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Status Report on Sewerage System in Sangli-Miraj-Kupwad, India

Final Report

Indo-USAID Financial Institutions Reform and Expansion Project—
Debt & Infrastructure Component (FIRE-D Project)

USAID-TCGI Contract No. 386-C-00-04-00119-00

January 2002

This publication was produced for review by the United States Agency for International Development. It was prepared by The Communities Group International (TCGI), in partnership with AECOM.

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Abbreviations

A/Amp	:	Ampere
AC	:	Asbestos cement
ACB	:	Air circuit breaker
Annex	:	Annexure
BA	:	Bachelor of Arts
B. Com.	:	Bachelor of Commerce
BE	:	Bachelor of Engineering
B. Sc.	:	Bachelor of Science
conn	:	Connection
Cum	:	Cubic meter
CI	:	Cast iron
COD	:	Chemical oxygen demand
CPHEEO	:	Central Public Health and Environment Engineering Organization
DCE	:	Diploma in Civil Engineering
DEE	:	Diploma in Electrical Engineering
DME	:	Diploma in Mechanical Engineering
DI	:	Ductile iron
dia	:	Diameter
DG	:	Diesel generator
DO	:	Dissolved oxygen
DO (fuse)	:	Drop out (fuse)
DP	:	Double pole
ESR	:	Elevated service reservoir
ETP	:	Establishment, Tools and Plant
FIRE Project	:	Financial Institutions Reform and Expansion Project
FSL	:	Full supply level
GI	:	Galvanized iron
GL	:	Ground level
GOI	:	Government of India
GOM	:	Government of Maharashtra
GR	:	Government Resolution
ha	:	Hectare
hh	:	House hold
HOT	:	Hand operated traversing (crane)
HDPE	:	High density polyethylene
HT	:	High tension
HP/hp	:	Horse power
HRD	:	Human Resource Development
HS/hs	:	Hume steel
IL & FS	:	Infrastructure Leasing & Financial Services (Ltd)
IPS	:	Indian patent stone
ITI	:	Industrial Training Institute
kg	:	Kilogram
kg/cm ²	:	Kilogram per centimeter

km	:	Kilometer
KT weir	:	Kolhapur type weir
KVA	:	Kilo volt ampere
KVAH	:	Kilo volt ampere hours
KVARH	:	Kilo volt ampere reactance hour
KW	:	Kilo watt
L	:	Length
LDL	:	Lowest drawable level
LIC	:	Life Insurance Corporation
LSGD	:	Local Self Government Diploma
lpcd	:	Litres per capita per day
lps	:	Litres per second
LT	:	Low tension
m	:	Meter
m ²	:	Square meter
m ³	:	Cubic meter
MA	:	Master of Arts
MBR	:	Master balancing reservoir
MCCB	:	Miniature current circuit breaker
M Com	:	Master of Commerce
mcum	:	Million cubic meters
Mech	:	Mechanical
mg/l	:	Milligram / litre
MJP	:	Maharashtra Jeevan Pradhikaran
MIDC	:	Maharashtra Industrial Development Corporation
MIS	:	Management information system
Misc	:	Miscellaneous
ML	:	Million litres
MLD	:	Million litres per day
mm	:	Millimeter
MPCB	:	Maharashtra Pollution Control Board
M&R	:	Maintenance and repairs
MSEB	:	Maharashtra State Electrical Board
MT	:	Metric tonne
NA	:	Not available
NIC	:	National Informatics Centre
No/no	:	Number / number
NRAP	:	National River Action Plan
NW	:	Non working
OCB	:	Oil circuit breaker
O&M	:	Operation and Maintenance
OMB	:	Open Market Borrowing
OT	:	Orthotolidine Test
ppm	:	Parts per million
PSC	:	Prestressed concrete
PSP	:	Private sector participation
PVC	:	Polyvinyl chloride
RCC	:	Reinforced cement concrete
Ref	:	Reference

RL	:	Reduced level
Rs	:	Rupees
RTO	:	Regional Transport Office
SMK-MC	:	Sangli Miraj Kupwad Municipal Corporation
S. No.	:	Survey number
SPDP	:	Screen protected drip proof
Sr. No.	:	Serial number
SS	:	Suspended solids
SSC	:	Secondary School Certificate
STP	:	Sewage treatment plant
SWD	:	Standing water depth
T	:	Total
TDS	:	Total dissolved solids
UCR	:	Uncoursed rubble
UFW	:	Unaccounted for water
UGD	:	Underground Drainage
V	:	Volt
VT	:	Vertical turbine
W	:	Working
WTP	:	Water treatment plant

