APPENDIX I

FINANCE

APPENDIX I

FINANCE

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1. PAST AND PRESENT FINANCIAL PERFORMANCE

1.1 General

The Finance Department and the Accounting Department share the responsibility for preparing the annual operating and investment budget statements. The budget statements are submitted to the national Ministry of Finance for approval every year. The Ministry of Finance controls most aspects of DAWSSA's fiscal management by: approving spending plans, setting salary, wage and benefit levels, prescribing the accounting practices, subsidizing revenue deficits to cover operating costs, paying principal and interest on loans, providing funding for investment projects, providing subsidy to cover the foreign currency costs of purchasing materials, auditing all accounts annually. In the following text, all costs are expressed in Syrian pounds SL unless otherwise stated.

1.2 Financial Accounting

DAWSSA's accounting function is centralized. The existing accounting system is paper based and labor intensive. Computers are used at the end of the year to tabulate income & expenditure statements, and balance sheets. The system is based the commercial cash accounting principle. This is different than fund accounting practices typically used by many non-profit seeking public authorities in developing countries. The system is sound in that it allows for financial accountability but it does not lend itself well to the accountability of public funds since it is difficult to identify the sources of different funds and the purpose for which they may be lawfully used. For example, funds collected from network improvement charges are not separated from funds collected for water meter maintenance or consumption tariffs. All income is lumped together and applied against the expenses encountered. In general the accounting of income is delayed by an inefficient billing and collection process. For example the accounting department is unable to provide an actual balance sheet for 1995 because income from the last quarter of 95 billings have not yet been collected. This means the 1996 fiscal year will almost be finished before the accounting department can close the books for 1995 and provide management with an accurate account of DAWSSA's financial performance for 1995. Meanwhile DAWSSA management lacks the information required to plan for the 1997 budget year. The lack of timely financial information seriously hampers management's ability to control costs and plan for the future. The lack of cost accounting also makes it impossible identify and to control operating and maintenance expenditures for various parts of the organization.

1.3 Revenue Billing and Collection

The separation of financial management into three departments has created a number of organizational inefficiencies which have not yet been resolved. The billing and collection process is a good example of the lack of functional integration between Departments.

The Customer Relations Department is responsible for meter reading, and collecting revenue. The number of metered connections has increased by 12% over the 1990-95 period to a total of 248,672 meters in 1995. This growing work load, coupled with inadequate staffing levels and a general lack of efficiency have resulted in a meter reading interval that has slipped from 3 months to 6 months.

The Accounting Department prepares billing statements based on the readings provided from the Customer Relations Department. Bills are prepared for separate quarters by averaging the 6 month meter readings. The accounting department uses a computer to prepare the billing statements for each subscriber connection. The process of preparing the billing statements can take up to 2 months. Once the billing statements are printed, they are sent to the Customer Relations Department for verification and detection of possible anomalies related to meter reading errors. This verification is carried out manually and can take up to 2 months.

The verified billing statements are then sent back to the accounting department which re-enters the corrected data and re-issues the billing statements. This process can take up to 1 month. On average the complete billing preparation process internal to DAWSSA's administration takes about 5 months from the time the meter readings are obtained.

Bills are then issued to one of 26 billing collection centers located throughout the City. Customers are notified by public announcement in the newspaper that the statements have been issued and are requested to pay at the local bill collection center. Payments are due within 2 months of notification. Customers who do not pay within the required time are given a second notice delivered in person by the meter reader. On average approximately 65% of customers pay on time. Another 20% of customers pay within one month of receiving the second notice. When payment is not received after three months, sanctions such as service disconnection can be imposed on consumers. Enforcement of sanctions for non-payment appears to be largely at the discretion of the meter readers and in most cases, sanctions are not imposed on economically disadvantaged families. Out of the 15% of consumers who ignore second notices for late payment almost 65% pay after having been disconnected. The remaining unpaid bills are shown as a bad debt and on on-going effort is made by DAWSSA to collect since the government does not allow writing these off as a loss. It takes on average about 5 months for DAWSSA to receive payment once a bill is issued.

The total process of billing and collection takes about 10 months from the time the meter is read to the time the payment is received.

1.4 Tariff

Maximum water tariffs are set uniformly by the Central Government for the whole country. No variations are permitted to reflect the individual operating costs of each water supply utility. The national billing tariff applicable to DAWSSA as of 1994 is as follows:

Category	Rate (SL/m^3)
Domestic	
0-20 m3/month	2.00
21-30 m3/month	3.00
31-60 m3/month	7.50
over 60m3/month	9.00
Government Departments & Institutions	5.00
Industries, Commerce and Tourism	12.0

The current tariff structure was established by decree in 1974. Since 1985, tariffs have been adjusted every three years except for a tariff increase which took place in 1994, only one year after the 1993 tariff increase. Tariffs have increased sharply by around 50% per year and in some cases by more than 100%. Tariffs, and miscellaneous water charges are shown in Table I-1.1. Domestic consumption is charged on the basis of a stepped tariff structure where unit rates for consumption become progressively higher with increased consumption. Other non-domestic consumers pay on the basis of a fixed tariff structure where the unit rate remains constant. There is a minimum monthly consumption charge of 18 m^3 for domestic and 9 m^3 for commercial, however there is no minimum flat rate charged for unmetered connections.

The average tariff, defined as the total annual water billing divided by the annual metered consumption from all connections, has increased substantially over the last five years from SL 2.17 per m^3 in 1990 to SL 4.62 per m^3 (US 11 cents) in 1995. However, this tariff is low compared to the average urban water tariff paid in other MENA countries. For example, the average tariff in Jordan is 38 cents US per m^3 and in Morocco ranges from 44 cents to $1.35 US. The median average water tariff based on a survey of 38 utilities in Asian and South Pacific countries is around 20 cents US per m^3.

A review of all 1995 billing was carried out as part of our assessment of water tariffs. DAWSSA's computer was used to tabulate the number of bills and usage for each customer class by billing district and by consumption band for each quarter of billing. The cumulative billed consumption for each customer class is tabulated in Tables I-1.2 to I-1.5. A comparison of the billing, shown in Table I-1.6 for each quarter shows no large seasonal variations which

is not consistent with the large difference between winter and summer production quantities. This is likely the result of averaging effects caused by the large meter reading intervals which has slipped to 6 months.

Total consumption by customer class for 1995, as derived from the billing analysis, are summarized in Table I-1.7. Domestic users accounted for 80% of the total metered water use and 63% of total water sales. A tariff ratio of 6 for industrial to domestic (for 20m^3/month) indicates the tariff structure is intended to provide a strong cross subsidy from commercial, and industrial users to domestic consumers. Unfortunately industrial & commercial consumption represents a very low 4 % of the total metered consumption and generates only 14% of the total revenues. This provides only a modest cross subsidy to residential users. On the other hand, there is a strong cross subsidy within the domestic class. For example larger volume domestic users (over 30 m3/month) account for 20% of the metered consumption and 40% of the income, whereas low volume consumers (less than 20 m3/month) account for 32 % of the metered consumption and only 16% of the income.

Until 1986, domestic users were allowed to purchase water rights for a one time lump sum payment. The water right allowed customers to consume from 0.25 to 1 m^3 per day, depending on the type of agreement, free of tariff charges in perpetuity. The total water consumed free of charge under water right agreements is metered but not billed and represents 20% of the total metered consumption. The billing analysis also revealed that customers with water right agreements tend to have a higher per capita consumption. This indicates that demand can likely be influenced by pricing policy.

1.5 Income & Expenditure Statements

A summary statement of incomes and expenditures for the last five years is shown in Table I-1.8. The figures indicate that in terms of revenue growth, the financial performance of DAWSSA has improved significantly over the 1990-95 period; improving from a pre-tax net income of SL 5.5 million in 1990 to SL 252.5 million in 1995. Water sales reached SL 293.5 million and accounted for 80% of revenues in 1995. The balance of revenue is generated from the sale of material and labor related to making service connections on a cost recovery basis.

The average revenue per m^3 sold has more than doubled from SL 2.17 to SL 4.62 over the 1990-95 period. This large improvement was the function of: i) the substantial increases in tariffs, and ii) the increase in the number of metered connections. Production has also increased substantially over the same period however the percentage of water sold has decreased from 34% in 1990 to 29% in 1995. There has been a corresponding increase in unaccounted for

water use from 56% to 65% over the same period, possibly indicating increased losses in an aging distribution network, or an increase in informal use or both.

A review of the DAWSSA income statement reveals the following observations:

a) Staffing and Salaries. While staffing levels have remained more or less constant at around 1300 employees, salary costs have increased by 220% over the 1990-95 period. Salary costs are the largest component of direct operating have remained stable at about 50% of direct operating expenses during the 1990-95 period.

b) Energy. Energy is the second largest component of direct operating expenses, accounting for 22% of operating expenses in 1990 and 21% in 1995. This is a relatively small amount for a large utility due to: i) the use of diesel generators for pumping at well sites which are not electrified; and ii) low electricity tariffs. In line with the development of a free market economy there will likely be a significant increase in electricity tariffs in the near future. Because DAWSSA is increasingly dependent on pumped water supplies it is clear that improving the efficiency of pumping operations and equipment is of the utmost importance to reduce energy costs.

c) Maintenance. DAWSSA financial accounting system does not separate costs related for maintenance. Estimated maintenance figures are shown in Table I-1.8. The data indicates that total maintenance costs for civil structures, buildings & grounds, and the water distribution system is about 16% of annual direct operating expenses. Based on DAWSSA's estimates, the amount of maintenance related to the water distribution system only is about 10% of total annual direct operating expenses. This relatively low proportion may indicate a significant level of deferred maintenance.

d) Service fees. Service fees in 1995 reached a high SL 36 million and accounted for 16% of direct operating expenses. Service fees include approximately SL 15 million for maintenance contract services, SL 6 million for equipment and transportation rentals, 1.5 million for insurance and 14 million classified as miscellaneous services expenses. By removing the amount spent on maintenance contracts, the percentage of total expenditures is reduced to 10 % which is still considered a relatively large proportion of DAWSSA's operating expenses. Without accurate cost accounting it is difficult to explain this rather high level of expenditure. Much of the expenditure appears to be related to specialized equipment and fleet vehicles. DAWSSA should evaluate to cost benefit of owning it's own fleet and specialized equipment pool rather than renting.

