PN-ABT-796
ISN 92634

TECHNICAL WORKING PAPER

Preliminary Draft

VALUATION OF LAKE SERVICES ASSETS

Prepared in support of:

The Malawi Railway Restructuring Project

Prepared by:

Abt Associates, Inc.

Funded by:

USAID/SARP/Zimbabwe

Funded via:

The Privatization and Development Project
(Prime Contractor: Price Waterhouse)

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Description of lake service operations	1
III.	Assets needed for a new lake service company	5
IV.	Valuation of assets for a new lake service	7
V.	Conclusions	10

APPENDIX I: Vessel Technical Details
APPENDIX II: Estimated Earning Capacity of Key Lake Service Assets
APPENDIX III: Bibliography
APPENDIX IV: List of Contacts
APPENDIX V: List of Acronyms

Valuation of Lake Services Assets: Malawi Railway Restructuring Project

I. INTRODUCTION

This paper, which has been prepared in support of the Malawi Railway Restructuring Project, is concerned with the Lake Service division of the existing Malawi Railways. It's purpose is to identify those assets belonging to the present Lake Service division that are likely to be of value in a new, restructured Lake Service company and to develop a preliminary estimate of the value of those assets. The assets included are the vessels, port terminals, ship building and repair facilities and other major equipment, buildings and facilities that are now operated by Lake Service. The main focus is on those assets that will likely be needed for successful future operation of the new company.

To prepare this valuation, interviews were conducted with senior Lake Service management to identify which services and assets would likely be needed in the new company. Physical inspections of all major assets and reviews of relevant documents were then carried out to determine the main specifications and current condition of the key assets.

Valuations for each major asset include estimates of the following: (i) current book value; (ii) depreciated replacement value; and (iii) an estimate of likely market value based on commercial potential in a Lake service.

The next section describes the various Lake Service operations and indicates how the assets are currently employed. Section III then identifies the assets which are likely to be needed in the new Lake Service company and provides a brief description of each, with a preliminary assessment of condition and any major repair work that may be required. Section IV describes the valuation methods used and provides valuation estimates for each asset identified for transferal to the new company. Further technical details of these assets are provided in an appendix.

II. DESCRIPTION OF LAKE SERVICE OPERATIONS

Lake Service operates, or is prepared to operate, shipping services on Lake Malawi that include container, oil tanker, dry cargo and passenger shipping. In addition, Lake Service operates a ship repair service that supports it's own vessels as well as a small amount of outside contracting for repair of government vessels and commercial fishing vessels. The ship repair operation also has provided facilities for final assembly of vessels that are constructed overseas and shipped piecemeal to Lake Malawi.

Container Service

The container service was intended to be introduced in 1991 when the vessel, terminals and cranes were placed in service as part of the Northern Corridor Transport project. However, the service has not as yet operated due to insufficient water depth for the vessel in the container ports. This is in part a consequence of the unusually low water level in the lake at the present time. A dredging project is currently underway to bring the berths at the container terminal to the required depth. When in operation, the service is intended to provide a modern, fully cellular container operation sailing weekly between the port of Chipoka at the southern end of the lake and the port of Chilumba at the northern end of the lake. The 68 TEU container vessel and container terminals at Chipoka and Chilumba, each with a gantry crane, are currently standing idle and have been since 1991. However, this equipment is in place and ready to operate as soon as the water depth can be provided.

This service could be viable in the new Lake Service company provided sufficient cargo can be generated to support approximately weekly sailings with load factors of at least 70% (round trip basis).

Oil Tanker Service

The 300 dwt oil tanker was placed in service on the lake in 1984. At that time it was very active carrying petroleum products (gasoline, kerosene, diesel fuel) from Chilumba in the north to Chipoka in the south on a one voyage per week basis. More recently, however, these cargoes have not been available and the vessel has been idle much of the time. In fact, it's last cargo was in August of 1993. This vessel has also been adversely affected by the lack of water depth at the main ports and, as a consequence, potential cargoes have become accustomed to using the alternative road transport route. However, this vessel is in place and ready to operate whenever the water depth at the oil terminals allow. In fact, as of this writing, she was expecting to take a cargo some time in July.

This service could be viable in the new Lake Service operation provided sufficient cargo can be generated to support sailings every 9 or 10 days with load factors of at least 80%. It should be noted that in 1991 there was sufficient cargo to support weekly sailings.