EXECUTIVE SUMMARY

A. Overview

- (1) The twin cities of Sangli-Miraj, which together with Kupwad form the Sangli - Miraj - Kupwad Municipal Corporation, are located on the banks of the river Krishna in the southern part of Maharashtra State. Sangli, as a city, has seen growth mainly in the last two decades.
- (2) The estimated population for the year 2001 is 0.45 million persons with the following distribution of population in each city:
 - (a) Sangli 0.25 million;
 - (b) Miraj 0.15 million; and
 - (c) Kupwad 0.05 million.
- (3) The growth of the city was faster in decades 1951-1961 and 1961-71, but in subsequent decades, it appears to have slowed down and settled for a moderate level of about 30% per decade.
- (4) The Sangli-Miraj-Kupwad Municipal Corporation (SMK-MC) has initiated a Water Supply and Sewerage Project with private sector participation, with a twin objective of improving the operation, maintenance and management of the existing system and developing new projects for major investments for meeting the future demands. This effort is aimed at eventually privatising the water and sewerage system in a phase-wise manner.
- (5) The Indo-USAID FIRE (D) Project¹ is positioning Sangli-Miraj-Kupwad as a model for medium-sized cities in the country for improvement of service delivery. The project is supporting the city in the areas of: private sector participation in water and wastewater, accounting reforms, energy audit, solid waste management, municipal resource mobilization and a strategy for improvement of access to services by the urban poor. The FIRE Project has also carried out an independent study on the municipal fiscal status. It is expected that the successful implementation of this demonstration project will lead to developing sustainable models for medium towns of Maharashtra (and India).

¹ The Indo-USAID Financial Institutions Reform and Expansion (FIRE) project addresses the development challenges facing India's cities. In the early 1990s there was growing recognition that engaging the private sector could increase resources for cities. Accessing these resources requires that cities adopt the discipline of commercial viability. The FIRE project initiated activities based on this theme in November 1994 and the second phase continues through September 2003. The project is sometimes called the FIRE (D) project. The (D) refers to debt— helping cities mobilize resources by issuing bonds, obtaining loans from financial institutions, or using other debt financing mechanisms for urban infrastructure. FIRE (R), recently launched as a distinct USAID project, aims to regulate expansion of India's capital markets.

B. Existing Sewerage System.

Sangli

- (6) The sewerage system, which has been developed only in the old parts of Sangli, has following main components.
- (7) **Sewage collection.** The sewer network covers about 53 km streets in the old town and consists of 150 to 900 mm diameter sewer lines. The sewers are overloaded and tend to get blocked.
- (8) **Sewage pumping and conveyance.** There are three pumping stations. Two of these (at Sangliwadi and Vakharbhag) are lift stations and the pumping station on Kolhapur road is the terminal pumping station. The civil structures of the two lift stations are not used as per their original design concept and will need substantial modifications and repairs. The basic structure of Kolhapur road pumping station also needs modifications and repairs, for its use in future. The pumps of the original designs, are completely damaged. The horizontal centrifugal pumps, now in use, are not suitable for the function. They have been installed on ground or weak foundation and are not operating well. There is a proposal to use different types of pumps in the NRAP project. The pumping mains from the three pumping stations are in use, but their condition and performance need to be investigated.
- (9) **Sewage treatment plant.** The sewage treatment plant, on Dhamni road, consists of screens, detritor tanks and ten stabilization ponds. Since the demand of the effluent for irrigation has substantially reduced due to residential development in the command area, only small quantity of sewage is pumped to this plant, depending on the demand and the remaining untreated sewage is diverted to Krishna river. The plant needs substantial repairs, desilting of the ponds and efficient disposal of treated effluent.
- (10) **Overall sustainability of Sangli sewerage system.** The system is not meeting its objective due to overloaded sewers, unsuitable pumping arrangement and inadequate operation of the treatment plant.
- (11) **Service coverage.** Only 16.69% of the total 5,397 sq.km. area and 52% of the 258,133 population have access to the sewerage facility.
- (12) **Performance and quality of service.** The performance is not satisfactory. A large part of the untreated sewage flows to the river causing pollution of the drinking water source of many towns in the downstream, since the pumping stations and treatment plant are not functioning properly.

Miraj

- (13) The sewerage system in Miraj, which is operative for last 30 years, is developed to serve only the old parts of the town.
- (14) ***Sewage collection.*** The collection network consists of 40 km sewers with diameters ranging from 150 mm to 675 mm. The sewers are largely functional.
- (15) ***Sewage pumping and conveyance.*** Sewage is collected in the pumping station, located in Timber area. The pumping station, with four pump sets, is able to handle the sewage, reaching this pumping station, without any serious problem. Sewage is pumped to the treatment plant through a 600 mm prestressed concrete main, which is also functioning well.
- (16) ***Sewage treatment plant.*** The 10 MLD treatment plant, consisting of screens, grit channel and stabilization ponds, is not operating well. There is no control on the velocity of flow in pretreatment works and the stabilization ponds are not being fully used. There is heavy silting in all the works. The quality of influent and effluent is not measured. The effluent is being used for irrigation.
- (17) ***Overall sustainability of Miraj sewerage system.*** The objective is not being met fully due to overloading of sewers and inadequate operation of the treatment plant.
- (18) ***Service coverage.*** Only about 5.5% of 43.98 sq.km. area and 54.13% of 150,000 population are covered by the existing sewer network.
- (19) ***Performance and quality of service.*** While the collection and conveyance of sewage is comparatively better in Miraj than in Sangli, the performance of the treatment is not good. The quality of the influent and effluent is not monitored.