1.6 Balance Sheet

A summary of the balance sheet for the 1990-95 period is shown in Table I-1.9. Substantial increases in pre-tax revenue have not resulted in a corresponding improvement in the overall financial position for DAWSSA. Accounts receivable for example have remained very high and increased from 160% of total revenue in 1990 to 190% in 1995 representing an equivalent of 23 months of sales. Accounts payable have also remained high and fluctuated widely from 98% of direct operating costs in 1990 to 229% in 1995. This substantial increase is mostly due to an increase in the investment spending programs over the 1993-94 period. Large contract holdbacks and performance bonds associated construction contracts have contributed to increases in accounts payable.

The annual depreciation allowance has increased over the 1990-95 period from SL 32 million in 1990 to SL 54 million in 1995. However as a percentage of total expenditures, depreciation has decreased from 25% in 1990 to 20% in 1995. All assets except land are depreciated as shown in Table I-1.11. In general the asset values appear to be considerably lower than the replacement costs. For example the JICA study team estimate for the cost per km of the water distribution network is approximately SL 5200 per km. There is an estimated 1000 km of water main in service which puts the replacement cost at SL 5,200 million (US$ 124 million). However, the book value shown by DAWSSA is only SL 445 million (US$ 10.6 million) which is a factor about 12. Fixed assets have never been re-valued since DAWSSA's inception. An auditor's report dated April 1983 recommends asset values be adjusted to reflect replacement cost but no action was taken by the DAWSSA or the central government.

1.7 Sources and Application of Funds

DAWSSA's operating income has increased rapidly in the last five years due to large tariff increases in 1991, 93 & 94. As shown in Table I-1.10 the total sources of funding increased substantially in 1993 to SL 900 million with the influx of substantial investment loans but have decreased since then to SL 564.8 million in 1995. Operating income before taxes accounted for only 14% of all funding available to DAWSSA. Loans over the 1990-95 period have accounted for 50 to 70% of total funding sources provided to DAWSSA. This relatively high proportion indicates a large dependency on local government and foreign loans.

The use of funds has generally exceeded the funding provided. The total use of funds in 1995 was larger than the total sources of funding resulting in a net shortfall in working capital. The total use of funds increased dramatically in 1993 because of an increase in capital investment. Capital investment in 1993 reached SL 334.2 million which represented a 435%

increase over 1992 levels. Capital investment has remained high but has decreased since 1993 to 240 million in 1995. Although the amounts invested in new capital projects has fluctuated, capital investment as a percentage of total available sources of funding has increased steadily from 28% in 1990 to a high of 43% in 1995. This trend indicates DAWSSA's commitment to provide new infrastructure and improve services to a growing population.

In general the amount of loan funding directed towards investment projects has fluctuated widely over the 1990-95 period. On average about 53% of all funding obtained from loans is directed towards spending on investment projects. In general there has been a decreasing trend in the ratio of capital investment to loans received from 55% in 1990 to 41% in 1995. There has been a corresponding increase in debt service over the same period from 36% of total sources in 1990 to 63% of total sources in 1995. The large increase in debt service in 1995 combined with a decrease in accounts payable resulted in a shortfall in net working capital of SL 78 million. This large shortfall indicates that the water tariff needs to be increased to cover the cost of existing investment spending levels and debt service charges from loans.

1.8 Investment Spending and Financial Planning

A five year plan for the 1996-2000 period identifies future capital projects, total estimated costs and a spending plan for each year of the plan as shown in Table I-1.12. The plan also provides an estimate of water sales, revenue and operating expenses over the period but there is no mention of what impact the plan will have on tariffs or where the funding will come from.

The total costs for the period are summarized and split into local resources consisting of Syrian and foreign currency components, and external resources. Investment spending is divided by DAWSSA into three categories: i) replacement & rehabilitation; ii) new projects ; and iii) on-going projects started before the planning period. DAWSSA plans to invest a total of SL 1,368 million over the 96-2000 period. Approximately 12% will be spent on rehabilitation of existing infrastructure, 80% will be spent on completing various projects started during the 1990-95 period and only 8% will be spent on new projects. This indicates that the ambitious capital program expansion which took place in 1993-94 will continue to keep DAWSSA's resources fully occupied until at least the year 2000. Any further increases in capital spending over this period must be carefully evaluated to determine the impact on existing DAWSSA human resources, especially those related to engineering, project management and contract administration.

The level of detailed planning provided by the engineering department for capital investment projects needs to be supported by the same high level of strategic financial planning.

It is particularly important for DAWSSA to estimate the impact that the many new investment projects will have on longer term operating and maintenance costs. More emphasis will be required on financial planning to cover the increasing costs of maintenance, and rehabilitation in order to protect DAWSSA's extensive investment in infrastructure.

1.9 Financial Management

DAWSSA has no clearly defined financial objectives. Historically the main aim of the utility has been to provide safe drinking water to domestic consumers at affordable levels. Heavy government subsidy has discouraged the concept of providing cost effective service. DAWSSA's ability to reform it's approach to operate on a more commercial basis is hampered by obstacles such as, politically determined tariffs, undercharging consumption by a large margin, and relatively high profit taxes. Effective use of available water and optimizing existing facilities has until very recently, not been a prime concern. This has resulted in the requirement to increase spending on costly water resources development schemes. Unless water demand management measures are implemented, capital costs will continue to grow and exert pressure on DAWSSA's already troubled financial situation.

The unit production cost has increased steadily over the 1990-95 period from SL 0.63 in 1990 to SL 0.97 per m^3 in 1995 which is equivalent to 2 cents US per m^3. This cost is very low because there is little treatment required and electricity used for pumping at well fields is very cheap. These low unit production costs are expected to increase significantly in coming years as extraction becomes more difficult, electricity tariffs increase and treatment costs increase with increased use of water resources of marginal quality. Although production costs are low, the average tariff per m3 sold is relatively higher. The average tariff reached SL 4.5 in 1995 equivalent to 11 cents US.

The operating ratio is the total annual operating costs including depreciation divided by the total annual revenue. The working ratio is the direct operating expenses (less depreciation) divided by the total annual revenue. These ratios indicate the extent to which tariffs cover the costs of providing water. The lower the ratios the better the performance. The operating ratio generally needs to be below 0.5 in order for a utility to fully cover all O & M costs, debt servicing charges, as well as build a reserve to contribute to the future financing of capital investment. DAWSSA's operating ratio has improved dramatically over the 1990-95 period from 0.95 in 1990 to 0.77 in 1995. The improvement is due to 3 substantial tariff increases during the period. The operating ratio reached a low of 0.61 in 1994. The operating ratio increased slightly since then to 0.77. This is an indication that a tariff increase will soon be required to keep pace with the growing costs of providing water. DAWSSA's working ratio has followed a similar trend reaching a low of 0.47 in 1994 and increasing to 0.61 in 1995.

The review of 1995 billings carried out for the tariff analysis was useful in identifying a significantly high number of potentially malfunctioning meters. Table I-1.13 identifies the estimated number of malfunctioning meters by customer class. Meters with a consumption less than 5 m^3 per 3 month period, including all zero readings, are assumed to be broken. In reality a small portion of the zero readings occur because meter readers can't gain access to the meters. However, this number is likely to be a small percentage and from a revenue point of view, and the effect on revenues is the same. The billing analysis indicates that, on average, meter malfunctions per user class are occurring in the following proportions: 33% for domestic meters, 56% for commercial meters, 48% for industrial meters, and 40% for government/institutional meters. These lost revenues could be as high as SL 98 million per year ($US 2.3 million) representing a potential increase over 1995 revenues of about 34%.

Another source of potential revenue is the large domestic population that remains unmetered. Based on JICA study team estimates there are approximately 407,000 informal users consuming an estimated 29.7 MCM per year. The potential revenue is conservatively estimated at SL 59.4 million based on the lowest domestic tariff of SL 2 per m^3. This represents a potential increase over 1995 revenues of 21%.

2. FUTURE FINANCIAL PERFORMANCE

Three significant factors impede good financial performance: 1) lack of explicit financial objectives, 2) inefficient billing & collection, and 3) lack of a cost accounting and management information.

2.1 Financial Objectives

(1) Pricing policy

DAWSSA needs to operate on a more commercial basis and should have the long term goal of becoming financially self supporting. The ability to provide cost effective services must be based on an appropriate water pricing policy aimed at recovering the true cost of services including operational costs, new infrastructure costs and long term rehabilitation costs. Changes in water tariffs are an issue which can only be addressed by the national government however DAWSSA must actively pursue this issue and lobby for change.

Since changes in the national tariff structure are not likely to occur in the short term it is recommended that DAWSSA pursue an aggressive water demand management program to reduce consumption. The benefits of deferring capital investment in expensive water resources schemes is of strategic importance to strengthening DAWSSA's financial position.

(2) Depreciation

The true cost of asset replacement needs to be recognized by an appropriate change in pricing policy. Fixed assets should be re-valued to reflect their actual replacement cost. The resulting increase in operating expenses needs to be reflected by an appropriate increase in tariff. Annual cash flow generated by depreciating assets should also be segregated into a special fund to be used strictly for the purpose of replacing or renewing existing fixed assets.

(3) Water demand management

An aggressive water demand management program is needed to reduce consumption and consequently defer the need to invest capital funds in expensive water resources development schemes. It is recommended that DAWSSA invest the time and effort required to assist it's consumers in reducing their water charges. Water demand management should focus primarily on large volume consumers by providing water audit surveys to identify sources of wasteful use and appropriate reduction strategies. The starting point should be the analysis of consumption trends for individual customers to identify unusual patterns or changing trends.

The water demand management function should be coupled with a public education program and an appropriate pricing policy to reduce water consumption.

