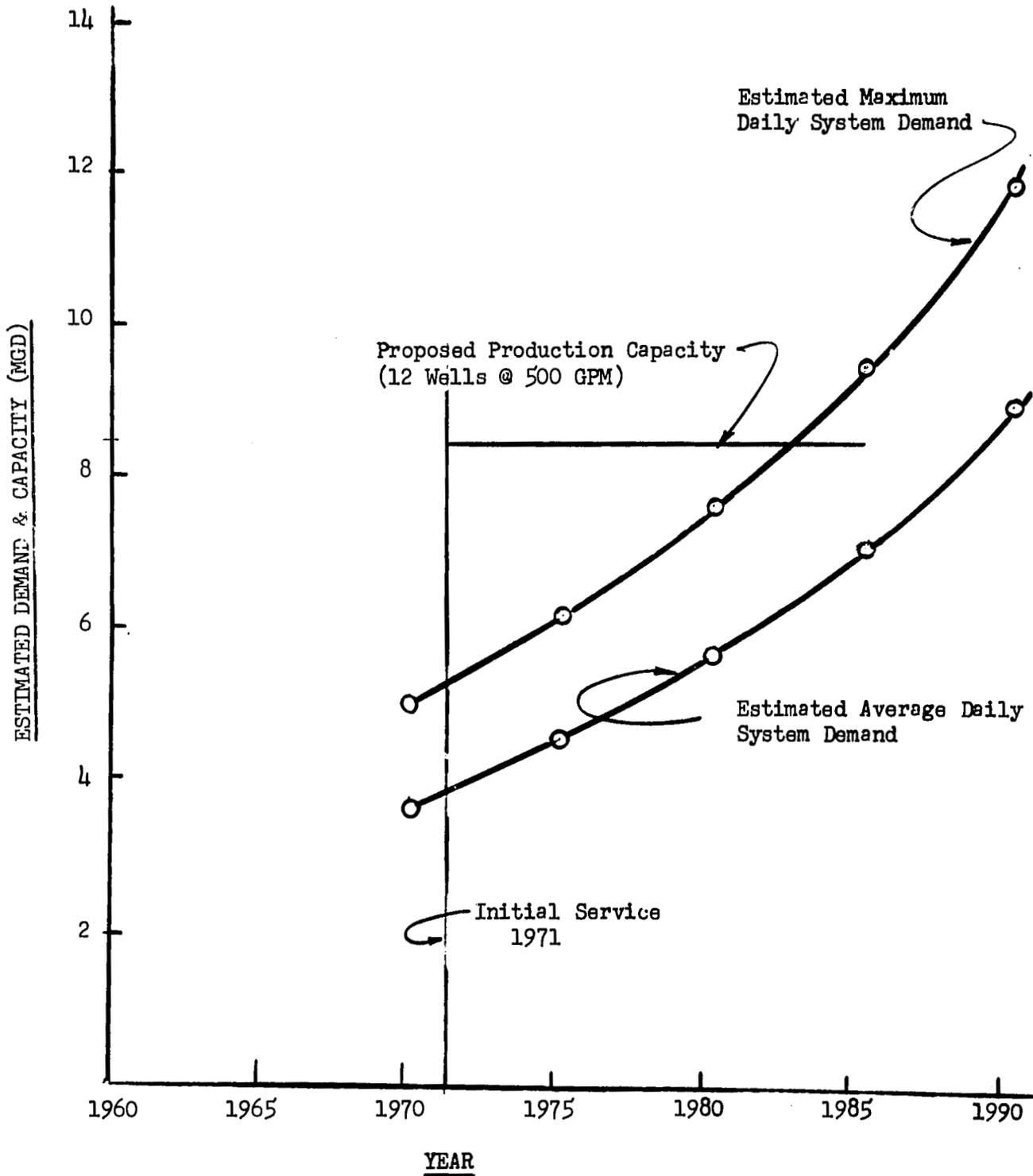
It is anticipated that the system will be operative in 1971 with a peak capacity requirement of 5.0 mgd.

E. Rate Structure

1. Present Price Structure. The present charge for fresh water ranges to \$5.33/1000 gallons and \$.80/1000 gallons for brackish water. Private wells may even charge higher prices. The Mogadiscio water price compares with water rates in Nairobi at \$.54/1000; in Dar es Salaam at \$.84/1000 gallons for household connections and \$.70/1000 gallons at kiosks; at Fort Archambault, Chad at \$.80/1000 gallons; in Kano and Lagos, Nigeria at \$1.40/1000 gallons and \$1.30/1000 gallons respectively; in Monrovia, Liberia at \$1.000/1000 gallons; and in most other West African cities at about \$.80/1000 gallons.

320,000/m.

MOGADISCIO WATER SUPPLY PROJECT
ESTIMATED SYSTEM DEMANDS



2. Future Price Structure. A detailed rate structure study, which was beyond the scope of Hydrotechnic's assignment, will be needed to determine water rates for various periods and possibly different rates for various types of services and usage. The rate structure will be established by the AMWA, with assistance by consultants, during fiscal 1970. The rates will be determined on the basis of up-to-date construction costs. Nevertheless, we have calculated annual net incomes for each year from 1970 to 1981 on the basis of a flat water consumption charge of 90. 10/1000 gallons (\$1.40/1000 gallons). This rate was selected as a reasonable figure for planning purposes based on assumptions regarding the design, financing, operation, and revenue capability of the project. This rate should be low enough to put water within the financial reach of everyone who is now consuming water and will provide sufficient revenue to make the project viable.

F. Primary Benefits. The primary benefit from the proposed project will be the revenue accruing to the AMWA. Since the construction of the new water supply will replace the existing system and will provide potable water (previously unavailable), total rather than incremental revenues were used in determining the benefit/cost ratio.

Revenues are premised on the posited \$1.40/1000 gallons rate. That rate is probably a conservative base on which to estimate economic benefits since the current charge is presently \$5.33/1000 gallons to low income groups. The \$1.40 figure is a realistic financial figure, however, and was used for that reason. The cost stream was calculated on the basis of a total cost for engineering services at \$1,614,218, initial cost for construction services at \$7,824,989. Based on these benefits and cost streams, the present value of benefits and costs are as follows:

	<u>Present Value</u>	
	<u>At 6% Discount</u>	<u>At 10% Discount</u>
Benefits	\$27,865,411	\$ 4,925,235
Costs	9,239,796	8,326,451
Benefit/Cost Ratio ^{1/}	3:1	1.8:1
Internal Rate of Return ^{2/}	14.5%	

^{1/} See Annex III-b

^{2/} See Annex III-c

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A variety of alternate schemes were explored by Hydrotechnic during the field investigation. These schemes are presented in Annex V. Since the cost and feasibility of these schemes are much less desirable than the present proposal, the cost calculations for these alternate schemes are not presented.

G. Secondary Benefits. One of the keys to the future growth of Mogadiscio is the availability of an adequate water supply, the lack of which is limiting the industrial, commercial, and residential development of the city. A major problem is the very poor sanitary quality of the existing water system.

The donkey carts or private tank trucks which distribute sweet water to the community are very badly maintained. They are cleaned infrequently, if at all. There is no adequate health inspection or control of the vehicles or of the people who handle the water. This water must be boiled and filtered to make it potable, and this is not done by most of the community. Because of the high cost of sweet water, the brackish water is used as drinking water by many people.

A large community of persons receive their water from the 200 odd wells about the city. All of the wells are open dug wells, some of which yield non-saline water, but almost all lack sanitary protection. Animals which are allowed near the wells inevitably leave their wastes around the periphery of the wells; the bucket or container which is used to dip water from the well is often rested on the contaminated ground before it is lowered into the well again, thus, adding to the pollution of the well. These conditions have created a high incidence of intestinal diseases in Mogadiscio and they point up strongly the necessity for a new, more sanitary water supply.

The intake of water by animals is an important social and economic factor. In the City, and especially in the peripheral areas of Mogadiscio, many people own large numbers of donkeys, goats, camels, cattle, and poultry, some of which require as much water per day as people living under primitive conditions. In recent years, many people who formerly lived as nomads, going from one water hole to the next, have moved to Mogadiscio and brought their animals with them. Adequate water availability will greatly reduce the present annual livestock and poultry losses and permit increased animal weight of significant economic value.

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If this project is carried through, the expenditure of construction funds for labor, food, rent, and materials would also temporarily benefit the community by increasing employment and by injecting much of the employees earnings into the economy. Many industries cannot exist without an adequate sweet water supply, and at present the establishment or expansion of such industries is out of the question for Mogadiscio. It is difficult to judge the volume of new local business and new residential construction which would develop as a result of completion of the proposed water supply project, but certainly the growth, longevity and economy of the community would be stimulated. A new, larger, more sanitary water supply would stimulate industrial, agricultural, and residential growth, and help reduce health hazards and expenditures for health services.