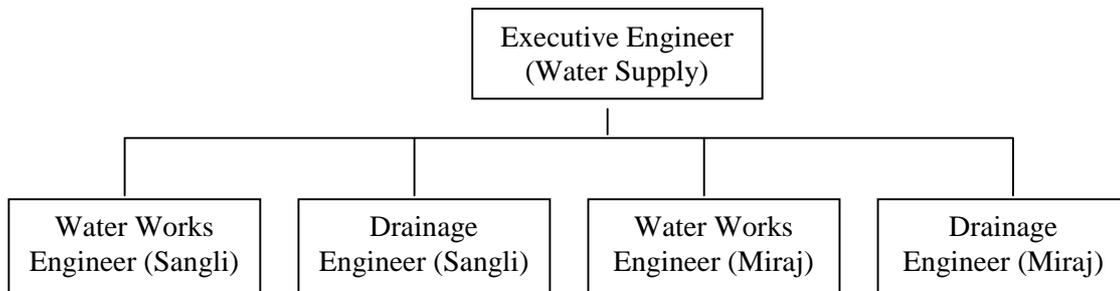
System Operation and Maintenance

- (20) ***System operation and maintenance.*** The O&M system suffers from the non-availability of O&M manual, maps, drawings and formal schedule of operations, inspection and maintenance. The quality is not monitored.
- (22) ***Maintenance facility.*** The SMK-MC staff carries out routine maintenance and repairs, while special repairs are done through local workshops.

C. Institutional Arrangement.

- (23) ***Organization structure of SMK-MC.*** The functioning of SMK-MC is controlled by the two main wings. The first consists of the General Body and the committees like Standing Committee, four Ward Committees, and other (Subject) Committees, which together are responsible for the policies and other administrative matters referred to them. The second wing is administrative wing, headed by the Municipal Commissioner.

- (24) The administrative set up is headed by the Municipal Commissioner, assisted in his functions by the Deputy Municipal Commissioner, Executive Engineer (Public Works), Executive Engineer (Water Supply), Chief Auditor and Medical and Health Officer.
- (25) **Organization of Water Supply and Drainage Department:** The setup of the water supply and drainage services is as under:



- (26) **Organization of Drainage Department.**
- (a) Sangli and Miraj Drainage Departments have two sections each viz. Civil and Mechanical, besides the office staff which look after the routine administrative functions.
 - (b) There are in all 116 persons working in the two drainage departments, 74 in Sangli, 42 in Miraj, against the sanctioned strength of 87 and 13, in Sangli and Miraj respectively. Out of the filled posts, 2 are in the managerial cadre, 9 are supervisors, 22 in operating category and 83 in helper category. Average population served by one staff member is 1545 in Sangli, 1564 in Miraj and 1726 in the Corporation as a whole.
- (27) **Staff profile.** The profile of the staff is as under:
- (a) The age profile of the staff shows that majority of the staff members (78 %) are in the age group of 36 to 55. 17 % of the staff are below the age of 35. Average age of the staff is 42.
 - (b) About 58 % employees have an experience of more than 15 years, while 42 % have an experience of 5 to 15 years. Thus the staff is quite well experienced.
 - (c) Education wise, less than 6 % of the employees hold degree or diploma. Only 13% have some vocational training in the related trades, while almost 81 % employees are educated upto 10th school standard only.
 - (d) 76 % of the staff are in the lowest salary scale, while another 21 % are in the next higher scale.
- (28) **Comparison of age with education and experience.** Comparison of age and education of the staff reveals that young employees upto age of 25 have only high school level education and 44% of employees in the age group of 26 to 55 are educated only upto SSC level. 31% employees in this age group have no formal education. Similarly, only 7% of employees have some formal education either in the form of vocational training or degree/diploma.

- (29) ***Adequacy of qualifications and experience.*** The managerial staff has adequate qualifications and experience for the designated functions. Only 2 out of 9 supervisors are not adequately trained to perform their functions. In operating cadre also, most of the technical persons have suitable qualifications in the respective trades.
- (30) ***Adequacy in respect of promotion to senior cadre.*** For promotions to the managerial cadre, adequately qualified and experienced supervisors are available. However, for promotion to supervisory cadre, suitable staff in the operating level is not available except for the post of Maistry. Similarly, adequately trained and experienced staff at the helper level is not available for promotion to the operating level.
- (31) ***Human resource development policies.*** There are no well documented HRD policies, which are followed in SMK-MC.
- (a) The concept of manpower planning is not followed in a real sense. The list of "sanctioned" posts is followed as a guideline. Vacancies are filled by recruitment or transfer. There are, at present, many vacancies in the water supply and drainage department. There is no system of career planning of individuals.
 - (b) The recruitment is done as per the set of Recruitment Rules of SMK-MC. There is no formal policy for training.
 - (c) Promotions are done as per the recommendations of the promotion committee.
 - (d) Transfers are done by the Commissioner.
 - (e) Some staff (usually in class IV) is employed on contract for a maximum period of one year.
- (32) ***Labour relations.*** Labour relations in the Corporation have generally been amicable. There are three employees' unions, which look after the interest of the employees. The major demand is application of the recommendations of the 5th Pay Commission.