2.2. Billing and Collection.

The unacceptably high level of receivable must be reduced in order to improve financial performance. A key factor in achieving efficiencies is the introduction of appropriate automation tools

(1) Meter reading

As a strategic first step, it is recommended that the number of meter readers be increased to a level that will allow reading on a quarterly interval. It is recommended that the a computerized data base be implemented in the Customer Relations Department to manage meter readings and screen for errors. The automation software should be fully integrated with the software recommended for the Accounting Department's billing and the accounting functions.

(2) Billing

The Accounting Department's existing computerized billing system needs to be completely replaced with a more modern, user friendly database system that can be networked and integrated with the meter reading function and the accounting function. The software package should provide management with the information required to make better informed decisions related to finance, planning and engineering functions. For example such information could consist of: consumption trends by consumer class, potential meter malfunctions, statistics on revenue by consumer class, unbilled and unaccounted for water.

Customer billing should be more frequent in order to speed up the cash flow from accounts receivable. Once the new automated billing system is in place, it is recommended that bills be issued on monthly on the basis of estimated consumption. Adjustments can be made on quarterly billings to reflect actual consumption obtained from meter readings. The accounting department's new billing system should also facilitate the task of preparing late payment listings and automatically issue late payment notifications.

2.3 Accounting and Financial Management Information System.

The whole of the accounting function should also be automated. The benefits include greater efficiency, ability to produce monthly trial balances, and development of a data base to support the fiscal management function. Suitable software packages are available in Japan,

Western Europe and North America which can integrate all billing, collection and accounting functions.

Automation provides an ideal opportunity to change the accounting system to provide cost accounting for important operating and maintenance cost centers within the organization. The benefits of cost accounting include improved cost control and the ability to provide management with regular and realistic measures of financial and operating performance for each important functional activity of the organization. In addition to the accounting system, there is a need to develop a financial planning tool to facilitate preparing the annual budget and multi-year budget forecasts. Linked with the automated accounting system to provide past cost trends, the budgeting tool can help management develop a better picture of future investment requirements and implications on tariff levels.

TABLES

Table 1-1.1 - National Tariff Structure

	Consumption charge (SL per m3)						
	1988	1991	% Increase	1993	% Increase	1994	% Increase
Domestic							
0-20 m3/month	0.50	0.75	150	1.25	167	2.00	160
21-30 m3/month	0.65	1.30	200	2.00	154	3.00	150
31-60 m^3/month [1]	1.25	3.00	240	5.00	167	7.50	150
over 60 m^3/month [2]				6.00		9.00	150
Commercial, Industrial & Tourism	1.25	4.00	320	8.00	200	12.00	150
Government, & Institutional	0.75	2.50	333	3.50	140	5.00	143

Minimum monthly consumption charge (SL/m^3)	
Domestic	18.0
Commercial, Industrial	9.0
Government, institutional	n/a
Annual fee (SL/ 0.5 m^3)	
Domestic	4.5
Commercial, Industrial	4.5
Government, institutional	n/a
Network maintenance fee	
Domestic	30.0
Commercial, Industrial	30.0
Government, institutional	n/a

Meter maintenance fee (service dia.)	consumer owned meter	rented meter
12, 13, 15 mm	2.5	4.5
20 mm	3.0	6.0
25 mm	4.0	9.0
30 mm	5.0	9.0
40 mm	7.5	15.0
50 mm	10.0	22.5
60 mm	12.5	30.0
65 mm	12.5	30.0
80 mm	15.0	45.0
100 mm or larger	17.5	60.0

Government taxes (SL)	0.1
DAWSSA system improvement surcharge added to total bill	1.00%

Table I 1.2 - Metered water use condition, domestic consumers with water rights (1995)

Quarterly Water Usage M3	Total Number of Bills in Block	Cummulative Bills Through Block	Use of Bills Stopping in Block	Cummulative Use of Bills Stopping in Block	Total Use to this Block of All Bills Passing Through Block	Cummulative Billed Usage M3/3 months	Cummulative Billed Usage %	Quarterly Water Usage M3
0	43,355	354,802	0	0	0	0	0.0%	0
5	52,171	311,447	33,304	33,304	1,296,380	1,329,684	5.6%	5
10	8,139	259,276	64,983	98,287	2,511,370	2,609,657	11.0%	10
15	8,045	251,137	104,944	203,231	3,646,380	3,849,611	16.2%	15
20	8,754	243,092	158,125	361,356	4,686,760	5,048,116	21.2%	20
25	9,856	234,338	227,350	588,706	5,612,050	6,200,756	26.0%	25
30	10,918	224,482	306,306	895,012	6,406,920	7,301,932	30.7%	30
35	11,684	213,564	386,188	1,281,200	7,065,800	8,347,000	35.1%	35
40	12,494	201,880	475,103	1,756,303	7,575,440	9,331,743	39.2%	40
45	12,879	189,386	553,817	2,310,120	7,942,815	10,252,935	43.1%	45
50	12,765	176,507	612,729	2,922,849	8,187,100	11,109,949	46.7%	50
55	12,795	163,742	678,174	3,601,023	8,302,085	11,903,108	50.0%	55
60	12,120	150,947	702,752	4,303,775	8,329,620	12,633,395	53.1%	60
65	11,316	138,827	716,550	5,020,325	8,284,315	13,304,640	55.9%	65
70	10,760	127,451	731,501	5,751,826	8,168,370	13,920,196	58.5%	70
75	9,828	116,691	717,310	6,469,136	8,014,725	14,483,861	60.8%	75
80	9,262	106,863	722,400	7,191,536	7,808,080	14,999,616	63.0%	80
85	8,418	97,601	698,502	7,890,038	7,580,555	15,470,593	65.0%	85
90	7,564	89,183	665,472	8,555,510	7,345,710	15,901,220	66.8%	90
95	7,177	81,619	667,075	9,222,585	7,071,990	16,294,575	68.4%	95
100	6,333	74,442	620,542	9,843,127	6,810,900	16,654,027	69.9%	100
120	19,864	68,109	2,180,512	12,023,639	5,789,400	17,813,039	74.8%	120
140	13,228	48,245	1,717,410	13,741,049	4,902,380	18,643,429	78.3%	140
160	9,034	35,017	1,354,916	15,095,995	4,157,280	19,253,275	80.9%	160
180	6,220	25,983	1,056,471	16,152,466	3,557,340	19,709,806	82.8%	180
200	4,276	19,763	812,753	16,965,219	3,097,400	20,062,619	84.3%	200
220	3,244	15,487	681,239	17,646,458	2,693,460	20,339,918	85.4%	220
240	2,345	12,243	539,226	18,185,684	2,375,520	20,561,204	86.3%	240
260	1,716	9,898	429,288	18,614,972	2,127,320	20,742,292	87.1%	260
280	1,360	8,182	367,363	18,982,335	1,910,160	20,892,495	87.7%	280
300	1,033	6,822	299,760	19,282,095	1,736,700	21,018,795	88.3%	300
330	1,213	5,789	381,865	19,663,960	1,510,080	21,174,040	88.9%	330
360	892	4,576	303,082	19,967,042	1,329,840	21,296,882	89.4%	360
390	604	3,694	226,208	20,193,250	1,205,100	21,398,350	89.9%	390
420	488	3,090	198,564	20,391,814	1,092,840	21,484,654	90.2%	420
450	401	2,602	173,292	20,565,106	990,450	21,555,556	90.5%	450
500	469	2,201	222,782	20,787,888	866,000	21,653,888	90.9%	500
550	379	1,732	198,116	20,986,004	744,150	21,730,154	91.3%	550
600	279	1,353	159,994	21,145,998	644,400	21,790,398	91.5%	600
>600	1,074	1,074	2,666,150	23,812,148	0	23,812,148	100.0%	>600
	354,802		23,812,148		173,377,185			

Source: Analysis of all DAWSSA billing issued in 1995

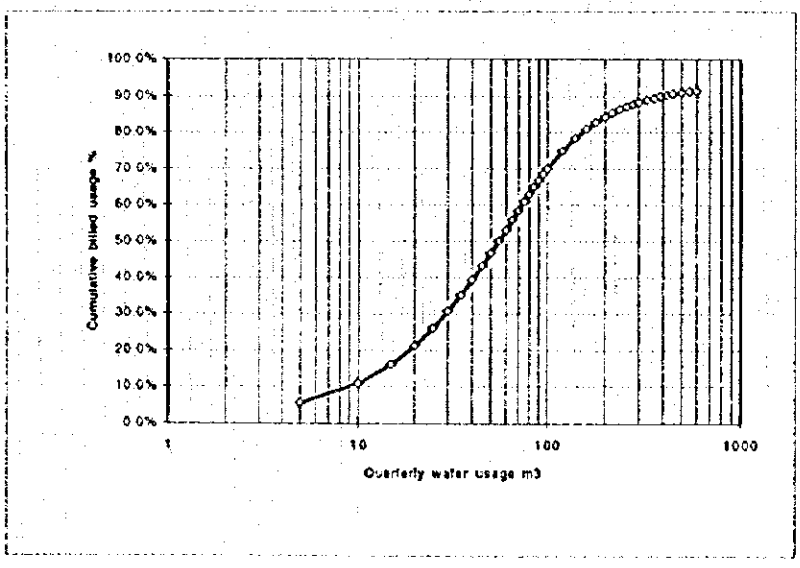

Table I-1.3 - Metered water use condition, domestic consumers without water rights (1995)