Dry Cargo Service

Lake Service operates a non-containerized cargo service carrying primarily tobacco, maize, rice, cotton products and consumer products in domestic trades. This service is operated in essentially a tramp mode carrying cargoes on a contract basis to and from various points on the lake, rather than operating a regular scheduled service. Although Lake Service does have three general cargo vessels for this service, only one of them appears to be regularly used. This vessel, the Karonga, is a small (300 dwt) cargo carrier with two holds and some oil cargo

capacity. She was built almost twenty years ago but appears to be in satisfactory condition for continued cargo operation. In her annual survey, just completed, she was given temporary certification by the government marine inspectors to allow her to operate during the tobacco season and as of this writing, she was proceeding to pick up a tobacco cargo. In October, she will be required to undergo further survey work in order to receive certification for another full year's operation.

The other two dry cargo vessels do not appear to be well suited to further cargo operation. The Nkwazi is too small (200 dwt), too old (built 1954), too obsolete and too expensive to run to be viable. For example she requires a crew of 27 -- twice the number on the Karonga which carries 50% more cargo and twice the number on the container vessel which can carry nearly four times as much cargo. The third cargo vessel, Mpasa (built 1935), is in fact no longer operational and appears to be used primarily for spare parts.

In summary, the Karonga is the only cargo vessel with any potential for offering a viable cargo service in the new Lake Service and even she would make only marginal contributions to capital unless quite good load factors could be generated.

In addition to the cargo vessels, Lake Service operates several small tugs and barges which are capable of carrying cargoes into locations that are not accessible to the larger vessels (barges can be run onto the beach to unload). It seems unlikely, however, that this service could be commercially viable even though it may be the only practical way of getting goods to some of the inaccessible areas. Furthermore, this equipment is now severely deteriorated. Of three small tugs, all built around 1947, only two seem to be even remotely operable and they suffer from breakdowns and inability to obtain spares. A fourth vessel, the launch Ncheni (built 1957), in fact is now providing most of the motive power for the small amount of barge traffic that does operate. The barges themselves, although also quite old, appear to be in workable condition. They include a 24 tonne oil barge (built 1965) and two cargo barges of 30 and 60 tonnes (built 1950 and 1966, respectively). Given the age, condition and small capacity of this equipment, it seems unlikely that any of it has the potential for offering a viable cargo service in the new Lake company, even though such a service may be the only way of reaching some remote areas.

Lake Service also operates a larger tug/barge unit which may offer some potential for a viable service. The 725 hp tug Viphya (built 1975) together with its barge (also 1975) have been operated as a unit in cargo carrying service. They appear to be in reasonable working condition, although they have done only two cargo voyages this year. At present they are out on charter to support the dredging operation at Chipoka and Chilumba. The present management of Lake Service has stated that they intend to use this equipment to introduce a domestic container service carrying a maximum of 25 containers on deck per voyage. Unlike the container carrier, this equipment would not be constrained by the present water depth in the container ports. Such a service could be viable in the new Lake Service only if sufficient cargo could be generated to support approximately three sailings per month with at least 70% load factors.

Passenger Service

On the passenger shipping side, Lake Service has operated three small passenger vessels with capacities ranging from 180 to 460 passengers. At present, however, only two of these vessels are operable. The third, Chauncy Maples (built 1899) which can carry 180 people, has been found "very substandard" by the government marine inspection department and has not been granted a certificate to operate. It seems highly unlikely that the renovations necessary to bring her back into operation could be justified. A second vessel, Mtendere (built 1980) and with capacity for 420 passengers, is also currently out of service due to bottom damage in a grounding incident. Repairs appear to be nearing completion, however, and she is likely to be back in operation by the end of July when she is scheduled for temporary charter employment on a refugee repatriation contract. The third vessel, Ilala (built 1949) which can carry 460 passengers, has just completed extensive renovation and is currently back in passenger service.

Although the passenger services are the only form of transportation for people and their goods from some remote areas (eg, Likoma Island), they clearly could not be economically viable services with these vessels. Running costs are relatively high for these ageing vessels while passenger load factors and fares are quite low. These services would not be viable in the new Lake Service unless they were subsidized as an essential service.

Shipyard and Repair Facility

Lake Service also operates the shipyard at Monkey Bay which provides maintenance and repairs for their own vessels as well a small amount of outside contract work on government vessels and commercial fishing vessels. The yard includes a floating drydock with lifting capacity of about 700 tonnes, a slipway which is used for repairs to small vessels as well as for assembly of newbuildings, and two modern workshops with the necessary machine tools, equipment, cranes, etc. for any in-house work the Lake Service is likely to do. At present, the drydock is not capable of lifting the two largest craft in the fleet (container vessel Kwacha and barge Viphya) but a building project which is already underway will expand the dock capacity to 850 tonnes allowing it to accommodate any Lake Service vessel. The slipway is adequate but its capacity is limited by the fact that the winches for hauling vessels out of the water have not operated since installation. They are scheduled to be replaced in the near future. The machine shops and tools, most of which are relatively new, appear to be in good condition and are quite adequate for their intended service. All in all the shipyard, as presently equipped, would be an essential part of a new Lake Service.