Systems, procedures and records

- (33) The Corporation has not framed its manual or by-laws. It follows bylaws of the erstwhile municipal councils at Sangli and Miraj and the Maharashtra Municipal Accounts Code, 1971. Record is kept in the form of registers, which are maintained manually. Only limited use of computer is made in billing and preparing demand register. However steps are being taken up to computerize many other operations of SMK-MC. The status of main systems and procedures followed is as mentioned below:
- (a) ***Granting new drainage connections.*** Elaborate procedure and forms are prescribed for granting new drainage connection.
 - (b) ***Customer grievance and redressal.*** In both Sangli and Miraj, a formal system of receiving, recording and attending to the complaints of the citizens is operated. The redressal normally takes one or two days. On an average, about 4 complaints are received daily in Sangli and 16 in Miraj.
 - (c) ***Periodical reporting.*** The Municipal Commissioner reviews the work of all the departments every week, for which one report is prepared by the Executive

Engineer (Water Supply) for the review of the Commissioner.

- (d) **Other records and registers.** Registers are maintained on daily basis at all the sewage pumping stations. In addition stock registers, accounts of revenue and capital expenditure and employee related records are maintained periodically.

D. Municipal Fiscal Status.

Municipal accounts and financial reporting

- (34) The Corporation's accounts are maintained on cash basis. Annual budget report is presented to the Corporation, which includes last two years actual accounts and budget estimates for the next year. Budget covers two parts: Part 'C' represents water supply and sewerage operations while part 'A' covers all other services. Both these parts have capital and revenue accounts on income and expenditure.

Financial performance of SMK-MC

- (35) Total income of the Corporation increased from Rs.394.28 million in the year 1998-99 to Rs.477.11 million in the year 2000-01, thus registering an average growth of 10.2%. During the same period, expenditure increased from Rs. 397.28 million to Rs.439.96 million with average growth of 10.6%.
- (a) **Revenue account performance.** Out of the total income, revenue income constitutes 86% share of the Corporation. Revenue income registered a growth of 19% during 1998-99 to 2000-01, which was the result of increase in the income from Rs.255.58 million to Rs.359.76 million in the respective years. Out of the total revenue income, share of the property tax and octroi was 17% and 59% respectively whereas income from revenue grants was 15% of the total revenue income. Income from properties and miscellaneous source constituted remaining 9% share of the total revenue income. In the same period, revenue expenditure of the Corporation increased from Rs.180.06 million in the year 1998-99 to Rs.225.82 million in the year 2000-01, with an average growth of 12% per annum. During this period, the Corporation generated average revenue surplus of Rs.112.37 million from Budget A operations. The water supply and sewerage operations resulted in an average deficit of Rs.17.96 million, which is 15% of the average annual revenue surplus.
- (b) **Capital account performance.** During the period under the review, the Corporation's capital expenditure increased from Rs.69.41 million to Rs.120.37 million. During the same period, the capital income generated was Rs.0.42 million and Rs.0.29 million respectively. Thus, the Corporation faced an average capital deficit of Rs.95.77 million from budget A and C operations. This is mainly due to the fact that there are no sources of capital income. Most of the capital expenditure is financed by the revenue surplus generated by the Corporation.

- (c) **Net surplus from operations.** The opening surplus (reserves) available with the Corporation at the beginning of the year 1998-99 was Rs.15.10 million. At the end of the year 1998-99, the surplus available was Rs.12.10 million, which increased to Rs.35.32 million at the end of the year 1999-00. But in the year 2000-01, the net surplus dropped to Rs.26.47 million.

Financial performance of sewerage operations

(36) **Revenue account performance.**

- (a) **Revenue income.** Revenue income from sewerage operations has remained more or less at the same level viz. Rs.4.22 million in the year 1998-99 and Rs.4.12 million in the year 2000-01. Out of this income, the share of income from drainage taxes was 92.1%. Other income sources are irrigation charges, drainage license and connection fees, income from private latrines and covers etc., the share of which was negligible in the total revenue income. The drainage tax is a part of property tax and is charged at 5% of the rateable value.
- (b) **Revenue expenditure.** Revenue expenditure covers expenditure on the items like establishment, M&R, power and fuel, administrative and other expenses. The revenue expenditure on sewerage operations increased from Rs. 13.94 million in the year 1998-99 to Rs.14.87 million indicating an average growth of 4%. Out of components of the revenue expenditure, the share of staff (establishment) cost was 49% of the total expenditure, whereas that of power cost and M&R was 28% and 22% respectively.
- (c) **Operating ratio.** Operating ratio was 3.30 in the year 1998-99 and 3.61 in the year 2000-01 respectively.

- (37) **Capital account performance of sewerage operations.** The Corporation incurred capital expenditure of Rs.4.12 million and Rs.3.03 million in the years 1999-2000 and 2000-2001 respectively. Out of this, 78% of the amount was spent on expansion of the existing schemes and/or for implementation new schemes. There is no source of capital income of sewerage operations.

- (38) **Collection performance.** The collection performance (of total demand) of Sangli Drainage Department was 62%, 68% and 64% in the years 1998-99, 1999-2000 and 2000-01 respectively. In Miraj, the collection performance of the total demand for the same period was 37%, 47% and 40% respectively.

- (39) **Sewerage connection.** Information about sewerage connections in Sangli is not available. In Miraj, there are 13,744 connections.