In conclusion, it can be asserted that Mogadiscio requires adequate water supply. The growth of the City is being limited by lack of sufficient water; disease is endemic because of polluted water supplies; and dangerous epidemics of water-borne diseases are continuously imminent. Moreover, economic development of the City and its environs is greatly hampered by a lack of an adequate water supply. Only a new, adequate and sanitary supply of water can correct these conditions.

H. Profitability. Pro Forma income statements for the AMWA are presented in Annex IV-a. It indicates that the system will become profitable after the usual financial difficulties in the initial year's operation of most enterprises. The profitability of the system was based on a hypothetical price of \$1.40/1000 gallons. Although the water rate will not be set by the AMWA until a rate study has been completed, the Project Committee believes that this rate is realistic. Furthermore, the Project Committee believes that the demand curve is relatively inelastic at this price range because (i) Somalia is a water shy country and (ii) the estimated water rate is still only about 1/4 of the present rate for fresh water.

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SECTION IV - TECHNICAL ANALYSIS

A. Description of Project. The design and construction of a modern water utility for the city of Mogadiscio with an ultimate production capacity of 7.4 mgd will proceed in two stages, as follow:

Stage I - The initial development scheme will provide for the water needs of the city for a period of about ten years to 1980.

Stage II - Design and construction of the second stage will take place in the period 1978-1981 and will provide for the estimated demand of 1990.

The proposed project considered for financing by A.I.D. consists of Stage I only. It will be developed in two phases.

Phase A - Phase A will include:

- a. The establishment of a municipal agency to manage and operate the improved utility.
- b. A training program for management personnel.
- c. A hydrologic program in the area to establish well sites and determine aquifer characteristics.
- d. The design of the production well facilities, procurement of equipment and materials and drilling and development of the production wells.
- e. A hydrologic exploration program to locate water reserves for second stage development.
- f. The design of the remaining utility components, preparation of drawings, specifications, bid documents, etc, and the review and analysis of construction bids.

Phase B - Phase B will include:

- a. Management services during the establishment and initial operations of the Agency.
- b. Installation of pumps and construction of production well facilities.
- c. Construction of all utility transmission, treatment, and distribution facilities.
- d. Supervision of construction by the design engineering firm.
- e. Training of operating and maintenance personnel.

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B. Description of System. The facilities to be designed and constructed under Stage I to meet the estimated 1980 demands are as follows:

1. Source of Supply - Results of the 1964 limited exploratory drilling program indicated that the initial capacity required can be developed by installation of twelve 500 gallons per minute (gpm) wells in an area north of Balad Road between KM 9 and KM 14. A proposed detailed test drilling program will establish actual well sites and determine aquifer characteristics, parameters, design criteria, etc. for final design of the production and transmission facilities.
2. Raw Water Transmission Systems - Final design of individual well discharge, piping, collection systems and field transmission lines to Mogadiscio will be based on the results of the detailed test drilling program. The preliminary design indicates that approximately 19,700 ft (6000m) of 12" diameter well field piping and approximately 36,000 ft (11,000m) of 24" diameter transmission line (along Balad Road) will be required.
3. Treatment Facilities - Raw water from the well field will require only chlorination before delivery to final consumers. The treatment facility will consist of chlorine feeding and measuring equipment, chlorine cylinder handling equipment, a diesel generating power source and related control equipment all contained in a secure, limited access building. Diesel storage tanks, chlorine cylinder unloading and handling equipment and storage are : will be located near the building and the entire facility enclosed with a protective fence.
4. Storage - The transmission line from the well field will terminate at a 5.3 million gallon reservoir near KM 3 on the Balad Road. Final design of the production facilities and the results of (i) detailed demand studies within the city (ii) surveys and trail layouts will determine the requirements for distribution storage. No specific provision was made for distribution storage in the Hydrotechnic preliminary design.
5. Distribution System - The distribution network will consist of approximately 300,000 feet (92,000m) of buried mains ranging from 6" to 24" in diameter. An estimated 6000 service connections, 150 fountains and 6 vendor watering points will be installed initially.

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C. Provisions for Engineering, Procurement and Construction. Under Phase A, final plans, specifications, and contract documents are to be prepared by a U.S. Engineering firm selected by and under contract to an agency or department of the Municipality responsible for the water system. The engineering firm will also carry out the hydrogeological testing drilling program as well as design, drill and develop the required number of production wells. Under Phase A the engineering firm will perform general supervision and resident inspection of the construction for the project.

Procurement under Phase A of the commodities required to explore, drill, test, and develop the production well (excluding operating pumps) will be obtained from the U.S. as agent for AMWA by the engineering firm or its sub-contractor. Procurement of all commodities for distribution, storage, transmission, operating pumps, storage facilities and other appurtenances needed to make the system complete shall be obtained under Phase B by the U.S. construction contractor. The awarding of all materials, equipment or construction contracts on a competitive basis will be the responsibility of the AMWA or the department of the Municipality then responsible for the administration and operation of the project.

D. Implementation Schedule. The implementation schedule is outlined below. It is anticipated that engineering services will commence in September 1967 and that construction will be completed in March 1972.

Implementation Schedule

	<u>Elapsed Time</u>
Receive proposals engineering service contract	-
Negotiate and execute contract for engineering services	Two Months
Engineering firm mobilized and begin exploratory drilling program	Five Months
Receive proposals for management services and negotiate contract	Six Months
Begin management consultant	Nine Months
Complete preliminary drilling program and development basic design criteria	Ten Months

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Complete design supply and distribution facilities	Fifteen Months
Complete exploratory drilling for initial field development	Seventeen Months
Receive and review bids and award construction contracts	Eighteen Months
Construction contractor mobilized	Twenty Months
Complete construction of production wells	Thirty Months
Complete Exploratory Drilling Stage II	Thirty-Nine Months
Initial Service	Forty Months
Complete construction	Forty-Two Months

E. Technical Studies. The project feasibility study was completed in August 1963 by Hydrotechnic Corporation, New York, New York under Contract AID/afe-103. Results of this study indicated that a ground water supply would be the most reliable and least costly system for the city if adequate sources could be found within a reasonable distance from the city. The firm recommended further investigation along these lines. These recommendations were reviewed and confirmed by the Tudor Engineering Company in their report of October 1963 under Task Order No. 875.

Hydrotechnic Corporation, under Contract AID/af-164, conducted an investigation of ground water resources for the City of Mogadiscio during the period October 1964-June 1965 and filed a report September 20, 1965. Revisions to the 1965 report were presented in a January 1966 Memorandum and a final compendium of all previous reports submitted in May 1966.

Prior studies and reports have provided information and findings which have been taken into consideration in the development of the final recommendations of the Hydrotechnic reports. See Annex V for a listing of these studies.

F. Technical Evaluation. Three alternate methods were considered for supplying water to Mogadiscio: (i) surface water diversion from the Uebi Sobelli River at Balad, (ii) saline water conversion facilities at Mogadiscio, and (iii) ground water wells within reasonable distance to the City. A combination of the river and well schemes was also studied. A discussion of these schemes is presented in Annex V.

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A careful review of all material concerning the project by A.I.D. Engineers shows that the cost estimate for the project provides a reasonably firm estimate of cost to the U.S. for the envisioned work to be financed. Review has also indicated that all significant technical problems have had adequate planning.

A benefit/cost ratio for the entire project has been computed in accordance with the requirements set forth in Senate Document 97. The benefit/cost ratio (discounted at 10%) for the project is 1.8 to 1. Accordingly, the project meets the technical requirements of Section 611 of the FAA of 1961.