Finally, it should be noted that Lake Service does also operate a small dredge. This dredge, which was built in 1971, is not in good condition, however, and is subject to frequent breakdowns. As a consequence, it is not being used in any of the dredging work now being done at the container ports and such work has instead been contracted to Kier International. A replacement dredge, financed by USAID, is scheduled to enter service this year. With this new

equipment Lake Service will have the expertise to offer dredging contract work to the ports. Their current dredge, however, is not adequate and would, therefore, not be useful in the new Lake Service.

III. ASSETS NEEDED FOR A NEW LAKE SERVICE COMPANY

Based on the review of Lake Service operations as described above, several assets were identified as being potentially viable in the new Lake Service company. These include the container ship, the tanker, one dry cargo vessel, one tug/barge unit and two passenger vessels, as well as the shipyard facilities and equipment including the floating dry dock and the slipway. The two older cargo vessels and the 1899 built passenger vessel were judged not viable for continued operation. The smaller tugs and barges also do not appear to be commercially viable, although, if appropriately subsidized, the barges could be used to offer service to remote areas with the launch Ncheni providing motive power.

It should be noted that a very low hurdle has been set in judging these assets "potentially viable." As will be further explained in the next section, for the cargo vessels "potentially viable" means capable of generating some contribution to capital cost at prevailing freight rates provided the vessel can be operated according to normal maritime industry practice (i.e. in relatively continuous operation). The question of whether there is sufficient cargo to operate according to normal maritime industry practice has not been addressed in this study[1]. For the passenger vessels "potentially viable" means no more than technically capable of performing the service because the passenger services could not be commercially viable unless subsidized as an essential service. Furthermore, the issue of whether one new company (public or private) or several companies constitute the best ownership and operating structure is not addressed.

The following paragraphs describe the assets that are judged potentially viable.

Container Vessel KWACHA -- The KWACHA is a modern, fully equipped ungeared container vessel, built in 1991. She has a capacity of 68 twenty foot containers (TEUs) with 44 below deck and 24 on deck. Despite her inland operation, she meets all international deepsea standards for safety, pollution control, etc. With a service speed of 10 knots she can easily provide a weekly round trip service on the lake. She is being well maintained and appears to be in excellent condition (having not yet operated) apart from some wear and tear due to movement of the vessel berthed alongside her.

Oil Tanker UFULU -- The UFULU is a modern fully equipped product tanker built in 1983 and has capacity for some 300 tonnes of oil products in eight segregated tanks plus some dry cargo

---

[1] The World Bank is planning to finance a study which will examine the restructuring potential and viability of Lake Services, develop a resultant business plan, and identify options for privatization.

capacity. She meets all international standards for safety, pollution control etc. including segregated ballast and double bottom tanks. With a service speed of 10.5 knots she can easily provide a weekly round trip service on the lake. She appears to be in good condition and well maintained apart from some steering gear problems which may have resulted from minor rudder damage (now corrected) due to a grounding.

Dry Cargo Vessel KARONGA -- The KARONGA is an older ungeared dry cargo vessel built in 1975. She has a 300-tonne dry cargo capacity in two holds plus an oil cargo capacity of 30 tonnes in wing tanks. Her service speed is 8 knots. She has adequate navigational and safety equipment for the lake. However, she is not in conformance with modern pollution control or crew living standards. Her general condition appears to be satisfactory, apart from the auxiliary engine which is on breakdown, and she is currently on a temporary operating certificate pending further survey work.

Tug/Barge VIPHYA -- The VIPHYA tug and VIPHYA barge were built in 1975 and operate as a unit. The tug was re-engined in 1988 with a 725 hp main engine. It has adequate navigational, safety, and pollution control equipment for its intended service on the lake. The barge is an unmanned 600 dwt tank barge which can carry either liquid cargo or on-deck dry cargo. The general condition of both units appears relatively good although the tug's auxiliary machinery is old and difficult to maintain.