E. Future Proposals, Investment Plans and Sustenance

Status of Planned Proposal

- (40) **Sangli Sewerage.** Some proposals have been prepared to extend the benefit of sewerage to the uncovered areas and prevent pollution of drinking water source.
- (a) **Master Plan.** This has been prepared to serve a population of 425,000 in year 2021 and includes components of additional sewer lines, rehabilitation of existing pumping stations, construction of additional four pumping stations and two treatment plants. The project cost estimated is Rs. 421.90 million.
 - (b) **Phase I of Master Plan.** Two primary sewers (R and U) are proposed in this project. The project has been approved by the Government of Maharashtra and is being implemented.
 - (c) **National River Action Plan Project.** This project includes the interception and diversion works and treatment plant (stabilization ponds) in Dhulgaon area. The project is yet to receive the approval of Government of India. The project cost estimated is Rs. 220.12 million.
- (41) **Miraj Sewerage.** The municipal corporation has deposited the funds required for surveys and design with Maharashtra Jeevan Pradhikaran. The project is yet to be prepared.
- (42) The FIRE project has scoped out and commenced implementation of a complementary approach to address the issue of ensuring access by the *urban poor to environmental infrastructure services*. The FIRE Project proposes to formulate strategies to improve access by the poor to basic services in the development of commercially viable urban water supply and sewerage projects in Sangli-Miraj-Kupwad Municipal Corporation. City-level action plans for slum upgrading will be prepared with active participation of all stakeholders. Implementation of the community and city level action plans will help to improve access to urban services by the poor, empower communities to participate in the process, build municipal capacity to respond to demands for services from low income settlements, and converge funds from different sources and contributions from the communities. As a part of Phase I, the FIRE Project has identified 10,800 households in 99 low-income settlements, of which 49 are situated in Sangli, 39 in Miraj and 11 in Kupwad. About 64 % of these settlements are located on public land. About 24 % of these settlements have access to community toilets and the settlements having access to individual sanitary units are negligible.

Demand Supply Assessment

- (43) **Sangli Sewerage.** The demand of sewerage facility is estimated at 27.879 MLD. In comparison, the existing sewer network does not cover entire area, is overloaded and needs to be extended and strengthened. All the pumping stations need to be rehabilitated and new pumping stations need to be created in uncovered areas. The existing treatment plant is to be improved and additional plant is required to be constructed.

- (44) **Miraj Sewerage.** The existing sewerage system can handle about 10 MLD flow compared to the present demand of 16.198 MLD. Sewer network needs to be extended, pumping arrangement needs to be augmented and existing plant needs to be revamped.
- (45) **Kupwad.** Since Kupwad does not have any sewerage facility so far, a new scheme will be necessary to take care of the present demand of 4.568 MLD.
- (46) **Augmentation Proposals.** Even with the two projects in Sangli, the demand of the town in years 2016 and 2031 will not be met. No proposals for augmentation of sewerage in Miraj and new scheme in Kupwad have been prepared so far.

Potential Areas of Improvement

- (47) **Technical Aspects.** Improvements in following areas are required.
- (a) Strengthening of sewers in Sangli and Miraj.
 - (b) Rehabilitation of pumping stations in Sangli.
 - (c) Improvements in sewage treatment plants in Sangli and Miraj.
- (48) **Institutional aspects.** Improvement in following areas is suggested.
- (a) Lack of homogeneous functioning of drainage departments in Sangli and Miraj.
 - (b) Need for manpower planning.
 - (c) Lack of formal education.
 - (d) Shortcomings in present HRD policies.
 - (e) Need for improvement in records and registers.
 - (f) Need for formal system of reporting and monitoring of key indicators.
- (49) **Financial Aspects.** Following areas need to be improved.
- (a) Collection performance of property tax.
 - (b) Control on energy and staff costs.
 - (c) Improvement in adverse operating ratios.
 - (d) Need to create comprehensive database of sewerage connection.

Investment Plans, Financial Implications and Investment Assistance

- (50) **Investment.** Some short term measures are required to be taken up for the optimum utilization and benefit of the existing schemes and the proposed two projects in Sangli (R and U sewers, and NRAP). The investment required for these measures is estimated at Rs. 26.65 million (Rs. 24.50 in Sangli and 2.15 in Miraj).

F. Sewerage Indicators

Indicator		Value
A. % Coverage (Population with access to sewerage services)	Sangli	52
	Miraj	54
	Kupwad	-
	SMK-MC average	49
B. Sewer network performance		
(a) Sewerage blockages/km in year 2000-2001	Sangli	31
	Miraj	143
C. Cost and staffing.		
(a) Unit operational cost		
	Rs/m ³ sewage handled in year 2000-2001	1.76
(b) Staff per 1000 population served.	Sangli	0.55
	Miraj	0.52
	Kupwad	-
	SMK-MC average	0.54
(c) Labour cost as a proportion of operational cost (%)		49
(d) Contracted out service cost as a proportion of operational cost.		Nil
D. Quality of service		
(a) Complaints about service per day	Sangli	4
	Miraj	16
(b) Waste water treatment (% of waste water treated)		about 70%
E. Billing and collection		
(a) Average tariff in Rs/m ³ (Total revenue/sewage flow handled)		0.49
(b) Total revenue per population served in Rs/capita/year		19.10
(c) Connection charge (Rs. per connection)	Domestic	50
	Other	50 to 500
(d) Collection period (Year end total receivables/Total annual operating revenues expressed in months equivalent of sales)		9