Quarterly Water Usage M3	Total Number of Bills in Block	Cummulative Bills Through Block	Use of Bills Stopping in Block	Cummulative Use of Bills Stopping in Block	Total Use to this Block of All Bills Passing Through Block	Cummulative Billed Usage M3/3 months	Cummulative Billed Usage %	Quarterly Water Usage M3
-	70,488	376,967	-	-	-	-	-	-
5	54,926	306,479	41,932	41,932	1,257,765	1,299,697	6.0%	5
10	9,973	251,553	79,663	121,595	2,415,800	2,537,395	11.7%	10
15	9,757	241,580	126,967	248,562	3,477,345	3,725,907	17.2%	15
20	10,939	231,823	197,331	445,893	4,417,680	4,863,573	22.5%	20
25	11,035	220,884	254,619	700,512	5,246,225	5,946,737	27.5%	25
30	11,940	209,849	334,695	1,035,207	5,937,270	6,972,477	32.2%	30
35	12,211	197,909	403,141	1,438,348	6,499,430	7,937,778	36.7%	35
40	12,562	185,698	477,686	1,916,034	6,925,440	8,841,474	40.9%	40
45	12,398	173,136	533,923	2,448,957	7,233,210	9,682,167	44.7%	45
50	12,182	160,738	584,764	3,033,721	7,427,800	10,461,521	48.3%	50
55	11,864	148,556	628,953	3,662,674	7,518,060	11,180,734	51.7%	55
60	11,133	136,692	645,735	4,308,409	7,533,540	11,841,949	54.7%	60
65	10,323	125,559	650,226	4,958,635	7,490,340	12,448,975	57.5%	65
70	9,789	115,236	661,359	5,619,994	7,381,290	13,001,284	60.1%	70
75	8,892	105,447	648,916	6,268,910	7,241,625	13,510,535	62.4%	75
80	8,235	96,555	642,283	6,911,193	7,065,600	13,976,793	64.6%	80
85	7,410	88,320	615,006	7,526,199	6,877,350	14,403,549	66.6%	85
90	6,887	80,910	605,911	8,132,110	6,662,070	14,794,180	68.4%	90
95	6,344	74,023	590,197	8,722,307	6,429,505	15,151,812	70.0%	95
100	5,805	67,679	568,650	9,290,957	6,187,400	15,478,357	71.5%	100
120	18,022	61,874	1,977,554	11,268,511	5,262,240	16,530,751	76.4%	120
140	11,732	43,852	1,523,269	12,791,780	4,496,800	17,288,580	79.9%	140
160	8,005	32,120	1,200,339	13,992,119	3,858,400	17,850,519	82.5%	160
180	5,631	24,115	956,400	14,948,519	3,327,120	18,275,639	84.4%	180
200	3,889	18,484	739,274	15,687,793	2,919,000	18,606,793	86.0%	200
220	2,934	14,595	616,761	16,301,554	2,565,420	18,869,974	87.2%	220
240	2,098	11,661	482,318	16,786,872	2,295,120	19,081,992	88.2%	240
260	1,678	9,563	419,395	17,206,267	2,050,100	19,256,367	89.0%	260
280	1,249	7,885	337,317	17,543,584	1,858,080	19,401,664	89.6%	280
300	981	6,636	284,383	17,827,967	1,696,500	19,524,467	90.2%	300
330	1,059	5,655	333,135	18,161,102	1,516,680	19,677,782	90.9%	330
360	765	4,596	263,120	18,424,222	1,379,160	19,803,381	91.5%	360
390	593	3,831	222,336	18,646,558	1,262,820	19,909,378	92.0%	390
420	442	3,238	179,050	18,825,608	1,174,320	19,999,928	92.4%	420
450	321	2,796	139,532	18,965,140	1,113,750	20,078,890	92.8%	450
500	426	2,475	201,249	19,166,389	1,024,500	20,190,889	93.3%	500
550	343	2,049	179,600	19,345,989	938,300	20,284,289	93.7%	550
600	273	1,706	156,895	19,502,884	859,800	20,362,684	94.1%	600
>600	1,433	1,433	2,139,371	21,642,255	-	21,642,255	100.0%	>600
	376,967		21,642,255					

Source: Analysis of all DAWSSA billing issued in 1995

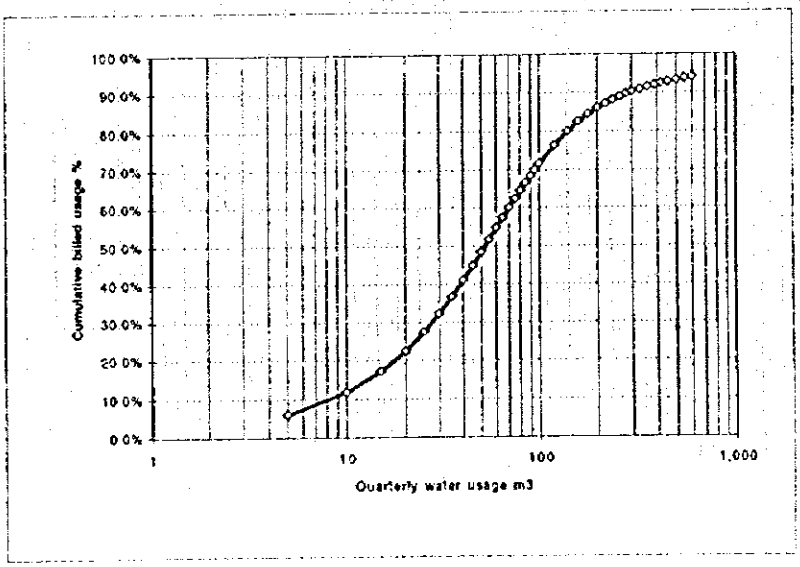

Table I-1.4 - Metered water use condition, commercial consumers (1995)

Quarterly Water Usage M3	Total Number of Bills in Block	Cummulative Bills Through Block	Use of Bills Stopping in Block	Cummulative Use of Bills Stopping in Block	Total Use to this Block of All Bills Passing Through Block	Cummulative Billed Usage M3/3 months	Cummulative Billed Usage %	Quarterly Water Usage M3
0	35,742	104,295	-	0	0	0	0.0%	0
5	20,898	68,553	38,231	38,231	238,275	276,506	9.9%	5
10	9,615	47,655	75,794	114,025	380,400	494,425	17.7%	10
15	6,976	38,040	89,939	203,964	465,960	669,924	24.0%	15
20	4,992	31,064	89,168	293,132	521,440	814,572	29.2%	20
25	3,655	26,072	83,500	376,632	560,425	937,057	33.6%	25
30	2,873	22,417	80,101	456,733	586,320	1,043,053	37.4%	30
35	2,265	19,544	74,613	531,346	604,765	1,136,111	40.7%	35
40	1,906	17,279	72,320	603,666	614,920	1,218,586	43.6%	40
45	1,473	15,373	63,241	666,907	625,500	1,292,407	46.3%	45
50	1,315	13,900	62,997	729,904	629,250	1,359,154	48.7%	50
55	1,086	12,585	57,515	787,419	632,445	1,419,864	50.9%	55
60	939	11,499	54,375	841,794	633,600	1,475,394	52.8%	60
65	861	10,560	54,157	895,951	630,435	1,526,386	54.7%	65
70	717	9,699	48,712	944,663	628,740	1,573,403	56.4%	70
75	725	8,982	53,021	997,684	619,275	1,616,959	57.9%	75
80	567	8,257	43,950	1,041,634	615,200	1,656,834	59.3%	80
85	504	7,690	41,854	1,083,488	610,810	1,694,298	60.7%	85
90	412	7,186	36,263	1,119,751	609,660	1,729,411	61.9%	90
95	386	6,774	35,921	1,155,672	606,860	1,762,532	63.1%	95
100	353	6,388	34,602	1,190,274	603,500	1,793,774	64.3%	100
120	1,234	6,035	135,571	1,325,845	576,120	1,901,965	68.1%	120
140	844	4,801	109,359	1,435,204	553,980	1,989,184	71.2%	140
160	678	3,957	101,479	1,536,683	524,640	2,061,323	73.8%	160
180	582	3,279	99,079	1,635,762	485,460	2,121,222	76.0%	180
200	321	2,697	70,767	1,706,529	465,200	2,171,729	77.8%	200
220	315	2,326	65,170	1,772,699	442,420	2,215,119	79.3%	220
240	259	2,011	59,635	1,832,334	420,480	2,252,814	80.7%	240
260	224	1,752	55,898	1,888,232	397,280	2,285,512	81.9%	260
280	185	1,528	49,882	1,938,114	376,040	2,314,154	82.9%	280
300	173	1,343	50,036	1,988,150	351,000	2,339,150	83.8%	300
330	191	1,170	59,762	2,047,912	323,070	2,370,982	84.9%	330
360	137	979	47,832	2,095,744	303,120	2,398,864	85.9%	360
390	111	842	41,861	2,137,605	285,090	2,422,695	86.8%	390
420	110	731	44,462	2,182,067	260,820	2,442,887	87.5%	420
450	59	621	25,711	2,207,778	252,900	2,460,678	88.1%	450
500	96	562	45,615	2,253,393	233,000	2,486,393	89.1%	500
550	70	466	36,551	2,289,944	217,800	2,507,744	89.8%	550
600	54	396	30,884	2,320,828	205,200	2,526,028	90.5%	600
>600	342	342	471,031	2,791,859	0	2,791,859	100.0%	>600
	104,295		2,791,859					

Source: Analysis of all DAWSSA billing issued in 1995

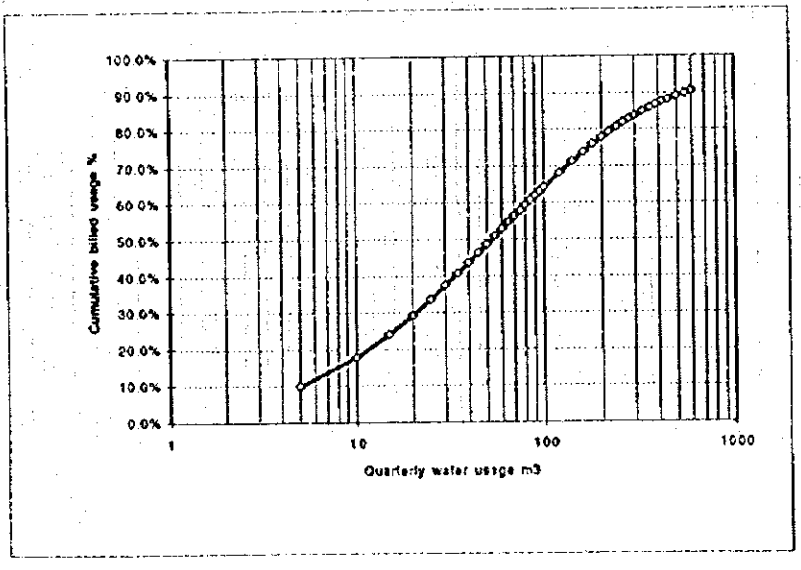

Table 1-1.5 - Metered water use condition, Industrial consumers (1995)