SECTION V - FINANCIAL ANALYSIS

A. Financial Requirements. The financial requirements for Phases A and B of the project, to be financed under the proposed loan are as follows:

<u>PHASE A(Design)</u>	<u>U.S. Costs</u>	<u>Local Costs</u>	<u>Total</u>
Engineering Design	\$ 272,000	\$ 26,000	\$ 298,000
Contingency *	54,400	5,200	59,600
Sub-Total	\$ 326,400	\$ 31,200	\$ 357,600
Hydrogeological Test Drilling and Development	\$ 887,500	\$ 185,000	\$ 1,072,500
Contingency	88,750	18,500	107,250
Sub-Total	\$ 976,280	\$ 203,500	\$ 1,179,780
Sub-Total Phase A	\$ 1,302,650	\$ 234,700	\$ 1,537,350
Escalation 5% **	65,133	11,735	76,868
Estimated Total Cost Phase A	\$ 1,367,783 (85%)	\$ 246,435 (15%)	\$ 1,614,218
<u>PHASE B(Construction, Management, Training)</u>			
Construction of Water Supply and Distribution Facilities	\$ 4,137,650	\$1,948,050	\$ 6,085,700
Contingency	436,365	206,405	642,770
Sub-Total	\$ 4,574,015	\$2,154,455	\$ 6,728,470
Resident Engineering Staff	184,000	48,000	232,000
Contingency	36,800	9,600	46,400
Sub-Total	\$ 220,800	\$ 57,600	\$ 278,400
Management Consultant services & Training	\$ 351,000	\$ 55,000	\$ 406,000
Contingency	\$ 34,100	\$ 5,400	\$ 39,500
Sub-Total	\$ 385,100	\$ 69,400	\$ 454,500
Sub-Total Phase B	\$ 5,179,915	\$2,272,455	\$ 7,452,370
Escalation 5%	\$ 258,996	\$ 113,623	\$ 372,619
Estimated Total Cost Phase B	\$ 5,438,911 (70%)	\$2,386,078 (30%)	\$ 7,824,989
Estimated Total Cost Stage I	\$ 6,806,694 (72%)	\$2,632,513 (28%)	\$ 9,439,207

* Contingency included

** Escalation accounted for

Total Contingencies & escalation
\$ 1,344,000

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B. Financial Plan. As a result of discussion of the project at the DFRC meeting of September 21, 1964, A.I.D. agreed that the GSR contribution to the project would be only 10% of the total costs in recognition of the Somali budgetary situation. On this basis the financial plan for engineering and construction of the new water system would be as follows:

	<u>Foreign Exchange</u>	<u>Local Cost</u>	<u>Total</u>
A.I.D.	\$6,806,694 (80%)	✓ \$1,688,593 (20%)	\$8,495,287 (90%)
AMWA		943,920 (100%)	943,920 (10%)
	<u>\$6,806,694 (72%)</u>	<u>\$2,632,513 (28%)</u>	<u>\$9,439,207 (100%)</u>

In addition to the loan, A.I.D. is planning to finance under a grant the services during the AMWA's initial years of operation of a U.S. management consultant to advise and assist the Somalis in running the system. The grant funds are expected to cover the services of a top-level adviser to the Technical Adviser, Audit Board and warehouse operation. Total cost estimates of the grant are \$650,000 over a three-year period. These services will be converted to loan financing as soon as the new system begins to generate sufficient cash to finance these services.

C. Other Sources of Financing. Ex-Im Bank clearance for this project was received October 6, 1964. During the period when this project was first being considered for financing by A.I.D., other donors were also undertaking a major role in assisting Somalia. Italy and Great Britain have provided substantial assistance to Somalia both for budgetary and balance of payments reasons in their respective roles as the former metropole. Since 1960 Italy has provided Somalia with the total of \$65 million in grants and another \$25 million in loans. Great Britain has provided about \$13 million in grants. The Federal Republic of Germany has financed \$11 million in grants and about \$10 million in loans since Somalia became independent. The EEC has also provided substantial assistance for Somalia amounting to about \$27 million since 1960. Because other donors have undertaken on a bilateral basis most of the other assistance projects, A.I.D. has always been considered as the source of financing for this project.

D. Prospects for Repayment

1. AMWA. The AMWA will have favorable debt repayment prospects after the initial years of operation. Annex IV gives the details of debt servicing by the AMWA. It should be noted that in the initial years the system will not generate sufficient cash to meet principal and interest payments. To that end, a five-year grace period is included. The GSR will permit capitalization of interest during that period.

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LIMITED OFFICIAL USE

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2. GSR - A.I.D. Since independence in 1960, the GSR has experienced continued budgetary deficits which have been covered by foreign budgetary aid. Although these deficits will likely continue in the near future, the Government has recently made serious efforts to eliminate them by introducing new taxes, improving its budget procedures and instituting greater control over expenditures. The trend of these deficits has been going steadily downward over the past five years having declined from \$7.2 million in 1963 to an estimated \$3.4 million for 1967 and from 34% to 9% of revenues during the same period. Foreign budgetary aid to cover the 1967 deficit is expected to be received from Italy.

Somalia's balance of payments was brought close to equilibrium in 1966 for the first time since dependence. A modest surplus is expected in 1967 due chiefly to the marked improvement of the trade balance. The continued GSR policy of restricting import demand along with steadily rising exports of agricultural products and livestock has resulted in achieving a near trade equilibrium in 1966, a significant reversal of the \$33 million deficit experienced in 1964.

As of mid-1966, the GSR had obtained loan and credit commitments with foreign donors in the amount of \$134 million, mostly at low interest rates with repayment terms in excess of ten years. The amount on which interest and principal payments are currently due was \$35 million as of April 30, 1966. Debt service payments amount to \$1 million in 1966 and about \$1.3 million for 1967. These payments amount to less than 5% of export earnings and recurrent annual budget revenues which is well within the commonly accepted international guidelines.

Somalia has had stand-by agreements with the IMF since 1964. Under the current agreement for \$2.8 million which expired on January 18, 1967, less than \$1 million was drawn down in March. A new one-year arrangement for \$5 million has been approved by the IMF to "provide a secondary line of reserves immediately available to the authorities in the event of temporary foreign payments difficulties".

Somalia continues to follow a conservative monetary policy in accordance with the provisions in its constitution and the recommendations of the IMF. The most recent measures the GSR has taken to strengthen its internal and external financial situation and balance of payments are expected to be continued, and assuming the amount of foreign debt does not rise too rapidly in the future, the prospects for the repayment of this loan are considered reasonable.

LIMITED OFFICIAL USE

VI. EFFECTS ON U.S. BALANCE OF PAYMENTS

A. Effects on the U.S. Economy. The goods and services to be financed under the loan will assist the U.S. economy by financing additional exports from the U.S. to the Somali Republic of approximately ~~\$2.5~~ million in direct project items and approximately ~~\$213,600~~ of general commodities and related services under the Special Letter of Credit (SLC) arrangement. None of these exports would otherwise take place without A.I.D. financing of this project. Although the U.S. balance of trade with the Somali Republic is positive, normal commercial Somali imports from the U.S. are negligible.

UNITED STATES FOREIGN TRADE WITH MOGADISCIO 1965/66*
(In millions of U.S. Dollars)

	<u>1965 Amount</u>	<u>1966 Amount</u>
U.S. Exports	\$2.7 million	\$1.9 million
U.S. Imports	\$.6 million	\$.6 million

*Overseas Business Reports, March 1967, Department of Commerce

The financing of local costs in the Somali Republic under the SLC arrangement has not worked out well. The Somali Government has encountered difficulties in utilizing the SLC balances deposited in its name in New York since Somalia's normal commercial import requirements from the U.S. are quite minimal. Only 10% of the balances built up since mid-1965 has been drawn down to date. After a series of temporary one and two-month extensions of the SLC arrangement, a serious study of the problem was undertaken by the GSR in mid-February. The GSR understood that the SLC arrangement must be used if there was to be any U.S. financing of local costs. After extended serious deliberations the Somali Government agreed on April 30, 1967 to a long-term indefinite extension of the SLC agreement and indicated its preparedness to take the necessary measures to redirect a portion of its import trade from traditional suppliers to the U.S. to draw down the SLC balances. It is clear that any local cost financing through the SLC will result in a net increase in U.S. exports to Somalia. This plus the fact of the long-term firm U.S. commitment to the project is the basis for the proposed level of local cost financing.

A recent letter from the Minister of Planning, Somali Republic, however, indicates that the GSR intends to import from the United States a minimum of 30% of their total imports of cigarettes and up to \$713,000 worth of rice imports a year to utilize SLC balances. It is clear that the SLC, then, may have a beneficial effect, redirecting elements of Somali trade to the U.S.

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B. Impact on U.S. Business. This loan does not conflict with any U.S. business interest. To the contrary; the loan will assist the U.S. economy by financing approximately \$6.8 million in U.S. procurement of goods and services.

C. Effect on Private Enterprise. This loan is directly related to the encouragement of private enterprise. Although the borrower is a public water utility, its function will foster private enterprise by providing water at reasonable terms. With limited industrialization in Somali, such infrastructure is a prerequisite to establishing a strong private sector in the economy. In addition, all procurement will be from private sources in the United States.

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June 5, 1967

CHECK LIST OF STATUTORY CRITERIA

(Development Loan Fund)

1. FAA §.102. Precautions that have been or are being taken to assure that loan proceeds are not diverted to short-term emergency purposes (such as budgetary, balance of payments, or military purposes) or any other purpose not essential to the country's long-range economic development. Will be covered in Loan Agreement by limiting use of loan funds to this project.
2. FAA §.102. Information on measures taken to utilize U.S. Government excess personal property in lieu of procurement of new items. Loan Agreement will require purchase of U.S. excess property to extent suitable items available.
3. FAA §.102. Information whether the country permits or fails to take adequate measures to prevent the damage or destruction by mob action of U.S. property. No such situation is known to exist.
4. FAA §.201(b). Manner in which loan will promote country's economic development, emphasizing help for long-range plans and programs designed to develop economic resources and increase productive capacities. Section III-G.
5. FAA §.201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States. Section V-C.
6. FAA §.201(b)(2). Information and conclusion on activity's economic and technical soundness, including the capacity of the recipient country to repay the loan at a reasonable rate of interest. Section III, F, G; Section IV, F; Section V, D.
7. FAA §.201(b)(3). Information and conclusion on existence of reasonable promise activity will contribute to development of economic resources or increase of productive capacities. Section III, G; Section VI, C.
8. FAA §.201(b)(4). Information and conclusion on activity's relationship to other development activities, and its contribution to realizable long-range objectives. Section III, C, G.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended by the Foreign Assistance Act of 1966.