F.	Financial performance		
	(a) Working ratio (Operational expenses/ Total annual revenues)		
	i. in 1998-1999	:	3.30
	ii. in 1999-2000	:	2.93
	ii. in 2000-2001	:	3.61
G.	Capital Investment		
	(a) Investment in 2000-2001 (% operating revenue)	:	128
	(b) Net fixed assets/capita	:	NA
	(c) Investment in Rs. per capita served.	:	24.43

I. INTRODUCTION

A. Historical Background of Sangli - Miraj - Kupwad

- 1.1 The twin cities of Sangli-Miraj, which together with Kupwad form the Sangli - Miraj - Kupwad Municipal Corporation, are located on the banks of the river Krishna in the southern part of Maharashtra State. Sangli, as a city, has seen growth mainly in the last two decades.
- 1.2 Historically, this city came into existence as a combination of six lanes called *Saha* (six) *Galli* (lanes) in Marathi, which then came to be known as SANGLI - The City of Six Lanes. His Highness Chintaman Raje Patwardhan, the Maharaja of the then princely state of Sangli played a vital role in promoting Sangli as a major business centre in the State. Sangli is now known as a Decent City in Maharashtra.
- 1.3 Miraj a twin city with Sangli is famous for musical instruments like Sitar, which are exported from here. Miraj has also developed as a Healthcare Centre with famous Hospitals like the Wanless Hospitals, Cancer Hospital and the Mental Hospital. Miraj is also a major railway junction.
- 1.4 Kupwad, till recently a separate municipal council, lies between Sangli and Miraj and has developed as a satellite township, with an industrial estate dominating its present land use.

Population

- 1.5 The historical population and growth trend of the three towns were as shown below.

Table 1.1: Population of Sangli, Miraj and Kupwad

Year	Population				Growth (%)
	Sangli	Miraj	Kupwad	Total	
1951	50,287	40,224	6,326	96,837	
1961	73,838	53,545	6,793	133,976	38.35
1971	115,138	77,606	9,353	202,097	50.85
1981	152,389	104,555	11,716	268,660	30.94
1991	196,181	121,564	33,313	351,058	30.67
2001 (estimated)	258,000	150,000	42,000	450,000	28.18

- 1.6 The growth of the city was faster in decades 1951-1961 and 1961-71, but in subsequent decades, it appears to have slowed down and settled for a moderate level of about 30% per decade.

Location of the city

- 1.7 Sangli is located about 450 km from Mumbai (Bombay), 750 km from Bangalore and 260 km from Pune in Southern Maharashtra. It is just 30 km off the Mumbai-Bangalore National Highway NH4. The Nagpur-Ratnagiri Highway MSH3 also passes through

Sangli. It lies on the border of Maharashtra and Karnataka States and acts as Maharashtra's hub to South Indian States. Goa and Andhra Pradesh States are also nearby.

Communication links with other cities

- 1.8 Sangli enjoys a central and strategic location in Southern Maharashtra and is linked to most parts of Maharashtra by road and railways. Twin cities of Sangli and Miraj lie on the Delhi-Goa Broad Gauge Railway line. Miraj is a major railway junction. The important railway routes like Delhi-Mysore, Mumbai-Bangalore also pass through Sangli-Miraj. The Kavalapur airport at Sangli which has been non-operational for the last decade due to short runway is now being expanded and will be ready for flights soon. This will connect Sangli to important cities in India.

Local economy

- 1.9 Over the years, Sangli has also developed as a prominent commercial centre in southern Maharashtra. Sangli is a main wholesale market for turmeric, jaggery, chillies and foodgrains.
- 1.10 Sangli has also developed as major Sugar and Jaggery Centre in India during the regime of Late Dr. Vasantdada Patil, the former chief minister of Maharashtra. He established various co-operative Sugar factories in the western Maharashtra region in and around Sangli. The Sugar Factory in SANGLI is the largest in Asia.
- 1.11 In addition to wholesale markets, there are localised retail markets in the commercial areas of the cities dealing in food grain, grocery, wood and furniture items, clothing etc. Co-operative departmental stores are also popular in Sangli.
- 1.12 The Spices and Oilseeds Exchange, Sangli Chamber of Commerce and Krishna Valley Chamber of Commerce and Industries are the major institutions associated with commercial activities in Sangli.
- 1.13 The head quarter of Sangli Bank Limited, one of the prominent banks in Maharashtra is in Sangli. Sangli Bank has around 200 branches spread all over India. The city also houses other nationalised banks and co-operative banks.
- 1.14 Sangli city has one of the largest industrial areas in Maharashtra. In addition to the MIDC Industrial Estate, following industrial areas have many medium and small-scale industrial units:
- (a) Vasantdada Industrial Area, Sangli
 - (b) Marathe Industrial Area, Miraj
 - (c) Islampur MIDC Industrial Area
 - (d) Vita MIDC Industrial Area
 - (e) Jaysingpur- Shirol Industrial Area
 - (f) Ichalkaranji Textile Zone
 - (g) Palus-Kirloskarwadi Industrial Area

Some other new MIDC industrial areas are also coming up in Sangli district.