Quarterly Water Usage M3	Total Number of Bills in Block	Cummulative Bills Through Block	Use of Bills Stopping in Block	Cummulative Use of Bills Stopping in Block	Total Use to this Block of All Bills Passing Through Block	Cummulative Billed Usage M3/3 months	Cummulative Billed Usage %	Quarterly Water Usage M3
0	2,473	8,422	0	0	0	0	0.0%	0
5	1,163	5,949	1,224	1,224	23,930	25,154	4.5%	5
10	417	4,786	3,347	4,571	43,690	48,261	8.7%	10
15	319	4,369	4,122	8,693	60,750	69,443	12.5%	15
20	269	4,050	4,867	13,560	75,620	89,180	16.1%	20
25	307	3,781	7,047	20,607	86,850	107,457	19.4%	25
30	237	3,474	6,614	27,221	97,110	124,331	22.5%	30
35	190	3,237	6,219	33,440	106,645	140,085	25.3%	35
40	168	3,047	6,357	39,797	115,160	154,957	28.0%	40
45	174	2,879	7,508	47,305	121,725	169,030	30.5%	45
50	165	2,705	7,910	55,215	127,000	182,215	32.9%	50
55	137	2,540	7,271	62,486	132,165	194,651	35.2%	55
60	110	2,403	6,398	68,884	137,580	206,464	37.3%	60
65	119	2,293	7,521	76,405	141,310	217,715	39.3%	65
70	113	2,174	7,689	84,094	144,270	228,364	41.2%	70
75	117	2,061	8,488	92,582	145,800	238,382	43.1%	75
80	100	1,944	7,799	100,381	147,520	247,901	44.8%	80
85	96	1,844	7,947	108,328	148,580	256,908	46.4%	85
90	75	1,748	6,519	114,847	150,570	265,417	47.9%	90
95	75	1,673	6,885	121,732	151,810	273,542	49.4%	95
100	84	1,598	8,442	130,174	151,400	281,574	50.9%	100
120	264	1,514	28,790	158,964	150,000	308,964	55.8%	120
140	197	1,250	26,106	185,070	147,420	332,490	60.1%	140
160	148	1,053	21,965	207,035	144,800	351,835	63.5%	160
180	131	905	22,654	229,689	139,320	369,009	66.6%	180
200	73	774	13,724	243,413	140,200	383,613	69.3%	200
220	66	701	13,755	257,168	139,700	396,868	71.7%	220
240	67	635	15,145	272,313	136,320	408,633	73.8%	240
260	62	568	15,289	287,602	131,560	419,162	75.7%	260
280	63	506	16,350	303,952	124,040	427,992	77.3%	280
300	46	443	13,613	317,565	119,100	436,665	78.9%	300
330	55	397	17,065	334,630	112,860	447,490	80.8%	330
360	31	342	10,617	345,247	111,960	457,207	82.6%	360
390	31	311	11,683	356,930	109,200	466,130	84.2%	390
420	33	280	13,346	370,276	103,740	474,016	85.6%	420
450	38	247	16,530	386,806	94,050	480,856	86.8%	450
500	43	209	20,587	407,393	83,000	490,393	88.6%	500
550	42	166	20,835	428,228	68,200	496,428	89.7%	550
600	23	124	13,313	441,541	60,600	502,141	90.7%	600
>600	101	101	112,139	553,680	-	553,680	100.0%	>600
	8,422		553,680					

Source: Analysis of all DAWSSA billing issued in 1995

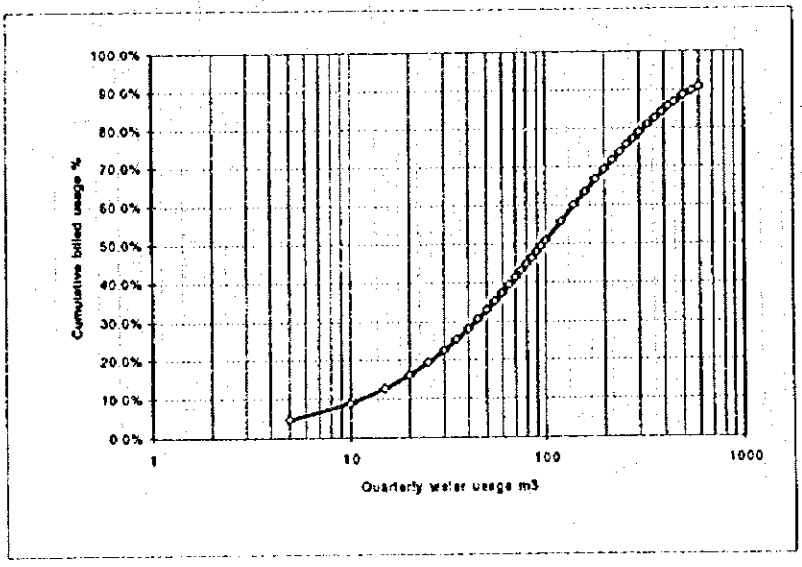

Table I-1.6 - Quarterly Billed Consumption Comparison

Billing Period: July, Aug, Sept.

Customer Class	Number of Connections with Consumption	Number of Connections with no Consumption	Total Use m3/Quarter	Average Consumption m3/Quarter per Connection	Unit Consumption (LPCD) 6 Persons per Connection
Domestic	56,242	46,333 45.2%	4,745,772	84.4	152.9
Domestic with Water Rights	64,357	27,910 30.2%	5,879,297	91.4	165.5
Commercial	11,290	19,249 63.0%	674,134	59.7	
Industrial	1,199	1,111 48.1%	125,851	105.0	
Government	1,847	1,218 39.7%	3,326,579	1,801.1	
Total	134,935	95,821 41.5%	14,751,633		

Billing Period: Jan, Feb, March

Number of Connections with Consumption	Number of Connections with Consumption less than 5m3	Total Use m3/Quarter	Average Consumption m3/Quarter per Connection	Unit Consumption (LPCD) 6 Persons per Connection
65,508	36,385 35.7%	5,927,331	90.5	163.9
51,560	26,705 34.1%	6,453,281	125.2	226.7
12,570	16,476 56.7%	753,846	60.0	
1,217	1,093 47.3%	151,834	124.8	
2,242	777 25.7%	3,277,831	1,462.0	
133,097	81,436 38.0%	16,564,023		

Billing Period: April, May, June

Customer Class	Number of Connections with Consumption	Number of Connections with Consumption less than 5m3	Total Use m3/Quarter	Average Consumption m3/Quarter per Connection	Unit Consumption (LPCD) 6 Persons per Connection
Domestic	65,508	36,385 35.7%	5,927,331	90.5	163.9
Domestic with Water Rights	51,560	26,705 34.1%	6,453,281	125.2	226.7
Commercial	12,570	16,476 56.7%	753,846	60.0	
Industrial	1,217	1,093 47.3%	151,834	124.8	
Government	2,242	777 25.7%	3,277,831	1,462.0	
Total	133,097	81,436 38.0%	16,564,023		

Billing Period: Oct., Nov., Dec.

Number of Connections with Consumption	Number of Connections with Consumption less than 5m3	Total Use m3/Quarter	Average Consumption m3/Quarter per Connection	Unit Consumption (LPCD) 6 Persons per Connection
64,295	39,645 38.1%	5,047,021	78.4	142.1
66,500	28,472 30.0%	5,026,289	75.6	136.9
15,388	18,137 54.1%	610,033	39.6	
1,154	1,152 50.0%	124,161	107.6	
2,200	865 28.2%	3,535,368	1,607.0	
149,537	88,271 37.1%	14,333,872		

Source: Analysis of all DAWSSA billing issued in 1995

Table I-1.7 - 1995 Consumption and Revenue by Customer Class

	Volume m3	% of total consumption	tariff	revenue	% of total revenue
Water rights	14,859,000	19.3%	0	-	
Residential					
1-20m3	24,636,084	32.0%	2.0	49,272,168	16.7%
21-30m3	6,300,426	8.2%	3.0	18,901,278	6.4%
31-60m3	7,531,155	9.8%	7.5	56,483,663	19.2%
>60m3	6,986,738	9.1%	9.0	62,880,642	21.3%
Sub total	45,454,403	59.0%		187,537,751	63.6%
Commercial	3,345,530	4.3%	12.0	40,146,468	13.6%
Government	13,417,609	17.4%	5.0	67,088,045	22.8%
Total	77,076,551	100%		294,772,264	100.0%