App. - Foreign Assistance and Related Agencies Appropriations Act, 1967.

9. FAA §.201(b)(5). Country's self-help measures, including institution of Foreign Assistance Act investment guaranty programs. Section V-B. An investment guaranty agreement was signed January 8, 1964.
10. FAA §.201(b)(6). Information and conclusion on possible effects on U.S. economy, with special reference to areas of substantial labor surplus. Section VI.
11. FAA §.201(b)(7). Information and conclusion on the degree to which the country is making progress toward respect for the rule of law, freedom of expression and of the press, and recognition of the importance of individual freedom, initiative, and private enterprise. Somalia has a multi-party Parliament which functions along constitutional lines. Since independence remarkable stability has been demonstrated which has encouraged private enterprise, freedom and initiative.
12. FAA §.201(b)(8). Information and conclusion on the degree to which the country is taking steps to improve its climate for private investment. Somalia has encouraged free enterprise through the development section of Credito Somalo and has also tried to encourage foreign investment.
13. FAA §.201(b)(9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth. Section III F, G and H.
14. FAA §.201(b). Information and conclusion on reasonable prospects of repayment. Section V-D.
15. FAA §.201(b). Information on applicability of the ten country ceiling. Somalia was included in the President's Determination of January 5, 1967.
16. FAA §.201(d). Information and conclusion on legality (under laws of the country and the U.S.) and reasonableness of lending and relending terms. Loan Agreement will require opinion of chief legal officer of GSR that Agreement is valid, loan on softest terms, and Annex IV demonstrates financial ability AMWA to repay.
17. FAA §.201(e). Information and conclusion on availability of an application together with sufficient information and assurances to indicate reasonably that funds will be used in an economically and technically sound manner. Section III F, G and IV-F. Application received and provision of consultants ensures proper development of water system.
18. FAA §.201(f). If a project, information and conclusion whether it will promote the economic development of the requesting country, taking into account the country's human and material resource requirements and the relationship between the ultimate objectives of the project and the country's overall economic development. Section III-G.
19. FAA §.201(f). If a project, information and conclusion whether it specifically provides for appropriate participation by private enterprise. Section IV, B and C.
20. FAA §.202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports

from private sources, or is otherwise being used to finance procurements from private sources. Section V-A and VI-B and C. Total loan will be used to finance procurement from private sources.

21. FAA §.281. Extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the developing countries, through the encouragement of democratic private and local governmental institutions. No apparent relation to this concept.
22. FAA §.601(a). Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; (f) strengthen free labor unions. With regard to (a), (b) and (e) see Sections III, G and VI, C. There appears to be no direct impact on (c), (d) and (f).
23. FAA §.601(b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad, and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise). Section VI.
24. FAA §.601(d). Conclusion and supporting information on compliance with the Congressional policy that engineering and professional services of U.S. firms and their affiliates are to be used in connection with capital projects to the maximum extent consistent with the national interest. U.S. engineering and management firms will be financed under the loan.
25. FAA §.602. Information and conclusions whether loan will permit American small business to participate equitably in the furnishing of goods and services financed by it. Section VI. The Loan Agreement will provide for this further.
26. FAA §.604(a); App. §.108. Compliance with restriction of commodity procurement to U.S. except as otherwise determined by the President and subject to statutory reporting requirements. Procurement will be U.S. or Somali Republic.
27. FAA §.604(b). Compliance with bulk commodity procurement restriction to prices no higher than the market price prevailing in the U.S. at time of purchase. Not applicable.
28. FAA §.604(d). Compliance with requirement that marine insurance be purchased on commodities if the participating country discriminates, and that insurance be placed in the U.S. To be covered in Loan Agreement.

29. FAA §.611(a)(1). Information and conclusion on availability of engineering, financial, and other plans necessary to carry out the assistance and of a reasonably firm estimate of the cost of the assistance to the United States. Section IV-F.
30. FAA §.611(a)(2). Necessary legislative action required within recipient country and basis for reasonable anticipation such action will be completed in time to permit orderly accomplishment of purposes of loan. Enactment of legislation necessary to establishment of the AMWA will be on a pre-condition to the loan. The progress shown to date, and good faith of the Municipality reasonably indicate that such action will be completed in a timely fashion.
31. FAA §.611(b); App. §.101. If water or water-related land resource construction project or program, information and conclusion on a benefit-cost computation. Section III-F and Annex V.
32. FAA §.611(c). Compliance with requirement that contracts for construction be let on competitive basis to maximum extent practicable. To be covered in Loan Agreement.
33. FAA §.612(b); §636(h). Appropriate steps that have been taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services. Section V-B. There are no excess foreign currencies.
34. FAA §.619. Compliance with requirement that assistance to newly independent countries be furnished through multilateral organizations or plans to maximum extent appropriate. See Section V-C. AID financing for this project is considered appropriate.
35. FAA §.620(a); App. §.107(a); App. §.107(b). Compliance with prohibitions against assistance to Cuba and any country (a) which furnishes assistance to Cuba or failed to take appropriate steps by February 14, 1964, to prevent ships or aircraft under its registry from carrying equipment, materials, or supplies from or to Cuba; or (b) which sells, furnishes, or permits any ships under its registry from carrying items of primary strategic significance, or items of economic assistance. The GSR is not known to be in violation of these provisions.
36. FAA §.620(b). If assistance to the government of a country, existence of determination it is not controlled by the international Communist movement. Determination has been made.
37. FAA §.620(c). If assistance to the government of a country, existence of indebtedness to a U.S. citizen for goods or services furnished or ordered where such citizen has exhausted available legal remedies or where the debt

is not denied or contested by such government or the indebtedness arises under an unconditional guaranty of payment given by such government. No such situation is known to exist.

38. FAA §.620(d). If assistance for any productive enterprise which will compete with U.S. enterprise, existence of agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan. Not applicable.
39. FAA §.620(e)(1). If assistance to the government of a country, extent to which it (including government agencies or subdivisions) has, after January 1, 1962, taken steps to repudiate or nullify contracts or taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking appropriate steps to discharge its obligations. No such situation is known to exist.
40. FAA §.620(f); App. §.109. Compliance with prohibitions against assistance to any Communist country. GSR is not considered a Communist country.
41. FAA §.620(g). Compliance with prohibition against use of assistance to compensate owners for expropriated or nationalized property. Loan Agreement will limit the use of funds to this project.
42. FAA §.620(h). Compliance with regulations and procedures adopted to insure against use of assistance in a manner which, contrary to the best interests of the U.S., promotes or assists the foreign aid projects or activities of the Communist-bloc countries. Will be covered in the Loan Agreement and Implementing Documents.
43. FAA §.620(i). Existence of determination that the country is engaging in or preparing for aggressive military efforts. No such determination is in existence.
44. FAA §.620(i). Information on representation of the country at any international conference when that representation includes the planning of activities involving insurrection or subversion against the U.S. or countries receiving U.S. assistance. The GSR is not known to have been so represented.
45. FAA §.620(j). Indonesia restriction. Not applicable.
46. FAA §.620(k). If construction of productive enterprise where aggregate value of assistance to be furnished by U.S. will exceed \$100 million, identification of statutory authority. Not applicable.

47. FAA §.620(l). Consideration which has been given to denying assistance to the government of a country which after December 31, 1966, has failed to institute the investment guaranty program for the specific risks of convertibility and expropriation or confiscation. Not applicable since an investment guaranty was previously instituted in Somalia.
48. FAA §.620(n); App. §.107(b); App. §.116. Compliance with prohibitions against assistance to countries which traffic or permit trafficking with North Vietnam. GSR is not believed to be in violation of these provisions.
49. FAA §.620(o). If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters, information on the consideration which has been given to excluding the country from assistance. No such situation is known to exist.
50. FAA §.620(p); App. §.117. U.A.R. restriction. Not applicable.
51. FAA §.620(q). Existence of default under any Foreign Assistance Act loan to the country. The GSR is not in default under any FAA loan.
52. App. §.102. Compliance with requirement that payments in excess of \$25,000 for architectural and engineering services on any one project be reported to Congress. Such reports will be made.
53. App. §.104. Compliance with bar against funds to pay pensions, etc., for military personnel. Loan Agreement will limit use of funds to this project.
54. App. §.106. If country attempts to create distinctions because of their race or religion among Americans in granting personal or commercial access or other rights otherwise available to U.S. citizens generally, application which will be made in negotiations of contrary principles as expressed by Congress. No such distinctions are known to exist.
55. App. §.111. Compliance with existing requirements for security clearance of personnel. Will be covered in Loan Agreement and Implementing Documents.
56. App. §.112. Compliance with requirement for approval of contractors and contract terms for capital projects. Will be covered in Loan Agreement and Implementing Documents.
57. App. §.114. Compliance with bar against use of funds to pay assessments, etc., of U.N. member. Loan Agreement will limit use of funds to this project.