Passenger Vessel ILALA -- The ILALA is a very old vessel, built in 1950, however she has been extensively rehabilitated in recent years. She has capacity for some 400 third class passengers plus 6 first class passenger cabins. She has a single cargo hold with capacity for about 100 tonnes and cargo gear of 1.5 tonne capacity. With a service speed of 12 knots she is capable of providing a weekly service around the lake. In 1990/91 her hull plating was extensively rehabilitated, in 1992 her auxiliary engines and generators were renewed, and in 1993 her main engines were renewed. In April 1994, after a 13 month lay-up for extensive overhaul, she was re-certified to operate passenger service on the lake and she now appears to be in quite satisfactory condition for this service.

Passenger Vessel MTENDERE -- The MTENDERE, which was built in 1980, underwent an extensive refit in 1993 re-entering service in November. She has had some problems since, however. In December 1993 she suffered engine problems (gear box failure) and in June of 1994 she grounded and suffered extensive hull damage. As of this writing she is in dry dock for hull repairs which are expected to be completed in July. This vessel has capacity for about 420 passengers plus some 50 tonnes of cargo in a single hold geared with a half tonne hoist. She has a service speed of 12 knots and she meets international standards for safety, pollution control and subdivision (including double bottom). After completion of her current dry dock work she should be in good condition for her intended service.

Shipyard at MONKEY BAY -- The Monkey Bay shipyard includes two substantial modern workshops equipped with lathes, drill presses, metal and wood working machines as necessary for ship repair. The workshops and most of the equipment was new in 1991, put into service

for the building of the containership. The key assets include: 15-ton mobile crane; 3-ton overhead workshop crane; precision center lathe machine; tractor; and various machine tools. These were all new in 1991. In addition, the shipyard possesses several older machine tools which are still in use as well as a 40-ton mobile crane, some 15 years old, which is currently located at the port of Chilumba. Most of this equipment is in good working condition and the shipyard, as presently equipped, would be essential for the maintenance and repair of vessels in a new Lake Service.

Slipway -- The slipway at Monkey Bay includes rails, foundations, cradles and winches necessary to haul vessels out of the water for repair and maintenance of underwater hull, propulsion and rudder. It also provides the space and facilities for vessel newbuildings. The slipway was substantially rebuilt, strengthened and extended in 1991 for building the container vessel. In general, it is in satisfactory condition for normal repair work. However, the winches provided in the 1991 rebuilding have failed to operate and, consequently, vessels have to be hauled by means of very old manual winches of very limited capacity. The power winches are scheduled to be replaced this year. In a new Lake Service the slipway would be necessary for future vessel newbuildings as well as for vessel repair and maintenance.

Floating Drydock -- The floating drydock at Monkey Bay provides the capability for lifting the Lake Service's larger vessels out of the water for underwater repair and maintenance. However, with current dimensions and lifting capacity, it is unable to dry dock either the container vessel or the large barge (VIPHYA). Furthermore, built in 1949, the dock machinery and equipment is somewhat out of date. These problems will be resolved by the end of 1994, however, when a rehabilitation contract currently underway to renew and expand the dock is expected to be complete. On completion of this project, the dry dock will be fully capable of handling all necessary repair and maintenance for vessels likely to be in service in a new Lake Service company.

Container Terminals -- The container terminals are operated by the government Ministry of Transportation and Communication and therefore are not considered Lake Service assets. However, they are essential to the container operation and, therefore, have been included in this valuation. These facilities include a quay with berthing facilities and container storage areas as well as a modern gantry crane at each end of the lake -- Chipoka in the south and Chilumba in the north. They were constructed in 1991 and the valuations in this report are based on that cost of construction.

IV. VALUATION OF ASSETS FOR A NEW LAKE SERVICE

Valuations of the assets that are potentially viable in a new Lake Service have been estimated on the basis of book value, depreciated replacement value, and market value. The results of these valuations are presented in Table IV-1. The methodology followed in deriving these valuations is described below.

TABLE IV–1: VALUATION OF LAKE SERVICE ASSETS
Estimated Valuations in Millions US Dollars

Asset	Date in Service	Book Value	Depr. Repl. Value	Market Value	Notes
Vessels:					
Container Vessel KWACHA	1991	2.83	7.18	1.64	(1)
Tanker UFULU	1984	0.26	2.41	0.82	
Cargo Vessel KARONGA	1976	0.02	0.55	0.18	
Tug/Barge VIPHYA	1975	0.05	0.66	0.26	
Passenger Vessel ILALA	1950	0.09	0.07	0.07	(2)
Passenger Vessel MTENDERE	1980	0.28	2.57	0.11	(2)
Shipyard:					
Slipway/Jetty	1991	0.36	1.02	N/A	(3,4)
Floating Dry Dock	1949	0.00	0.05	0.05	(5)
15 ton Crane	1991	0.08	0.22	0.22	(6)
5 ton Crane	1991	0.01	0.03	0.03	(6)
Precision Lathe	1991	0.01	0.03	0.03	(6)
Other Machine Tools	1991	0.05	0.15	0.15	(6)
Dockyard Land & Workshops	--	--	--	0.53	(7)
Ports (Chilumba & Chipoka):					
Container Terminal	1991		6.08	N/A	(4)
Gantry Cranes	1991		3.95	N/A	(4)
Non–Marine:					
Housing & Land	--	--	--	1.05	(7)
TOTAL		$4.03	$24.99	$5.14	