Source: Analysis of all DAWSSA billing issued in 1995

Table 1-1.8 - Operating Income & Expeditures Statement

	1990	1991	1992	1993	1994	1995[4]
Water Produced (000 m3)	154,680	172,900	201,490	212,000	209,000	222,080
Water Sold (000 m3)	53,280	64,515	66,328	70,000	69,582	63,596
Water Sold (% of total production)[1]	34%	37%	33%	33%	33%	29%
Water delivered to water rights (000 m3)[2]	14,020	15,750	15,154	15,750	15,028	14,859
Total accounted for water (000 m3)	67,300	80,265	81,482	85,750	84,610	78,455
Unnaccounted for Water (% of total productio	56%	54%	60%	60%	60%	65%
Average Cost (SP/m3 produced)[3]	0.63	0.66	0.69	0.69	0.86	0.97
Average Tariff (SP/m3 sold)[3]	2.17	3.00	2.70	2.67	4.61	4.50
Operating Revenues						
Water Sales	115,657,868	193,306,344	179,126,281	187,163,513	320,991,221	286,048,800
Cost Recovery Services & Fees	13,352,711	21,422,020	23,233,802	24,690,816	48,426,323	55,200,780
Sale of Connection Materials	2,219,513	2,507,869	3,215,977	4,230,948	3,450,660	3,348,949
Other Revenue	4,339,884	3,390,899	3,446,209	5,377,817	6,654,672	8,241,847
Bank Interest	39,176	114,414	160,222	318,931	320,690	315,122
Previous Year's Adjustments	-	1,036,641	-	3,356,824	-	-
Total Revenues	135,609,152	221,778,187	209,182,491	225,138,849	379,843,566	353,155,498
Operating Expenses						
Salaries & Wages	40,365,378	43,370,708	52,721,801	57,313,006	74,336,324	83,344,724
Benefits	7,970,999	8,563,920	11,925,133	12,116,067	17,914,417	22,941,860
Sub-total	48,336,377	51,934,628	64,646,934	69,429,073	92,250,741	106,286,584
Energy & Utilities	22,077,927	29,130,575	36,898,942	27,356,795	32,018,654	45,841,074
Chemicals	1,861,063	3,619,879	3,579,510	4,075,856	3,727,908	5,442,000
Purchase of service connection materials for n	781,410	1,227,297	1,632,034	2,821,856	3,068,393	2,939,940
Materials	2,455,063	1,931,080	3,432,293	5,470,420	2,798,561	2,758,721
Service fees	18,979,171	24,059,394	25,290,988	28,501,920	31,624,374	36,164,871
Other Expenses	395,658	561,914	441,249	384,844	290,522	1,293,725
Previous Year's Expenses	2,710,021	1,313,215	2,603,988	8,093,270	13,830,897	15,698,722
Total Direct Expenses	97,596,690	113,777,982	138,525,938	146,134,034	179,610,050	216,425,637
Depreciation	32,449,648	36,137,223	40,019,431	39,749,619	50,234,879	54,100,434
Net Income (deficit)	5,562,814	71,862,982	30,637,122	39,255,196	149,998,637	82,629,427
Profit tax	4,664,141	53,221,000	29,305,275	33,721,759	87,535,873	48,338,215
Net Income (deficit) after taxes	898,673	18,641,982	1,331,847	5,533,437	62,462,764	34,291,212
Financial Indicators						
Working ratio (direct expenses/revenue)	0.72	0.51	0.66	0.65	0.47	0.61
Operating ratio (total expenses/revenue)	0.96	0.68	0.85	0.83	0.61	0.77
Profit margin (before taxes)	0.04	0.32	0.15	0.17	0.39	0.23

(1) based on metered billings
(2) based on metered billings, but no revenue collected
(3) equal to income from water sales divided by volume of water sold
(4) estimated results based on third quarter data

Cost component	No. of staff	% of total staffing	Total maintenance costs	Distribution system maintenance
Staffing	60	4.44	4,711,111	
building and grounds	35	2.59	2,748,148	2,748,148
mechanical & electrical	5	0.37	392,593	392,593
stand-by wells	125	9.26	9,814,815	9,814,815
distribution	225	16.67	17,666,667	12,955,556
Materials			400,000	400,000
Maintenance service contracts			15,000,000	7,500,000
Total			33,066,667	20,855,556

Table I-1.9 - Balance Sheet

	1990	1991	1992	1993	1994	1995(1)
Fixed Assets						
Cost	1,127,833,263.11	1,195,070,589.72	1,249,207,165.97	1,324,096,191.28	1,437,040,532.80	1,555,258,020.48
Less: Accumulated Depreciation	272,865,913.92	304,785,053.22	339,978,598.38	375,987,944.15	422,145,279.31	471,882,127.13
Net Fixed Assets, Sub-total	854,967,349.19	890,285,536.50	909,228,567.59	948,108,247.13	1,014,895,253.49	1,083,375,893.35
Work in Progress	262,512,853.41	269,733,730.00	292,364,533.81	551,637,494.91	702,744,635.83	825,166,460.96
Total Fixed Assets	1,117,480,202.60	1,160,019,266.50	1,201,593,101.40	1,499,745,742.04	1,717,639,889.32	1,908,542,354.31
Investments & Advances						
Loan Interest (paid by government)	52,200,100.00	54,200,100.00	54,200,100.00	54,200,100.00	54,200,100.00	54,200,100.00
Transfer Earnings to the Government	695,667,626.01	826,741,376.92	961,042,312.39	1,329,226,722.94	1,569,788,897.42	1,838,857,866.98
Total Investment & Advances	747,867,726.01	880,941,476.92	1,015,242,412.39	1,383,426,822.94	1,623,988,997.42	1,893,057,966.98
Current Assets						
Debtors Net of Provision	186,124,615.55	297,662,924.66	304,256,168.24	295,195,009.16	428,854,242.59	455,823,835.72
Letters of Credit	8,242,971.22	19,392,401.38	76,886,694.00	182,628,107.76	211,588,034.03	202,848,922.52
Advanced Payments	4,796,001.92	4,086,106.85	2,450,024.96	1,668,802.41	5,445,990.91	3,114,970.24
Losses (1980-81 accumulated)	16,644,981.89	16,644,981.89	16,644,981.89	16,644,981.89	16,644,981.89	16,644,981.00
Differed Currency Difference		0.00	0.00	202,142,234.61	0.00	0.00
Net Receivables	215,808,570.58	337,786,414.78	400,237,869.09	698,279,135.83	662,533,249.42	678,432,709.48
Stores Inventory	62,438,817.55	62,612,988.72	85,345,727.38	146,020,391.40	165,128,821.11	149,374,037.17
Cash and Equivalent	8,825,399.15	3,171,206.04	5,068,343.09	17,061,899.64	6,160,477.24	15,980,388.34
Total Current Assets	287,072,787.28	403,570,609.54	490,651,939.56	861,361,426.87	833,822,547.77	843,787,134.99
Total Assets	2,152,420,715.89	2,444,531,352.96	2,707,487,453.35	3,744,533,991.85	4,175,451,434.51	4,645,387,456.28
Equity						
Capital	103,193,067.62	103,193,067.62	104,694,386.89	104,694,386.89	104,694,386.89	104,640,387.27
Provisions (including profit reserves)	139,904,991.99	145,092,531.19	160,231,727.19	165,717,050.89	199,326,701.08	259,070,329.48
Profit for the Current Year	899,563.03	18,641,983.03	1,331,846.78	5,533,435.27	46,809,572.46	25,718,409.46
Less Accumulted Defficit	0.00	0.00	0.00	0.00	0.00	0.00
Net Equity	243,997,622.64	266,927,581.84	266,257,960.86	275,944,873.05	350,830,660.43	389,429,126.21
Long Term Loans						
Government of Syria	1,313,918,398.40	1,456,871,800.58	1,610,682,438.59	2,061,309,455.57	2,387,381,997.13	2,941,281,628.32
Foreign Loans	222,222,537.97	178,204,015.73	150,116,314.09	313,209,338.48	324,312,079.71	317,391,046.27
Total Long Term Loans	1,536,140,936.37	1,635,075,816.31	1,760,798,752.68	2,374,518,794.05	2,711,694,076.84	3,258,672,674.59
Current Liabilities						
Accounts Payable	95,428,461.57	185,458,523.94	211,748,650.02	418,741,296.40	564,541,776.29	496,584,768.31
Installements on Foreign Loans	275,606,401.84	355,976,554.97	467,183,982.28	471,989,541.92	547,137,638.46	499,577,295.75
Pension Fund Provisions	1,247,293.47	1,092,875.90	1,190,791.16	893,311.35	1,247,282.49	1,123,591.81
Overdraft	0.00	0.00	307,316.30	303,940.47	0.00	0.00
Total Current Liabilities	372,282,156.88	542,527,954.81	680,430,739.76	891,928,090.14	1,112,926,697.24	997,285,655.87
Total Equity & Liabilities	2,152,420,715.89	2,444,531,352.96	2,707,487,453.30	3,542,391,757.24	4,175,451,434.51	4,645,387,456.67
Financial Indicators						
inventory (% of total assets)	2.9%	2.6%	3.2%	3.9%	4.0%	3.2%
inventory (equivalent to months of rev	5.5	3.4	4.9	7.8	5.2	5.1
receivables (equivalent to months of re	19.1	18.3	23.0	37.2	20.9	23.1
receivables/total revenue	1.6	1.5	1.9	3.1	1.7	1.9
accounts payable/total expenses	0.98	1.63	1.53	2.87	3.14	2.29

(1) Estimate based on final trial balance because fourth quarter billings have not been collected

Table I-1.10 Source & Use of Funds

	1990	1991	1992	1993	1994	1995(1)
Source of Funds						
Operating IncomeBefore Taxes	5,562,814	71,862,982	30,637,122	39,255,196	149,998,637	82,628,428.00
Depreciation	32,449,648	36,137,223	40,019,431	39,749,619	50,234,879	54,100,434
Loans Received	127,897,417	147,653,462	178,604,884	613,720,042	359,577,715	585,986,734
Grant Aid			1,501,319			
Increase in payables	85,069,595	90,030,062	26,290,126	206,992,610	146,154,451	(67,957,008)
Total Sources	250,979,474	345,683,729	277,052,882	899,717,467	705,965,682	654,758,588
Uses of Funds						
Capital Investments	70,544,102	74,458,203	76,767,380	334,161,986	264,051,482	240,639,313
Foreign Loans Repayment	14,741,655	15,905,054	-	67,944,821	37,855,453	95,027,618
Loans Interest	76,325,174	85,103,348	81,197,520	143,496,345	150,804,247	258,630,012
Increase in receivables	(24,492,565)	121,977,844	62,451,454	298,041,267	(35,745,886)	15,899,460
Increase in inventories	(3,903,507)	174,171	22,732,739	60,674,664	19,108,430	(15,754,784)
Income Taxes	4,664,141	53,221,000	29,305,275	33,721,759	87,535,873	48,338,215
Transfer to Ministry of Finance	-	2,000,000	-	-	-	
Total Use of Funds	137,879,001	352,839,620	272,454,368	938,040,842	523,609,598	642,779,834
Net working capital (sp)	113,100,473	(7,155,891)	4,598,514	(38,323,375)	182,356,084	11,978,754
$US	2,692,868	(170,378)	109,488	(912,461)	4,341,812	285,208
Financial indicators						
Income/total sources	2.2%	20.8%	11.1%	4.4%	21.2%	12.6%
Loans/total sources	51.0%	42.7%	64.5%	68.2%	50.9%	89.5%
Capital investment/total sources	28.1%	21.5%	27.7%	37.1%	37.4%	36.8%
Capital investment/ loans rec'vd	55.2%	50.4%	43.0%	54.4%	73.4%	41.1%
Debt service/total sources	36.3%	29.2%	29.3%	23.5%	26.7%	54.0%