- 1.15 Recently Sangli is coming up as a mini metro city with a number of Educational Institutes, Industrial Estates and all modern facilities such as Mobiles, Internet, etc. It has a large number of schools and colleges in both English and Marathi medium; such as colleges in Engineering and Information Technology, Medical, Pharmacy, Management, Law, etc.

B. Background of the Status Report on Sewerage

- 1.16 **Objective.** Sangli-Miraj-Kupwad Municipal Corporation (SMK-MC) has initiated a Water Supply and Sewerage Project with private sector participation, with a twin objective of improving the operation, maintenance and management of the existing system and developing new projects for major investments for meeting the future demands. This effort is aimed at eventually privatising the water and sewerage system in a phase-wise manner.
- 1.17 USAID, FIRE - D and IL&FS are actively assisting SMK-MC in implementing this reform program through PSP. It is expected that the successful implementation of this demonstration project will lead to developing sustainable models for medium towns of Maharashtra (and India).

This project will be implemented in two phases viz.

- Phase I :** Improved O & M and management of existing system through PSP.
- Phase II :** Development of the Project for meeting future demands, arranging finances with PSP and procurement of an operator for implementing the Project.

Scope of Consultant's Work

- 1.18 **Preparation of a Status Report on the existing water and sewerage system.** As per the scope of work, defined by FIRE, the consultant is expected to collect, compile and analyse the existing information on the existing water supply and sewerage as detailed below.
- (a) Based on available records with SMK-MC like maps, drawings, data sheets, reports etc assess the physical conditions and status of the water supply facilities such as raw water pumping, water treatment plants, raw and pure water rising mains, elevated service reservoirs, distribution systems, consumer connections and metering systems. In case of sewerage systems, such facilities would include collection and conveyance systems, treatment plants, pumping stations etc. The records will have to be collected from the concerned department of the Municipal Corporation and the local offices of the Maharashtra Jeevan Pradhikaran (MJP). The adequacy, accuracy and completeness of the records should be commented upon.
- (b) Based on the records made available by the SMK-MC, compile the information

about the age of facility and also status of the performance and utilisation of the facilities mentioned in (1) above. The objective of this assessment is to determine the service utility of the equipment for some more periods and the need to replace / repair some of that equipment to make it serviceable.

- (c) Document from available sources, the service levels of the water supply and wastewater facilities at various locations of the city. The important factors to be covered in this assessment are - coverage of the area, number of hours of supply, quantity, reliability, pressures and quality of water. The deficiencies noted in the service levels should be highlighted.
- (d) Assess the population coverage and coverage of various categories of consumers with respect to number and types of connections such as stand posts, individual connections and areas covered. This assessment should also include the slum settlements and other disadvantaged groups.
- (e) Assess the nature and extent of record keeping in the municipal corporation with respect to water supply and sewerage operations. This should cover the types of records (forms, registers, records etc) frequency of updating and utilisation. This assessment must cover the aspects of system records, maintenance, consumers, billing and collection and consumer grievance. The possibility of improving the record keeping through computerisation and other measures should be commented upon.
- (f) Collect information on the present procedures followed for the maintenance of the facilities (preventive or breakdown), scheduling of such maintenance, attending breakdowns, attending leakage etc. The nature and level of repairs and maintenance undertaken during last three years must also be documented. If some components show alarming levels of disrepair or neglect, on the basis of quick assessment of this records, these should also be highlighted.
- (g) On the basis of the available reports, collect and compile the information on the proposed augmentation plans of the water supply and sewerage facilities. The status of these plans with respect to various approvals, financing arrangements, implementation should be stated. The consultant is also expected to assess the nature and quality of augmentation plans in terms of technical, economic, social and environmental issues.
- (h) Collect information on the organisational structure of the water supply and sewerage departments of the Corporation covering Head Office set-up and set-ups provided at ward offices and installations. Compile the details of the staff deployment covering all the staff categories. The details should include name, age, staff category/position, job responsibilities, educational qualifications, collected for the permanent staff. For contract staff, the number of persons deployed for each category should be compiled. Deficiencies noted in the quick analysis of the information should be highlighted.
- (i) Collect information on the financial performance of the water supply and sewerage services and assess the cost of service. (Based on expenses on staff,

consumables, electricity, debt servicing if any etc.) The priority attention areas, which become evident in this assessment, should be noted.

- (j) Conduct the demand-supply assessment of the water supply and sewerage services. Cognisance of the proposed augmentation plans should be taken in this assessment.
- (k) Conduct preliminary water audit of water production and consumption based on the billing records. Broad recommendation should be made in respect of (i) making the records complete to cover various items to be considered in the water audit, (ii) areas of concern in respect of the unaccounted for water, and (iii) action plan which the Corporation should initiate to correct the situation.
- (l) Compile all information available into presentable reports including preparation of necessary maps.
- (m) Identify and describe potential areas of improvement.

1.19 ***Preparation of a Status Report on Billing and Collection System.*** The Consultant shall collect, compile and analyse the existing information on the existing billing and collection system related to the water supply and sewerage services provided by the Corporation as detailed below.