Notes:

1) Container vessel KWACHA was built in 1991 but has not yet entered service. Therefore no depreciation has been applied to either book value or depreciated replacement value.
2) Market value is vessels's scrap value because the passeneger vessels are unable to generate a positive income stream.
3) The main value in the slipway is represented by the 1991 rehabilitation.
4) A market value is not determinable because no market exists for these facilities other than their present use.
5) The market value is the dry dock's scrap value bocause of it's poor condition. However rehabilitation work costing $0.68m is currently underway and due to be completed end 1994.
6) Market value for machine tools and equipment is equated to depreciated replacement value becuase this equipment would have a ready market in other industries.
7) Market values for land and structures have been taken direcly from the Mullock study, converted to US dollars.

Book Value -- Book values have been determined from Malawi Railway records to the extent possible. The latest records available, however, were for end March 1991 and they exclude some key assets. The assets excluded are the cargo vessel KARONGA and the tug and barge VIPHYA all of which were apparently transferred to the Lake Service from other organizations but were never entered into the Lake Service books. The Malawi Railway book values are based on original cost in Malawi Kwacha and a straight line depreciation to zero residual value generally over 25 years. Unfortunately, the devaluation of the Kwacha over past years renders these book values essentially meaningless -- particularly for the older assets.

Physically most of these assets can, and do, last a lot longer than 25 years. In the fresh water lake environment corrosion is minimal and vessels can last almost indefinitely. For example, the 1899 built CHAUNCY MAPLES has only recently been withdrawn from service.

In this analysis, the book values provided by the Malawi Railway have been adjusted to end March 1994 by simply extending the straight line depreciation reflected in the Railway books. In addition, book values for the missing assets (KARONGA and VIPHYA) have been estimated based on available information on original cost and assuming a 25 year life with no residual value.

Depreciated Replacement Value -- Depreciated replacement value is the new replacement cost of the asset, delivered in Malawi, and depreciated by the age of the asset. In general, new replacement vessel costs in Malawi do not reflect typical international shipbuilding prices because of the unusual transportation and assembly requirements and because of the unusually small sized vessels required for the lake. Therefore new replacement cost has been estimated on the basis of the actual historical experience in Lake Malawi newbuildings. Original costs were determined for the container vessel KWACHA (contracted 1989), the tanker UFULU (1981), and the passenger vessel MTENDERE (1980). These costs were converted to US dollars and then projected forward to 1994 using a shipbuilding price index (Ref. Clarksons) on the basis that Malawi vessel costs will move in tandem with international shipbuilding prices, although from a different base.

For the remaining, older, vessels a different approach was used because changes in shipbuilding practice over the years make the original costs of these vessels virtually irrelevant. Instead of projecting original costs forward, new replacement cost was estimated on the basis of light vessel tonnage. Cost per light tonne for the three recent newbuildings mentioned above were considered to be representative for a Malawi newbuilding. This per light tonne cost of new vessels, with some adjustment for size and complexity of the vessel, was then applied to the light weight of each of the older vessels in order to estimate its new replacement cost.

New replacement costs for non-vessel assets (shipyard equipment) were generally estimated from original cost (as per Malawi Railway books) converted to US dollars and projected forward to 1994 by the US CPI index.

In all cases, depreciated replacement values were finally derived by depreciating for actual age

of the asset on the same basis as the asset is depreciated in the Malawi Railway books.

Market value -- A market value, reflecting the price these assets would fetch in an open market, is of course most difficult to determine. In essence, there is no market for the vessels because there are no competing lake operators who might bid for them and because it would be entirely infeasible to dismantle the vessels, transport and re-assemble them in another operating area (lake or sea). The vessel market values are, therefore, somewhat subjective and are based on assumptions that may or may not be entirely valid.

The approach used to estimate vessel market values is to, first, estimate a potential earning stream from operating the vessel in the intended lake service, assuming that it could be utilized according to normal maritime industry practice at current cargo freight rates. This means relatively continuous service (about one round trip per week on typical lake routes) at good load factors. It assumes that sufficient cargo would be available to support such level of utilization but no effort has been made in this study to establish the validity of this cargo market assumption.