(1) Estimate based on final trial balance because fourth quarter billings have not been collected

Table I-1.11 - Asset values & depreciation

Assets	Value SI. (millions)	Depreciation %	Accumulated depreciation to 1994	% of Asset value
Buildings	101.7	2	12.8	12.6
Pump Stations	114.5	5	17.7	15.5
Distribution network	444.9	2	100.8	22.7
Conveyance tunnels	452.3	2	164.5	36.4
Reservoirs	145.2	2	36.9	25.4
Machinery	87.6	10	50.8	58.0
Transportation	15.6	20	9.2	59.0
Tools	28.7	10	14.8	51.6
Furniture	33.9	10	14.4	42.5
Total	1,424.4		421.9	29.6

Table 1-1.12 - Capital Investment Plan for the 1996-2000 period (SP 000's)

		1996	1997	1998	1999	2000	Total
324	**Replacement & Renovation of existing distribution network**						
3242	Buildings, installations, utilities & roads		39,300	46,500	33,550	28,850	148,200
3243	Machines & equipment		600	600	600	3,600	5,400
3244	Transportation	12,000	-	-	-	-	12,000
	Total	12,000	39,900	47,100	34,150	32,450	165,600
							-
	On-going (transfered) projects						-
313	**Distribution network**						-
3132	Buildings, installations, utilities & roads	49,600	99,751	66,500	44,500	21,500	281,851
3138	Establishment costs	400	1,000	700	400	300	2,800
	Sub-Total	50,000	100,751	67,200	44,900	21,800	284,651
							-
314	**Ejich spring**						-
3142	Buildings, installations, utilities & roads	2,800	8,700	14,700	10,650	8,050	44,900
3148	Establishment costs	200	400	500	300	300	1,700
	Sub-Total	3,000	9,100	15,200	10,950	8,350	46,600
							-
315	**Equipment for O & M, Training and certification**						-
3155	Buildings, installations, utilities & roads	500	500	-	-	-	1,000
3156	Office furniture & materials	400	1,500	500	500	-	2,900
	Sub-Total	900	2,000	500	500	-	3,900
317	**Miscellaneous fixed assets**						
	Vehicles & equipment	2,000	18,700	16,300	11,300	5,800	54,100
	Office furniture & equipment	1,700	2,500	500	500	500	5,700
	Sub-Total	3,700	21,200	16,800	11,800	6,300	59,800
318	**Consolidation of reserve water resources**						
3182	Buildings, installations, utilities & roads	27,200	25,600	25,900	24,500	10,900	114,100
3183	Machines & equipment	-	600	600	600	600	2,400
3188	Establishment costs	500	500	500	500	500	2,500
	Sub-Total	27,700	26,700	27,000	25,600	12,000	119,000
319	**Ejich spring development**						
3192	Buildings, installations, utilities & roads	11,400	11,800	6,000	13,000	1,000	43,200
3193	Machines & equipment	3,300	1,000	-	-	-	4,300
3198	Establishment costs	400	1,550	1,450	1,550	1,450	6,400
	Sub-Total	15,100	14,350	7,450	14,550	2,450	53,900
320	**Pumping stations**						
3202	Buildings, installations, utilities & roads	6,000	21,800	22,500	13,000	8,000	71,300
3203	Machines & equipment	6,500	-	-	-	-	6,500
3208	Establishment costs	300	943	600	500	400	2,743
	Sub-Total	12,800	22,743	23,100	13,500	8,400	80,543
321	**Distribution network automation**						
3212	Buildings, installations, utilities & roads	40,000	-	4,874	28,623	4,000	77,497
3218	Establishment costs	400	4,023	100	300	100	4,923
	Sub-Total	40,400	4,023	4,974	28,923	4,100	82,420
327	**Studies**						
327/1	New water resources						
3272/1	Buildings, installations, utilities & roads	2,000	1,000	-	-	-	3,000
3273/1	Machines & equipment	300	-	-	-	-	300
3278/1	Establishment costs	700	200	-	-	-	900
	sub-total	3,000	1,200	-	-	-	4,200
327/2	Electrical servicing for permanent power supply						
3278/2	Establishment costs	4,500	4,500	-	-	-	9,000
	Sub-Total	7,500	5,700	-	-	-	13,200
329	**Barada spring and wells**						
3292	Buildings, installations, utilities & roads	77,200	92,593	1,000	-	-	170,793
3298	Establishment costs	800	700	50	-	-	1,550
	Sub-Total	78,000	93,293	1,050	-	-	172,343
330	**Kudsaya development**						
3302	Buildings, installations, utilities & roads	101,600	30,000	12,000	5,000	-	148,600
3303	Machines & equipment	21,300	7,100	-	-	-	28,400
3308	Establishment costs	1,000	500	200	100	-	1,800
	Sub-Total	123,900	37,600	12,200	5,100	-	178,800
	Total of transfered projects	363,000	337,460	175,474	155,823	63,400	1,095,157
	New projects						
	Dier - Ashayer wells						
	Buildings, installations, utilities & roads						
	Machines & equipment						
	Sub-Total	-	80,000	50,000	70,000	40,000	240,000
	Grand total		429,460	265,374	272,923	137,550	1,367,607

Table I-1.13 - Estimated Revenue Losses from Malfunctioning Meters (1995)

Total No. of metered connections per quarter

	JFM	AMJ	JAS	OND	Quarterly average
Domestic	101,893	101,893		103,940	102,575
Domestic with water rights	92,254	92,254		92,293	92,267
Commercial	29,046	29,046		33,525	30,539
Industrial	2,310	2,310		2,306	2,309
Governement	3,019	3,019		3,065	3,034
				Total	**230,724**

No. of malfunctioning meters (consumption less than 5 m³ per quarter)

	JFM	AMJ	JAS	OND	Quarterly average	% of total
Domestic	36,385	36,385		39,645	37,472	36.5
Domestic with water rights	26,705	26,705		28,432	27,281	29.6
Commercial	16,476	16,476		18,137	17,030	55.8
Industrial	1,093	1,093		1,152	1,113	48.2
Governement	1,228	1,228		1,191	1,216	40.1
				Total	**84,110**	**36.5**

Average billed consumption per metered connection (m3/quarter)

	JFM	AMJ	JAS	OND	Quarterly average
Domestic	91	91	84	78	86
Domestic with water rights	125	125	91	76	108
Commercial	60	60	60	40	55
Industrial	125	125	105	108	116
Governement	1,462	1,462	1,801	1,607	1,583
				Total	**1,947**

Estimated average revenue loss from meter malfunction

	No. of meters	Average quarterly per unit consumption (m3)	Average quarterly consumption (m3)	Tarrif	Potential quarterly revenue
Domestic	37,472	32	1,197,220	3	3,591,659
Domestic with water rights	27,281	54	1,474,922	3	4,424,767
Commercial	17,030	28	473,850	12	5,686,206
Industrial	1,113	89	98,527	12	1,182,320
Governement	1,216	1,583	1,924,400	5	9,622,002
				Total	**24,506,953**

Total estimated annual lost revenue from malfunctioning meters	98,027,814
Revenue 1995	286,048,800
Total estimated revenue from bad meters added to 1995 revenue	384,076,614
Potential % increase in revenue	**34%**

(1) Average consumption reduced by minimum monthly billed consumption, 18 m3 domestic & 9 m3 commercial/industrial

APPENDIX J

ECONOMIC EVALUATION

APPENDIX J

ECONOMIC EVALUATION

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1. ECONOMIC EVALUATION

1.1 Project Benefits

Unless otherwise indicated, all costs are expressed in US$. Four types of projects are proposed in the water supply master plan: i) reduction of unaccounted for water through improved leakage control and rehabilitation of the existing distribution system; ii) extension of the formal distribution network into existing informal areas; iii) the development of new water resources to meet the demands of a growing population; and iv) improvements in revenue metering. All projects are expected to generate increases in water sales and improve service levels to minimum acceptable standards. In the case of informal areas the expected health benefits, although not quantifiable, are expected to be significant.

1.2 Capacity and Willingness to Pay

Income levels in Damascus were reviewed to assess if the average household has the capacity to pay for increases in tariffs. A billing analysis, carried out to assess the suitability of existing tariffs, indicates that 41% of consumers use less than 30 m^3/month. It is assumed that most of these consumers are in the low income group and would be significantly affected by a change in tariffs. The low income group represents 54% of the total annual domestic consumption.

Based on the household income survey conducted for this master plan study, 30% of the families surveyed receive less than SL 5,000 per month, about 60% receive less than SL 10,000 per month and 80% receive less than SL 25,000 per month. Based on the survey, the average household income for all income groups is SL 16,254. The data collected from the survey indicates that a relatively small proportion of the population earns a disproportionate amount of the total income. As shown in Figure J-1.1 income distribution is skewed with approximately 20% of the households earning about 50% of the income, therefore the average or median income criteria is not recommended to meaure affordability. The assessment of affordability is determined for the two income classes most likely to be affected by tariff increases, namely the low income class with income less than SL 10,000 and the middle income less with income less than SL 25,000. In order to estimate the water charges for these two income classes, assumptions are made regarding water consumption as follows:

Low income		Middle income	
- present	19.8 m^3/month	- present	30.6 m^3/month
- future	34.2 m^3/month	- future	38.7 m^3/month

Based on these average consumption, the quarterly water charge per household is calculated as indicated in Table J-1.1. At current per capita consumption levels, the cost of water represents only 0.70% and 0.45% of the household income for low and middle income groups respectively. These ratios appear to be low when compared to a normally acceptable affordability ratio of 3 to 5%. It is therefore assumed that the average household in the study area has the capacity to pay for water charges and further increases in the tariff are feasible. Previous large increases in tariffs have had no apparent effect on reducing consumption which also indicates that there is sufficient elasticity to absorb further price increases. If per capita consumption increases as predicted by the water demand analysis, then the cost of water in the future will represent 3.36% and 1.05% of the household income for low and middle income groups respectively. Although the middle income group would still have some capacity to pay for tariff increases, the lower income group would clearly become disadvantaged by the existing tariff structure. Some adjustment to the tariff structure will be required in the future to maintain the internal cross subsidy from high volume (assumed high income) consumers to the lower volume (low income) users.