58. App. B.115. Compliance with regulations on employment of U.S. and local personnel for funds obligated after April 30, 1964, (Regulation 7). Will be covered in Loan Agreement and Implementing Documents.
59. App. B.118. Vietnam iron and steel restrictions. Not applicable.
60. App. B.401. Compliance with bar against use of funds for publicity or propaganda purposes within U.S. not heretofore authorized by Congress. Loan Agreement will limit use of funds to this project.

CAPITAL ASSISTANCE LOAN AUTHORIZATION

**Somali Republic: Mogadiscio Water Supply
Provided from: Development Loan Funds**

Pursuant to the authority vested in the Assistant Administrator for Africa of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, to an autonomous water authority ("Borrower") of not to exceed \$8,500,000 to assist in financing the foreign exchange and local costs of goods and services for the Mogadiscio Water Supply Project subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment.

- a. Borrower shall, in legal tender of the Somali Republic, pay to the Government of the Somali Republic ("Government").
 - i. an amount equivalent to the amount of the loan within thirty (30) years, including a grace period of not to exceed five (5) years.
 - ii. Interest at the rate of three and one-half percent ($3\frac{1}{2}\%$) per annum on the unpaid amount payable to the Government under Subparagraph i.
- b. The Government shall, in United States dollars:
 - i. repay the loan to A.I.D. within forty (40) years, including a grace period not to exceed ten (10) years.
 - ii. pay A.I.D. interest on the unrepaid principal and any interest accrued thereon at the rate of one percent (1%) per annum during the grace period and two and one-half percent ($2\frac{1}{2}\%$) per annum thereafter.

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2. Other Terms and Conditions.

- a. Goods and services financed under the loan shall have their source and origin in the United States and/or the Somali Republic.
- b. Dollars used to finance goods or services of Somali source shall be subject to a Special Letter of Credit.

Assistant Administrator for Africa

Date

AUTONOMOUS MOGADISCIO WATERWORKS AGENCY
ESTIMATED COST, DESIGN AND CONSTRUCTION
STAGE I DEVELOPMENT (1980)

	<u>FOREIGN EXCHANGE</u> <u>(US \$)</u>	<u>LOCAL COSTS</u> <u>(US \$)</u>	<u>TOTAL COST</u> <u>(US \$)</u>
<u>PHASE A ENGINEERING DESIGN</u>			
1. <u>Hydrogeological Test Drilling</u>			
a. Mobilization Test Drilling and Support Equipment	\$ 127,500	\$ 5,000	\$ 132,500
b. Procurement Materials, Supplies, Construction Equipment	225,000	20,000	245,000
c. Drilling and Testing Exploratory Wells (40)	220,000	100,000	320,000
d. Drilling and Developing Production Wells (12)	200,000	40,000	240,000
e. Engineering Design and Supervision	115,000	20,000	135,000
	<u>887,500</u>	<u>185,000</u>	<u>1,072,500</u>
Estimated Cost	887,500	185,000	1,072,500
Contingency 10%	88,750	18,500	107,280
Total Estimated Cost	<u>\$976,250</u>	<u>\$203,500</u>	<u>\$1,179,750</u>
2. <u>Studies, Engineering Design</u>			
a. Field Surveys 4 men - 3 months	\$ 12,000	\$ 6,000	\$ 18,000
b. Local Labor - Transport - Materials, etc.	0	20,000	20,000
c. Office Design and Plans, specifications, bid documents, 100 man months @ \$2600/MM	260,000	0	260,000
	<u>272,000</u>	<u>26,000</u>	<u>298,000</u>
Estimated Cost	272,000	26,000	298,000
Contingency 20%	54,400	5,200	59,600
Total Estimated Cost	<u>\$326,400</u>	<u>\$31,200</u>	<u>\$357,600</u>
Estimated Cost Phase A	\$1,302,650	\$234,700	\$1,537,350
Escalation 5% **	65,133	11,735	76,868
Total Estimated Cost Phase A	<u>\$1,367,783</u>	<u>\$246,435</u>	<u>\$1,614,218</u>

	<u>FOREIGN EXCHANGE</u> (US \$)	<u>LOCAL COSTS</u> (US \$)	<u>TOTAL COST</u> (US \$)
<u>PHASE B CONSTRUCTION, MANAGEMENT, TRAINING</u>			
<u>3. Construction of Water Supply and Distribution Facilities</u>			
a. Mobilization IS	\$ 400,000	\$ 50,000	\$ 450,000
b. Procurement and Installation of Pumping Equipment	196,800	10,800	207,600
c. Pump houses, complete with Mechanical, Technical Piping Meter	63,600	37,200	100,800
d. Wellfield Piping to Transmission Line	218,600	112,500	331,100
e. Transmission Line	581,800	332,100	913,900
f. Distribution Storage Facilities	190,000	105,000	295,000
g. Treatment Facilities	24,000	16,000	40,000
h. Distribution System Piping (6"φ - 24"φ)	1,722,050	1,029,250	2,751,300
i. Vendor Water Points	16,800	7,200	24,000
j. Public Fountains	18,000	12,000	30,000
k. Service Connections	400,000	120,000	600,000
Estimated Cost	\$3,911,650	\$1,832,050	\$5,743,700
Contingency 10%	391,165	183,205	574,370
Total Estimated Cost	<u>\$4,302,815</u>	<u>\$2,015,255</u>	<u>\$6,318,070</u>
<u>4. Other Project Requirements</u>			
a. Mobile Construction and Service Equipment	\$ 136,000	\$ 6,000	\$ 142,000
b. Operational Facilities and Laboratory	50,000	60,000	110,000
c. Equipment Maintenance Shops	40,000	50,000	90,000
Estimated Cost	\$226,000	\$116,000	\$342,000
Contingency 20%	45,200	23,200	68,400
Total Estimated Cost	<u>\$271,200</u>	<u>\$139,200</u>	<u>\$410,400</u>

	<u>FOREIGN EXCHANGE</u> (US \$)	<u>LOCAL COSTS</u> (US \$)	<u>TOTAL COST</u> (US \$)
5. <u>Resident Engineering Staff</u>			
a. Resident Engineer Manager (24 man months)	\$ 72,000	\$18,000	\$ 90,000
b. Resident Engineers (2) 40 man months	112,000	30,000	142,000
Estimated Cost	184,000	48,000	232,000
Contingency 20%	36,800	9,600	46,400
Total Estimated Cost	<u>\$220,800</u>	<u>\$57,600</u>	<u>\$278,400</u>
6. <u>Management Consultant Services *</u>			
a. Project Manager 18 months @ \$5,000	\$ 78,000	\$12,000	\$ 90,000
b. Engineering Adviser 18 months @ \$4,167	65,000	10,000	75,000
c. Fiscal Adviser 24 months @ \$4,167	87,000	13,000	100,000
d. Oper./Maint. Adviser 24 months @ \$4,167	87,000	13,000	100,000
e. Misc. Special Consultants IS	<u>24,000</u>	<u>6,000</u>	<u>30,000</u>
Estimated Cost	\$341,000	\$54,000	\$395,000
Contingency 10%	34,100	5,400	39,500
Total Estimated Cost	<u>\$375,100</u>	<u>\$59,400</u>	<u>\$434,500</u>
7. <u>Training *</u>			
U.S. Training Program Somali Tech.	10,000	1,000	11,000
Estimated Cost Phase B	\$5,179,915	\$2,272,455	\$7,452,370
Escalation 5% **	258,996	113,623	372,619
Total Estimated Cost Phase B	<u>\$5,438,911</u>	<u>\$2,386,078</u>	<u>\$7,824,989</u>
Total Estimated Cost Stage I	<u>\$6,806,694</u>	<u>\$2,632,513</u>	<u>\$9,439,207</u>

*Financing provided under the loan for management services and U.S. training is to cover requirements for the period July 1971 to July 1973 (FY 72-73). Funds for these services prior to July 1971 will be covered by grant financing.