In estimating this earning stream, vessel costs have been estimated from the Malawi Railway 1994/95 budget. Detailed earning and cost assumptions are given in an appendix to this report.

The net present value of the vessel's earning stream, so determined, projected out to a 25 year vessel life and discounted at a real 5 percent discount rate (no inflation), is then calculated as an estimate of the market value of the asset in the assumed cargo market. In essence, the market value is then the net present value of the vessel's potential earnings, assuming that there is sufficient cargo available at current freight rates to fully employ the vessel. In the cases where potential earnings are projected to be a loss (the passenger vessels) market value is estimated at the vessels scrap value.

For the non-vessel assets, market value is simply taken as depreciated replacement value on the basis that these assets could be used interchangeably in other industries. For land associated with the Monkey Bay shipyard, market values have been reported directly from the Mullock study (see Bibliography), after conversion to US dollars at the then current exchange rate.

V. CONCLUSIONS

The Lake Service Division of Malawi Railways provides, or is prepared to provide, shipping services on Lake Malawi that include container, oil tanker, dry cargo and passenger services. In addition, they have the facilities to provide the repair and maintenance work necessary to maintain their fleet as well as provide some outside contracting work for repair of government vessels and commercial fishing vessels.

At present, however, much of the Lake Service's fleet is very much under-utilized. the container vessel has not operated since delivery due to lack of water depth at the container ports.

The tanker, although well utilized a few years ago, has had very little cargo in recent months with most oil shipments moving by road. The dry cargo vessels have had more business but, operating on a spot contract basis, cargos have been relatively few and irregular. The passenger services are somewhat better utilized, however, with a low fare structure and inadequate load factors, they operate at significant losses.

In anticipation of restructuring, the Lake Service management is eager to resolve these problems with a more market-oriented approach. However, it is not clear at this point if there is sufficient market to support these services on a commercial basis. In this study, for the purpose of estimating a market value for the fleet it has been assumed that sufficient cargo could be available, at current freight rates, to operate the vessels according to normal maritime practice (i.e., continuous operation) and market valuations have been based on earnings potential from full operation. No attempt has been made, however, to verify the assumption that sufficient cargo does indeed exist.

After viewing the fleet and the land-based facilities, the following were identified as potentially viable in a new Lake Services company:

Containership, KWACHA -- New in 1991, and barely operated since, this vessel is modern, well equipped and well maintained. It's depreciated replacement value is estimated at a little over $7 million. Its market value, however, is estimated at less than $2 million based on the relatively low earnings potential in this freight market.

Product Tanker, UFULU -- Also modern, well equipped and well maintained, this vessel's value is estimated at $2.4 million depreciated replacement value and a little under $1 million market value. At current freight rates, it also appears to have a relatively low earnings potential even if fully employed.

Dry Cargo Vessel, KARONGA -- Although 18 years old and not in conformance with modern pollution control and crew living standards, this vessel is in satisfactory condition and potentially could generate a positive earnings flow. It is valued at $0.5 million depreciated replacement value and $0.2 million market value. The two remaining cargo vessels are too small and too old to be viable.

Tug/Barge, VIPHYA -- These vessels appear to be in good condition and could be viable if sufficient cargo can be generated. A stated intention is to operate them as a container carrying barge service. They are valued at about $0.7 million depreciated value and $0.25 million market value.

Passenger Vessel, MTENDERE -- At 14 years of age this vessel's depreciated replacement value is estimated at about $2.5 million. It has no significant market value because it appears unlikely that it could ever generate positive earnings. It has, nevertheless, been included as potentially viable in the new company on the basis that passengers may be subsidized as essential services.

Passenger Vessel, ILALA -- Over 40 years old, this vessel has no significant depreciated replacement value. It, too, can be considered potentially viable in the new company only if passenger services are to be subsidized. The remaining passenger vessel, the 1899 built CHAUNCY MAPLES, is in poor condition and is not considered viable for the new service.

Shipyard at MONKEY BAY with workshops, slipway and drydock -- These facilities are considered essential to a new Lake Service company for repair and maintenance of the fleet. Together, they have an estimated depreciated replacement value of $1.5 million.

The assets listed above are considered potentially viable in a new Lake Services company, provided sufficient cargo could be generated at current freight rates and provided that passenger services would receive financial support.