The survey clearly demonstrates that households in the project area are willing to pay slightly more for better services. Middle income households indicate a willingness to pay up to SL 150 per month (36% increase) and low income groups consider SL 140 per month (53% increase) as acceptable for improved services. Based on willingness to pay, existing domestic tariffs could be increased by a factor of 2.1. This factor is calculated as shown in Table J-1.1 applying a weighting factor based on the consumption of the two income groups to the average tariff increment based on willingness to pay. The weighted average tariff increment is applied to all domestic tariff bands to obtain the following tariff increases based on willingness to pay:

Consumption	Tariff (SL/m^3)
0-20 m^3	from 2 to 4.2
20-30	from 3 to 6.3
30-60	from 7.5 to 15.8
>60	from 9 to 19

The average tariff based on the distribution of water use by tariff band is SL 7.44 (0.18 US$)

1.3 Economic Benefits

Economic benefits are quantified by taking the difference between the "with" and "without" project case which represents the incremental water made available for consumption by each project. Incremental water provided by the development of new water resources is based on full production capacity and not on the production plan identified for varying hydrological conditions. The economic value of the incremental water depends on the type of project. Works to recover water production which is now being lost in the distribution system are evaluated using the marginal cost of production since these projects differ the need to invest

in the development of new resources. Works to increase existing production capacity through the development of new water resources or reinforcement of existing wells are evaluated at the cost that customers are willing to pay for improved services.

The marginal cost of production is defined as the cost of producing one additional increment of water above existing production levels. In DAWSSA's case, the next increment of production requires the completion of the existing Barada Springs. The marginal cost is estimated at \$0.22 per m^3 based on investment and estimated production costs identified by DAWSSA. Calculation of the marginal cost is shown in Table J-1.2. Willingness to pay is based on data from the JICA study team household income survey conducted as part of the water supply master plan study. Calculations based on a weighted average shown in Table J-1.1 indicate customers are willing to pay up to \$0.18 per m^3.

For the EIRR calculations, only the benefit from increased water supply is counted as a "quantifiable" benefit. The estimated economic benefits for the whole of the selected master plan projects are shown in Table J-1.3. The total economic benefit is expected to reach \$26 million in incremental water sales in the year 2010.

1.4 Economic Costs

The estimated capital investment costs for the projects are converted to the economic costs by applying the shadow exchange rate to the local cost components excluding taxes and duties. Economic costs include engineering, administration and contingency allowances. Incremental operational and maintenance costs are also estimated on the "with" and "without" project basis and include related increases in staffing, materials and electricity. The economic life for the main elements of the master plan is assumed to be 25 years. Replacement costs are also included in the investment cash flow for projects with shorter economic life as follows: i) every 10 years for meters, meter test equipment and laboratory equipment, ii) every 15 years for pumps, DMA and pressure reduction components. Incremental operation and maintenance costs are also included in the cost stream and are estimated to reach \$1.7 million per year at the end of 2007.

1.5 Economic Evaluation

Economic evaluation is based on finding the internal rate of return for the discounted cash flow developed for the project on the basis of economic costs and benefits described previously. The EIRR was calculated twice, once to screen individual projects before formulating the master plan and a second time to establish the economic viability of the selected

master plan projects as a whole. The following assumptions were made for the economic evaluations:

1) benefits are estimated on a "with" and "without" project basis
2) all costs are estimated at mid 1996 constant price and exclude taxes and duties
3) costs and benefits are estimated on an incremental basis
4) only quantifiable benefits are included in the EIRR calculations

(1) Evaluation of master plan candidate projects

The economic life was assumed to be 25 years with the following exceptions: i) the ductile iron mains were given a 75 year life; ii) the Hermon and Zabadani water resources projects were given a 35 year life because of the significant cost of the conveyance components; iii) metering and lab equipment were given a 10 year life; and iv) pumps and other mechanical equipment were given a 15 year life. Discounted cash flows produced for each project are shown in Tables J-1.4 to J-1.37.

In general, the projects with an EIRR above 10% (assumed opportunity cost of capital in Syria) were deemed economically viable and considered for the master plan. Other projects were rejected unless they provided significant improvements to social conditions and public health as is the case for some distribution system improvements in informal areas. Results of the analysis indicate that water development schemes are in general economically viable only if they are located in Damascus City or in the case of Barada Springs if there is a considerable sunk cost in existing infrastructure. The rehabilitation projects are all economically viable and provide some of the highest internal rates of return. The water resources development schemes in the Zabadani and Hermon spring area are generally not economically viable because of the high cost of building lengthy transmission mains. The exception is Deir al Ashayer which yields a marginally acceptable EIRR of 7% and is considered for the master plan because of the relatively low cost for developing a significant production capacity.

(2) Evaluation of the selected master plan project

Following the same assumptions that were identified for the screening of candidate projects, the selected master plan project as a whole was evaluated for economic and financial viability. The economic life is assumed to be 25 years starting in 2007. The EIRR calculations are shown in Table J-1.38. The resulting EIRR of 34% clearly demonstrates that the project as a whole is a worthwhile investment. A sensitivity analysis also indicates that results are robust to variations in the cost and benefit parameters. For example, if costs are increased by 10% and benefits decreased by 10% the EIRR is still in excess of 25.8%.

2. FINANCIAL EVALUATION

2.1 General

Financial viability of the water supply master plan as a whole is carried out by assessing the financial internal rate of return (FIRR) on the basis of project cost estimates and incremental revenue generated by the project.

2.2 Incremental Revenue

The replacement of leaking mains, improvements in metering and the development of new water resources are all expected to provide significant increases in the amount of water that is sold. Total incremental water sales resulting from the master plan projects are identified in Table J-2.1. Revenue from new water resources projects is based on the quantities identified in the production plan for the average year. Revenue is calculated on the basis of the average tariff in 1995 which is obtained by dividing the total revenue from water sales by the volume of water sold. The average tariff in 1995 is \$0.11 per m^3 (SL.4.5)

2.3 Incremental Costs

Incremental costs are based on estimated project investment costs, operation and maintenance costs. Incremental costs also include equipment replacement for projects with a useful life that is less than the assumed 25 year life of the master plan project. The total investment costs, excluding the future costs of equipment replacement , is \$95.3 million.

2.4 FIRR Calculations

Based on incremental revenue and costs, the financial internal rate of return FIRR is calculated as shown in Table J-2.2. The resulting FIRR of 9.8% indicates that the project as a whole is financially viable if 10% is assumed to be the opportunity cost of capital. The results are very sensitive to variations in the cost and benefit parameters. For example, a 10% increase in cost combined with a 10% decrease in expected benefits would yield an unfavorable FIRR of 6.8%.

The large difference between the results of the economic and the financial evaluations is partly due to the gap between the existing tariff of \$0.11 and the economic cost of water valued at \$0.18/m^3 and \$0.22/m^3 for willingness to pay and marginal cost respectively. Potential capacity versus actual production is another factor which contributes to the different results. For the economic evaluation, the full production capacity is used to evaluate the benefits

derived from the investment whereas in the financial evaluation, only the amount of water actually produced is used to evaluate revenue. Since the selected production schedule for the "average year" does not use all of the available capacity the financial benefits derived from the investment are much lower than the economic benefits based on full production. This represents the worst case scenario from a revenue perspective since the development of the new water resources capacity will only provide full benefits during drought years.

2.5 Average Incremental Cost of Water

The average incremental cost of water is the cost per m^3 of water over the expected economic life of the project at a defined discount rate. The master plan project would not be financially viable at present water tariff levels should estimated costs increase by 10% and expected benefits decrease by 10%. Under this worst case scenario the average incremental cost of water would have to be increased from \$0.11 per m^3 to \$0.15 per m^3 in order to obtain an acceptable 10% rate of return. The average incremental cost of water required to obtain alternative rates of return of 8% and 12% is \$0.13 per m^3 and \$0.17 per m^3 respectively.

2.6 Least Cost Solution

The investment objectives of the master plan project are to increase the availability of water to consumers and reduce unaccounted for water. The alternatives considered include leakage reduction through mains replacement, an active leakage detection program, metering improvements, distribution system improvements, and increases in production capacity through the development of existing and new water resources. Estimated costs and the amount of water expected from each project are identified in Table J-2.3. The most expensive solution for increasing the amount of water available for consumption is the replacement of mains which costs \$9.15 per m^3 of water saved. The least cost solution is active leakage detection and control costing \$0.24 per m^3 of water saved. Developing new water resources is also relatively inexpensive at \$0.94 per m^3 , however it ranks second to leakage detection and control because of the high investment cost. Financial constraints and the fact that the existing per capita production capacity would be sufficient to meet demands if the system did not leak, make active leakage detection and control the least cost solution and the most feaible to implement.

2.7 Funding Implications

Total project investment costs including future equipment replacement costs are assessed against DAWSSA's historical investment spending levels. Over the 1990-95 period, the investment budget grew from \$1.68 million to \$5.73 million in 1995. The investment funding identified by the master plan exceeds this range of spending by a substantial amount

especially during the initial stages of implementation from 1998 to 2002. The average annual funding requirement identified by the master plan is $9.5 million over a 10 year period. DAWSSA will need a large increase in the level of funding assistance it receives from the national government in order to implement the master plan project.

A review of the national investment budget indicates that in 1996 the Syrian government proposed to spend $174.8 million in the water sector (8.2% of the total investment budget). DAWSSA received only $8 million (4.5%) while other national water supply authorities received the balance; the Rural Damascus authority received the lion's share of $95 million (55%). The proposed master plan project will add to the growing number of competing infrastructure development priorities that the government must fund. Current spending levels in the water sector will have to be increased to meet the funding requirements of the proposed master plan. Although there appears to be some opportunity to re-allocate funds from other sectors, it is likely that the Syrian government will seek investment capital from foreign sources in the form of loans and grant aid.