** An estimated 5% escalation in general price levels has occurred since the May 1966 date of the cost estimate.

MOGADISCIO WATER SUPPLY

Benefit-Cost Analysis

	<u>Total Costs 1/ 1967</u>	<u>Present Value Cost at 6%</u>	<u>Present Value at 10%</u>	<u>Present Value at 12%</u>	<u>Total Benefits 2/ 1967</u>	<u>Present Value at 6%</u>	<u>Present Value at 10%</u>	<u>Present Value at 12%</u>
1962	22,000	29,430	35,420	38,764				
1963	32,000	40,384	46,848	50,336				
1964	52,000	61,932	69,212	73,008				
1965	205,000	230,215	248,050	257,070				
1966	16,000	16,960	17,600	17,920				
1967	26,000	26,000	26,000	26,000				
1968	1,085,000	1,023,584	986,265	968,249				
1969	2,619,000	2,330,899	2,164,341	7,087,848				
1970	4,535,000	3,807,672	3,407,208	3,227,922				
1971	1,110,000	879,223	758,144	205,424	1,336,776	1,058,850	913,035	849,545
1972	535,000	399,783	332,192	286,555	1,736,378	1,297,522	1,078,135	985,266
1973	190,000	133,942	107,247	96,258	1,801,286	1,270,187	1,012,059	912,840
1974	50,000	33,252	25,657	22,617	1,867,194	1,241,790	958,165	844,263
1975	50,000	31,370	23,325	20,994	1,934,128	1,213,495	902,284	781,151
1976					2,027,130	1,199,854	859,699	731,003
1977					2,125,242	1,186,722	819,372	684,270
1978					2,218,244	1,168,542	777,478	637,091
1979					2,311,246	1,148,617	736,432	593,239
1980					2,397,612	1,124,094	694,453	549,470
1991	384,600	127,115	57,167	39,485				
1996	110,800	25,816	10,226	6,517				
2006	324,500	42,219	11,547	10,830				
2021	-	-	-	-	\$95,904,480 3/	\$15,955,738	\$6,174,123	\$4,043,990
	\$11,346,900	\$9,239,796	\$8,326,449	\$7,936,255	\$115,660,216	\$27,865,411	\$14,925,235	\$11,612,736

1/ Costs here include prior AID grants, Municipality of Mogadiscio internal expenses for new waterworks 1967-1971, engineering, construction and consultant services.

2/ Benefits are calculated at 100% collection rate to reflect economic benefits more accurately. The 80% rate is used in the financial analysis to reflect a more accurate financial position.

3/ Calculated on annuity basis.

Benefit/Cost Ratio

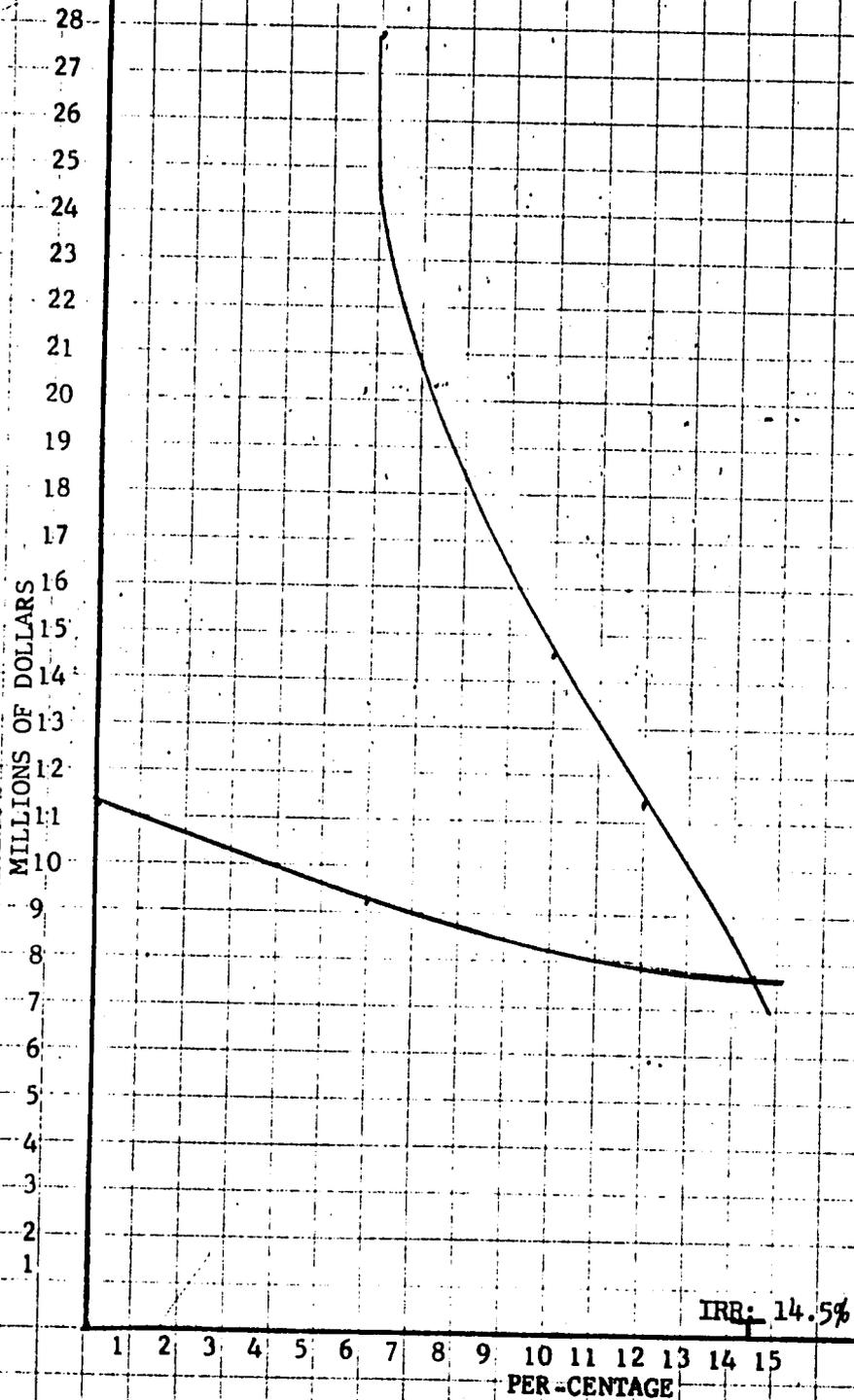
6% = 3:1

10% = 1.8:1

12% = 1.5:1

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Annex III(c)

INTERNAL RATE OF RETURN ANALYSIS



IRR: 14.5%

Mogadiscio Water Supply
AMMA - Actual and Projected Revenues and Expenditures - 1971-1981

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
<u>WATER DEMAND</u> ^{1/}											
Average Daily Consumption	2.616	3.398	3.526	3.654	3.785	3.967	4.159	4.341	4.523	4.692	4.692
Annual Consumption	954.84	1240.27	1286.99	1333.71	1381.52	1447.95	1518.03	1584.46	1650.89	1712.58	1712.58
<u>REVENUES AND EXPENDITURES</u>											
Total Sales	\$ 1336776	\$ 1736378	\$ 1801786	\$ 1867194	\$ 1934128	\$ 2027130	\$ 2125242	\$ 2218244	\$ 2311246	\$ 2397612	\$ 2397612
Less: Collection Losses ^{2/}	<u>267356</u>	<u>347276</u>	<u>362159</u>	<u>373439</u>	<u>386826</u>	<u>405426</u>	<u>425049</u>	<u>443649</u>	<u>462250</u>	<u>479523</u>	<u>479523</u>
Gross Operating Revenue	\$ 1069420	\$ 1389102	\$ 1441428	\$ 1493755	\$ 1547302	\$ 1621704	\$ 1700193	\$ 1774595	\$ 1848996	\$ 1918089	\$ 1918089
Less: Operating, Administrative & Maintenance Expenses ^{3/}	\$ 566703	\$ 620300	\$ 545144	\$ 421005	\$ 435884	\$ 394347	\$ 408132	\$ 423253	\$ 436856	\$ 452181	\$ 452181
Depreciation ^{4/}	171214	171214	171214	171214	171214	171214	171214	171214	171214	171214	171214
Franchise Tax ^{5/}	<u>224842</u>										
Total Operating Expenses	\$ 962759	\$ 1016536	\$ 941200	\$ 817061	\$ 831900	\$ 790403	\$ 804188	\$ 819309	\$ 832912	\$ 848237	\$ 848237
<u>NET OPERATING REVENUE</u>	\$ 106661	\$ 372566	\$ 500228	\$ 876694	\$ 715402	\$ 831301	\$ 896005	\$ 955286	\$ 1016084	\$ 1069852	\$ 1069852
Less: Interest ^{6/}	<u>291469</u>	<u>311954</u>	<u>333431</u>	<u>325502</u>	<u>317295</u>	<u>308800</u>	<u>300008</u>	<u>290908</u>	<u>281490</u>	<u>271742</u>	<u>261653</u>
NET OPERATING RETURN	\$ (184808)	\$ 60612	\$ 166747	\$ 551192	\$ 398107	\$ 522501	\$ 595997	\$ 664378	\$ 734594	\$ 798110	\$ 808199

1. Source: Table II, Section III, above
2. A collection rate of 80% is assumed.
3. As estimated in Hydrotechnic Report 1963; Expenses per 1968-1970 will be absorbed by the existing system.
4. Depreciation has been calculated at different rates for different items to derive the assumed figure.
5. The draft Resolution for AMMA provides for a Franchise Tax of 2½% premised on Aggregate Initial Capital payable to the Municipality.
6. Interest for the period 1968-1970 has been capitalized to place total financial responsibility with the new water agency.