Appendix I

Vessel Technical Details

1) Container Vessel KWACHA: Built 1991 (Germany)

Dimensions:	LOA: 61.5m, Draft: 2.4m
Hull:	double bottom, double side
Cargo Capacity:	750 dwt, 68 TEU (44 under deck)
Cargo Gear:	none
Machinery:	2 X 624 bhp Caterpillar
Propulsion:	twin screw, twin rudder
Speed:	10 knts
Crew:	12 total

2) Product Tanker UFULU: Built 1984 (Germany)

Dimensions:	LOA: 45.35m, Draft: 2.6m
Hull:	double bottom tanks, segregated ballast
Cargo Capacity:	330 dwt, 8 tanks, 1 dry hold
Cargo Gear:	2 X 1000 l/min pumps, 1 X 5 tonne crane
Machinery:	2 X 490 bhp Cummins
Propulsion:	twin screw, twin rudder
Speed:	10.5 knts
Crew:	14 total

3) Cargo Vessel KARONGA: Built 1975 (Germany)

Dimensions:	LOA: 43.1m, Draft: 2.1m
Hull:	single skin,
Cargo Capacity:	300 dwt, 2 dry holds, wing cargo tanks
Cargo Gear:	none
Machinery:	1 X 260 bhp Caterpillar
Propulsion:	single screw
Speed:	8 knts
Crew:	12 total

APPENDIX I: VESSEL TECHNICAL DETAILS (cont.)

4) Tug/Barge VIPHYA: Built 1975 (Germany)

Dimensions:	LOA: 16m, Draft: 2.2m (tug)
	LOA: 53m, Beam: 12m, Draft:1.55m (barge)
Hull:	single skin
Cargo Capacity:	600 dwt in single tank or dry on deck
Cargo Gear:	none
Machinery:	1 X 725 bhp Caterpillar (tug)
Propulsion:	single screw (tug)
Speed:	8 knts (tug)
Crew:	10 total (tug)

5) Passenger Vessel ILALA: Built 1950 (UK)

Dimensions:	LOA: 52.4m, Draft: 2.24m
Hull:	single skin
Cargo Capacity:	180 dwt, 1 hold
Passenger Capacity:	about 400 in 2nd class; 11 in 1st class
Cargo Gear:	1 X 1.5 tonne boom
Machinery:	2 X 425 bhp Cummins
Propulsion:	twin screw
Speed:	12 knts
Crew:	42 total

6) Passenger Vessel MTENDERE: Built 1980 (Germany)

Dimensions:	LOA: 50.7m, Draft: 2.4m
Hull:	dble bottom, intl. subdivision standard
Cargo Capacity:	about 200 dwt, 1 hold
Passenger Capacity:	420
Cargo Gear:	2 X 0.5 tonne hoist
Machinery:	2 X 490 bhp Cummins
Propulsion:	twin screw, twin rudder
Speed:	12 knts
Crew:	44 total

7) Floating Drydock: Built 1949 (UK)

Dimensions:	entrance width: 11m; overall length: 49m depth 6.6m
Lift Capacity:	designed for 450 tonnes
Being rebuilt to:	15m entrance width
	850 tonne lift capacity

Appendix II

Estimated Earning Capacity of Key Lake Service Assets

1) Container Vessel KWACHA:

Revenue per TEU	117 US dollars	
Vessel TEU Capacity	68 each way	
Load Factor	80%	
Annual Voyages	50 round	
Annual Revenue ($000)	---------->	636
Daily Operating Cost	720 US dollars	
Days per year	365	
Annual Running Cost ($000)	---------->	263
Fuel Cost	380 US dollars per ton	
Daily Fuel Consumption	3.0 tons per day	
Days per Voyage	4.5 per round	
Annual Voyages	50 round	
Annual Fuel Cost ($000)	---------->	257
Annual Contribution to Capital ($000)		117

2) Tanker UFULU:

Revenue per cargo tonne	42 US dollars	
Vessel Cargo Capacity	300 tonnes	
Load Factor	80%	
Annual Voyages	50	
Annual Revenue ($000)	---------->	504
Daily Operating Cost	720 US dollars	
Days per year	365	
Annual Running Cost ($000)	---------->	263
Fuel Cost	380 US dollars per ton	
Daily Fuel Consumption	1.9 tons per day	
Days per Voyage	4.5 per round	
Annual Voyages	50 round	
Annual Fuel Cost ($000)	---------->	162
Annual Contribution to Capital ($000)		79

APPENDIX II: ESTIMATED EARNING CAPACITY OF KEY LAKE SERVICE ASSETS (cont.)