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ANNEX IV-(b)

MOGADISCIO Water Supply

AMWA-Projected Source and Application of Funds 1968-1981

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
<u>SOURCE OF FUNDS</u>														
Internal Cash Generation														
Net Operating Return				\$(184808)	\$60612	\$166797	\$551192	\$398107	\$522501	\$595997	\$664378	\$734594	\$798110	\$805199
Depreciation				<u>171214</u>										
Sub-Total				\$(13594)	\$231826	<u>\$338011</u>	\$722406	\$569321	\$693715	\$767211	\$435592	\$905808	\$969324	\$979413
AID Loans	\$927000	\$2259000	\$3884000	\$860000	\$585282									
GSR/MCC Contribution	<u>103000</u>	<u>205000</u>	<u>419000</u>	<u>109000</u>	<u>109000</u>									
Total Source of Funds	\$1030000	\$2464000	\$4303000	\$955406	\$926108	\$338011	\$722406	\$569321	\$693715	\$767211	\$835592	\$905808	\$969324	\$979413
<u>APPLICATION OF FUNDS</u>														
Construction Costs	<u>\$1030000</u>	<u>\$2464000</u>	<u>\$4303000</u>	<u>\$969000</u>	<u>\$694282</u>									
Principal Payments						<u>\$226529</u>	<u>\$234498</u>	<u>\$242705</u>	<u>\$251200</u>	<u>\$259992</u>	<u>\$269092</u>	<u>\$278510</u>	<u>\$288258</u>	<u>\$298347</u>
Total Application of Funds	\$1030000	\$2464000	\$4303000	\$969000	\$699282	\$226529	\$234498	\$242705	\$251200	\$259992	\$269092	\$278510	\$288258	\$298347
INCREASE (OR DECREASE) OF CASH	-	-	-	\$(13594)	\$231826	\$111482	\$487908	\$326616	\$442515	\$507219	\$566500	\$627298	\$681066	681066
Cumulative Cash Balance				\$(13594)	\$218232	\$329714	\$817622	\$1144238	\$1586753	\$2093972	\$2660472	\$3287770	\$3968836	\$4649902

June 5, 1967

ENGINEERING ANALYSIS

Mogadiscio Water Supply System - Somali

I. DESCRIPTION OF EXISTING SYSTEM

The City of Mogadiscio is presently supplied from ground water by two independent systems and from private wells.

One of the municipal systems provides approximately .9MGD of relatively fresh water from four wells located along the Afgoi Road. A system of small storage tanks at the well field provides total storage of 20,000 gallons. Water is fed from storage through 25,000 ft. of 4" diam. and smaller mains to water dispensing points and approximately 50 service connections.

A second completely independent system provides brackish water to approximately 2,300 service connections in three distribution areas within the city. The system consists of about 35 working wells, eighteen concrete or steel tanks providing a total of 290,000 gallons of storage and 76,000 ft. of 4" diameter and smaller distribution mains.

In addition to the municipal systems, there are over 200 private wells within the city. These wells are, in most cases, actually private water companies which sell water to donkey cart operators who in turn supply most of the transient population of Mogadiscio.

The municipal water supply systems are in very bad condition and are rapidly approaching the end of their useful life. Piping is deteriorating, breaking, and leaking. The lack of adequate water meter maintenance on the brackish system is a major problem at the present time; some 50% of the meters are out of order.

There is a municipal water system repair shop which would be reasonably adequate (except for the meter repair facilities) providing there were enough repairmen skilled in the use of such equipment. In 1963 the meter testing equipment was in bad condition, unusable and no stock of repair parts was available.

Maintenance of existing wells, pumps, motors, etc. has been inadequate for years and are presently considered beyond repair.

The over-all water supply systems for Mogadiscio presently provide sufficient quantities of extremely poor quality water at prohibitive prices.

The existing municipal systems and the private wells should be closed except for a few animal watering points, as soon as the new water supply becomes available.

2. Description of Project

The first phase shall consist of: (a) the final engineering design including the hydrogeological test drilling and well development; (b) the establishment of a municipal agency with full operational and financial autonomy including a training program for the operation and maintenance of the water system. The second phase shall consist of: (a) the construction of all facilities designed under phase one; (b) the management, operation and training of personnel for the water agency.

The facilities to be designed and constructed are as follows:

(a) Source of Supply

The initial well field development will take place north of the city along the Balad Road in areas located in a 15Km² area north of the Balad Road between Km9 and Km 14. A hydrogeological test drilling program will be undertaken to establish well sites and determine the design parameters of the aquifers to be developed.

The major production well field will consist of a maximum of twelve production wells designed in accordance with final test data determined during the initial phase of engineering.

(b) Transmission Mains

The location and development of the wells shall be the determining factors in setting the size and length of the mains.

It is expected that approximately 19,700 ft of 12" diameter well field piping will be laid to connect the wells to the 24" diameter transmission main. The transmission main will be about 36,000 ft in length.

(c) Treatment Facilities

Raw water from the well field will require only chlorination before delivery to final consumers. The treatment facility will consist of chlorine feeding and measuring equipment, chlorine cylinder handling equipment, a diesel generating power source and related control equipment all contained in a secure, limited access building. Diesel storage tanks, chlorine cylinder unloading and handling equipment and storage areas will be located near the building and the entire facility enclosed with a protective fence.

(d) Storage

The transmission line from the well field will terminate at a 5.3 million gallon reservoir near KM 3 on the Balad Road. Final design of the production facilities and the results of (1) detailed demand studies within the city (2) surveys and trail layouts will determine the requirements for distribution storage. No specific provision has been made for distribution storage in the preliminary design.

(e) Distribution System

The distribution network will consist of approximately 300,000 feet (92,000 m) of buried mains ranging from 6" to 24" in diameter. An estimated 6,000 service connections, 150 fountains and 6 vendor watering points will be installed initially.

3. Technical Studies

(a) Recent Reports

The project feasibility study was completed in August 1963 by Hydrotechnic Corporation, New York, New York under Contract AID/afe-103. Results of this study indicated that a ground water supply would be the most reliable and least costly system for the city if adequate sources could be found within a reasonable distance from the city and recommended further investigation along these lines. These recommendations were reviewed and confirmed by the Tudor Engineering Company in their report of October 1963 under Task Order No. 875.

Hydrotechnic Corporation, under Contract AID/afr-164, conducted an investigation of groundwater resources for the City of Mogadiscio during the period October 1964-June 1965 and filed a report September 20, 1965. Revisions to the 1965 report were presented in a January 1966 memorandum and a final compendium of all previous reports submitted in May 1965.

The engineering firm of Orr-Schelen-Mayeron completed an appraisal of the present Mogadiscio Water Agency law before its final approval and a study of the engineering legal and financial considerations involved in the establishment of an operating agency for Mogadiscio.

(b) Prior Studies

Prior studies and reports have provided information and findings which have been taken into consideration in the development of the final recommendations of the Hydrotechnic report. A partial list of contributing prior reports is as follows:

(1) "A Reconnaissance Groundwater Survey of Somalia, "Thomas P. Ahrens, November 1951.

- (2) "Groundwater Geology in Somalia", George Wilson, June 1958.
- (3) "Potable Water Supply for Mogadiscio - Somali Republic".
- (4) "Groundwater geology in the Vicinity of Mogadiscio - Somali Republic"
Glenn A. Brown, USAID/SR July 1962.

4. Technical Evaluation

(a) Proposed Groundwater Development

The results of the 1964-65 Hydrotechnic investigation program indicated that groundwater of good quality existed within a reasonable distance of Mogadiscio and that this resource could be developed in sufficient quantities to supply the needs of the city. This subsurface source is recommended for development and offers the following advantages over alternate schemes.

- (a) The capital and operational costs will be lower than the alternate schemes.
- (b) Greater flexibility exists for future stage development to increase capacity.
- (c) Treatment of the groundwater will require disinfection only while the surface water will require full treatment.
- (d) The source of supply is accessible by an all-weather road and close to the city for ease of maintenance.

(b) Consideration of Alternates

Alternate schemes for meeting the water requirements of Mogadiscio were considered during the original 1963 studies of feasibility and re-examine in the final report. The following basic schemes were considered and eliminated in favor of the ground water source:

(1) Utilization of the water from the Uebi Scebeli river would involve large expenditures for an impounding dam, spillway, inlet works, pumping facilities, longer transmission mains and full treatment facilities. The yield from this river cannot be assured as it has been recorded at Mahaddei Goi that the flow was nil during February and March of 1964. Further as this river originates in Ethiopia an international agreement for water rights would have to be concluded.

(2) Saline Water Conversion - comparable preliminary cost estimates, between the ground water development scheme and an alternate desalinization plant at Mogadiscio, favor the ground water source as the lower investment of capital and annual cost. Also, technological difficulties and the lack of adequate skilled and semi-skilled personnel for operation and maintenance of a large saline water conversion plant, are disadvantageous.

(3) Combination River and Well Scheme - This plan was studied as a possible scheme for augmenting an initial ground water development by future extension from the Uebi Scebeli, however, comparable cost estimates indicated that the combination would have only slightly lower investment costs than the development of wells as the single supply source and that the combination scheme would have greater annual costs than the well scheme.

(c) Selection of Site for Groundwater Development

The above alternates were eliminated in favor of development of a groundwater source in the dunal areas surrounding the city. Previous investigations have suggested that a supply of water could be developed in a natural swale in the dunes, lying about $3\frac{1}{2}$ km from the city and extending between Balad and Afgoi Roads. This can probably be done, but in view of the scarcity of hydrological data, this particular area might be considered for the future rather than as the first stage of development of a water supply for the following reasons, safety of the supply from salt intrusion being most important:

(1) Static ground water levels going north closer to the road toward Balad appear to be higher.

(2) Percolation into the dunes is not dependent on flow into basins, and all areas are apparently about equal in percolation capacity.

(3) The swale area is probably more in the path of salt intrusion which is taking place within the City.

In addition, locating the first stage in or near the Balad Road will furnish greater safety because:

The location is farther removed from the known water salt areas.

The Balad road runs diagonally away from the sea and thus affords a better opportunity to correct salt water intrusion by shifting the draft should the need occur.

The location provides some flexibility in permitting a two source system (wells plus Scebeli River) in later years, should the need ever arise.

The Balad road provides access without extra costs, and will thus facilitate both construction and operation.

(d) Technical Soundness

The preliminary plans and design criteria are adequate to define the scope and magnitude of the project. An estimate of project cost was prepared during the 1963 feasibility study by Hydroelectric and brought up to date in the final 1966 report. Costs are based on U.S. and Somali procurement of all commodities and services. Estimates provide a reasonably firm estimate of the cost for the project.

5. Technical Information

(a) Physiology, Hydrology and Hydrogeology

A topographic survey of both the Balad and Afgoi Roads from Mogadiscio to the Uebi Scebeli River was made available to Hydrotechnic Corporation. This survey was completed by the Hunting Survey Corporation Limited in connection with the Agricultural and Water Survey for the United Nations Food & Agricultural Organization.

The belt of stabilized dunal sands is approximately 20 kilometers wide at Mogadiscio, and its inland limit marks the edge of the alluvial deposits bordering the Uebi Scebeli River.

Fragmentary records of rainfall show an average rainfall of 390 mm (15.4 in) for the period 1951 to 1961 with large variation from year to year. Rainfall in 1961 is reported as 1,165 mm (45.88 in) and in 1955 as only 148 mm (5.83 in).

Rainfall is almost entirely restricted to the two rainy seasons. The first is during March, April, and May, and the other in September, October, and November. In any year, however, the start and end of the rainy seasons may vary by several months.

Evaporation from land and water surfaces is very high. Evaporation as great as 165 mm (6.5 in) per month from free water surfaces has been estimated by Howard Humphries and Sons. The surface of the stabilized sand dunes in the coastal belt near Mogadiscio is porous and there is little if any surface runoff. The estimated dunal area for water catchment is about 20 km² for each kilometer or length parallel to the coast.

In estimating the recharge of the aquifers, it has been assumed that most of it will eventually come from infiltration or rainfall. Due to the 25 to 33 kilometer distance separating the Scebeli River from the area where the wells will first be drilled, and due to the proposed increased diversions from the river by future irrigation projects located upstream, there is no positive assurance of recharge by infiltration from the Scebeli river bed. In view of these conditions, it will obviously be necessary for most of the recharge to come from rainfall sources.

Because of climatic and soil conditions, the average annual rainfall is a poor guide to the amount of percolation which actually takes place. A light short rainfall will barely wet the surface and will contribute to groundwater. Moderately heavy rains may fail to provide enough percolation to saturate the surface soil fringe and therefore much of that rain water will evaporate soon after the storm. Heavy rainfalls will saturate the surface soil fringe, and most of this water will percolate downward to the aquifer.

Therefore, concentration and intensity of the rainfall are much more important than the annual average; one heavy storm can provide more percolation than many scattered periods of light rain. Such heavy storms occur during the rainy season; they are local in nature and pass along the coast in a strip only a few miles in width while adjacent areas are without rainfall.

The surface geology in the Mogadiscio area consists of a broad belt of stabilized dunal sands 50 to 300 feet thick bordering the Indian Ocean with underlying limestone beds. At places within the city limits and along the shoreline there are outcrops of consolidated limestones of the reef variety. Further inland, however, the dunal sands are comparatively thick, 50-100 ft. and logs of deep wells show alternating beds of sand, caliche, cemented sand and sandy limestones.

The sand dune formations and the underlying beds of sand, gravel and silts are dry. Water is not found until depths of about 200 feet or more. The waterbearing strata along the Balad Road, due to their structure, seaward tilt and posture, have artesian characteristics. The corresponding figures for the beds below the dunal sands consisting of sands, gravels and silts of Pleistocene epoch are 100 to 225 feet. The top of the underlying Pliocene limestone formation is 150 feet below the surface at the coast and about 325 feet below the surface at KM 15.

Little information is available on the very deep units, but it appears that the entire sequence of Tertiary beds occur under the coastal region in a thick and extensive wedge, whose thin end lies a considerable distance from the coast, possibly greater than 50 km.

The water table within the city limits of Mogadiscio appear to be at or only slightly above sea level. Proceeding inland, however, it rises steadily toward the Uebi Scebeli and is roughly 30 m above sea level 15 km southwest of Balad on the Balad-Afgoi road, and 45 m above sea level at Balad. Salt water encroachment is a serious problem. Almost every shallow dugwell within the City of Mogadiscio yields water containing a high percentage of seawater.

6. Provisions for Engineering, Procurement and Construction.

Under Phase A final plans, specifications and contract documents are to be prepared by a U.S.-Engineering firm selected by and under contract to an agency or department of the municipality responsible for the water system. The engineering firm will also carry out the hydrogeological test drilling program as well as design, drill and develop the required number of production wells. The drilling and development of the wells will be performed by the Engineering firm or by sub-contract to such firm. Under Phase B the engineering firm will perform general supervision and resident inspection of the construction for the project.

Procurement under Phase A of the commodities required to explore, drill, test and develop the production well (excluding operating pumps) will be obtained from the U.S. or Somali by the engineering firm. Procurement of all commodities for distribution, storage; transmission, operating pumps, storage facilities and other appurtenances needed to make the system complete shall be obtained under Phase B by the U.S. construction contractor. The awarding of all materials, equipment or construction contracts on a competitive basis will be the responsibility of the agency or department of the municipality responsible for the administration and operation.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

AID Loan # 649-H-005
(Ref: AID-ILC/P-569)

CAPITAL ASSISTANCE LOAN AUTHORIZATION

Provided from: Development Loan Funds
Somali Republic: Mogadiscio Water Supply

Pursuant to the authority vested in the Assistant Administrator for Africa of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan pursuant to Part I, Chapter 2, Title I, the Development Loan Fund, to an autonomous water authority ("Borrower") of not to exceed \$8,500,000 to assist in financing the foreign exchange and local costs of goods and services for the Mogadiscio Water Supply Project subject to the following terms and conditions:

1. Interest Rate and Terms of Repayment.

- a. Borrower shall, in legal tender of the Somali Republic, pay to the Government of the Somali Republic ("Government"):
 - i. an amount equivalent to the amount of the loan within thirty (30) years, including a grace period of not to exceed five (5) years.
 - ii. interest at the rate of three and one-half percent (3 1/2%) per annum on the unpaid amount payable to the Government under Subparagraph i.
- b. The Government shall, in United States dollars:
 - i. repay the loan to A.I.D. within forty (40) years, including a grace period not to exceed ten (10) years.

- ii. pay A.I.D. interest on the unrepaid principal and any interest accrued thereon at the rate of one percent (1%) per annum during the grace period and two and one-half percent (2 1/2%) per annum thereafter.

2. Other Terms and Conditions.

- a. Goods and services financed under the Loan shall have their source and origin in the United States and/or the Somali Republic.
- b. Dollars used to finance goods or services of Somali source shall be subject to a Special Letter of Credit.


Assistant Administrator for Africa

19 June 1967

Date