3) Cargo Vessel KARONGA:

Revenue per cargo tonne	45	US dollars	
Vessel Cargo Capacity	175	each way	
Load Factor	80%		
Annual Voyages	50	round	
Annual Revenue ($000)	---------->		315
Daily Operating Cost	590	US dollars	
Days per year	365		
Annual Running Cost ($000)	---------->		215
Fuel Cost	380	US dollars per ton	
Daily Fuel Consumption	0.6	tons per day	
Days per Voyage	6.0	per round	
Annual Voyages	50	round	
Annual Fuel Cost ($000)	---------->		65
Annual Contribution to Capital ($000)			35

4) Tug/Barge VIPHYA:

Revenue per TEU	103	US dollars	
Vessel TEU Capacity	25	tonnes	
Load Factor	80%		
Annual Voyages	45		
Annual Revenue ($000)	---------->		185
Daily Operating Cost	300	US dollars	
Days per year	365		
Annual Running Cost ($000)	---------->		110
Fuel Cost	380	US dollars per ton	
Daily Fuel Consumption	0.3	tons per day	
Days per Voyage	5.5	per round	
Annual Voyages	45	round	
Annual Fuel Cost ($000)	---------->		24
Annual Contribution to Capital ($000)			52

Appendix III

BIBLIOGRAPHY

Malawi Railways Restructuring Project (RRP), World Bank Appraisal Mission - April 1994 Aide Memoire

Malawi Railways, Lake Service Division Asset Register

Draft Operating Budget for Year Ending 31 March, 1995 (Revised), April 1994

Lake Service memo to Board "Current State of Vessels", undated (about March 1994)

Valuation Report for Malawi Railways Ltd., Chris Mullock, December, 1993.

Container Vessel Lake Malawi -- Tender Documents, Lahmeyer International Gmbh, Frankfurt, January 1989

Technical documents relating to container vessel delivery, Deggendorfer Werft und Eisenbau GmbH, Hamburg, 28 June 1991

Contract Specification for a 300 dwt Bulk Oil Tanker for Lake Malawi Service, Deggendorfer Werft und Eisenbau GmbH, Deggendorf, Germany, 2 December 1981

Shipbuilding Contract Between Malawi Railways Limited and Deggendorfer Werft und Eisenbau, Germany, December 1981

Specification No 2.007.78-8060 9-03 of a Passenger Vessel, Between Malawi Railway and Schlichting-Werf, Hamburg, Germany, 19 January 1979

Malawi Railways Project Submission, Project Title: Replacement of Mv NKHWAZI and MPASA by One Cargo Vessel of 400 Tonnes Deadweight, Letter dated 16 July, 1993

Contract for the Rehabilitation of the Monkey Bay Floating Dock, Malawi Railways Ltd. and Brown & Clapperton Ltd., Blantyre, 24 September 1993

Malawi Ministry of Transport and Communication, Marine Dept. letter No 3/3/12/14 relating to inspection of Mv Chauncy Maples, 24 February 1994

Various vessel maintenance records and files kept at Lake Service, Monkey Bay

APPENDIX III: BIBLIOGRAPHY (cont.)

Lake Service internal memo, "Inventory and Valuation of New Plant and Machinery", Monkey Bay, 5 October 1993

Lake Service internal memo, "NTC Funded Assets at Monkey Bay", Monkey Bay, 16 December 1993

Specifications, Ellicott Series 370 Transportable Hydraulic Pipeline Dredges, 26 July 1988

Newbuilding Report, Clarkson Research Studies Ltd, April 1994

Lloyds Shipping Economist, London, May 1994

Appendix IV

LIST OF CONTACTS

Lake Services, Monkey Bay:

Mr. Albert Nkana, Lake Service Manager

Mr. Kingsley Likukuta, Shipping Services Manager

Mr. Joshua Chitsonga, Senior Marine Engineer

Mr. Isaac Liva, Marine Engineer - Workshops

Mr. Gracious Chitwanga, Marine Engineer - Slipway and Floating Dock

Mr. Denny Kalua, Operations Superintendent

Malawi Railways, Limbe:

Mr. Frank Markham, General Manager

Mr. Stephen Takomana, Corporate Planning Manager

Mr. K. Karan, Financial Planning Officer

Mr. Dick Msyani, Supplies Manager

USAID, Lilongwe:

Mr. William Brands, Project Development Officer

Appendix V

List of Acronyms

bhp	Brake Horse Power
CPI	Consumer Price Index
dwt	Dead Weight Tonnes/Tonnage
hp	Horse Power
LOA	Length Overall
TEU	Twenty-Foot Equivalent Unit
USAID	United States Agency for International Development