- (a) Collect and analyse the information on existing practices of record keeping related to the billing and collection within the municipal corporation with respect to water supply and sewerage operations. This should cover all the activities from preparation of the bill till its receipt/recovery and generation of reports on arrears/collection, if any. The adequacy, accuracy and completeness should be commented upon. Recommendations should be given for making this record up-to-date and complete.
- (b) Collect information on granting and execution of connections to various categories of consumers. Appropriateness of the system should be commented upon.
- (c) Collect information on the revenue generation mechanisms (including water charges, connection charges, water tax, conservancy tax etc.) and their collection performance during past 3 years.
- (d) Collect and compile information of present tariff and past revisions (last three years) across various categories of the consumers. Since Miraj Water Supply Scheme has been recently taken over by the Municipal Corporation from Maharashtra Jeevan Pradhikaran, information on tariff profile of MJP in Miraj area should also be collected.
- (e) Collect information on the existence and extent of illegal connections, if possible. Details of surveys of illegal connections, if done in the recent past, should also be collected.

- (f) Collect information on the metering policy of the Corporation (installation, maintenance and replacement) and assess the performance of the meter-based connections on the basis of available information. If any disparities exist in individual areas such as Sangli, Kupwad and Miraj due to the historical practices adopted by the local municipal bodies, MJP, MIDC etc, these should be highlighted.
- (g) Assess and document the procedure for recording water consumption and estimation of billing demand. The performance of meters, policy on repairs to meters and corrective measures in billing and recovery should also be highlighted.
- (h) Assess the procedure for delivery of bills and collection of revenues. Document the procedures for the delayed payment. The deficiencies noted in the procedures, areas of concern and the possibility of alternative measures to correct the situation should be highlighted.
- (i) Assess the collection efficiency of water charges and / or taxes based on the historical performance. Estimate the arrears from various categories of consumers. Areas, which need priority attention, should be noted.
- (j) Collect information on the procedures for the disconnections and reconnections.
- (k) Collect information on customers grievance system including documentation of type of complaints. Effectiveness of the system should be highlighted.
- (l) Compile all information available into presentable reports including preparation of necessary maps.
- (m) Identify and describe potential areas of improvement.

Base for report preparation.

1.20 The status report is based on the

- (a) Project reports of various stages of development of water supply and sewerage services in SMK-MC, collected from the corporation and Maharashtra Jeevan Pradhikaran,
- (b) Maps of the water supply and sewerage schemes showing the pipe and sewer networks,
- (c) Records in various sections of water supply and drainage departments and other department of SMK-MC,
- (d) Discussions with the officers and staff of various departments of SMK-MC, who are connected with the water supply and sewerage operations in the town,
- (e) Field visits by a team of engineers to various installations of the existing water supply and sewerage schemes, for studying their condition and performance,

- (f) Reconnaissance surveys of all wards to gather information about the coverage and level of service and assessment of likely demand, and
- (g) Field visits with the maintenance staff of SMK-MC for collecting information required to prepare an updated map of the water supply distribution network.

C. Structure of the Report

Separate reports are prepared for water supply and sewerage systems. This report, which deals with the sewerage system, is divided into three volumes. Volume I contains the Status Report, which is divided in five chapters as under:

- Chapter I : Introduction
- Chapter II : Existing Sewerage
- Chapter III : Institutional Arrangements
- Chapter IV : Municipal Fiscal Status
- Chapter V : Future Proposals, Investment Plans and Recommendations

Volume II includes following five appendices, which provide detailed background information used for preparing the text of the above chapters.

- Appendix A : Details of System Coverage
- Appendix B : Staffing Particulars
- Appendix C : Registers and Forms
- Appendix D : Municipal Finance Status
- Appendix E : Augmentation Proposals

Volumes III includes the fact sheets on each system component.

II. EXISTING SEWERAGE SYSTEM

2.1 Sewerage facilities have been developed and are in use in the old parts of Sangli and Miraj for last three decades. These were operated and maintained by the respective erstwhile municipal councils earlier and are now being operated by the municipal corporation. Kupwad does not have any sewerage facility.

A. Sangli Sewerage ¹

History

2.2 The sewerage scheme was planned in year 1965 to serve a population of 100,000, planned for the year 1985. The works of the scheme were eventually completed and commissioned in year 1976 and handed over to the municipal council for operation and maintenance in the year 1982.

Sewage Collection

2.3 The sewer network consists of primary and secondary sewers of diameters ranging from 150 to 900 mm and length of 14.21 km, laid in the old part of the town. Tertiary sewers, which are mostly 150 mm diameter lines, are laid as per the demand over the last 30 years. Total length of sewers is about 53 kms. The sewers are overloaded in most of the areas, generally blocked and require frequent cleaning.

Sewage Pumping and Conveyance

2.4 *Civil Structures of Pumping Stations.* The sewage, collected through the sewer network, flows to three pumping stations. Two of these pumping stations (at Sangliwadi and Vakharbag), are lift stations from which sewage is pumped to the nearby primary sewers. The entire sewage of the sewered area of the town is collected in the terminal pumping station on Kolhapur Road.

(a) Sangliwadi Pumping Station. The structure was designed separately for wet and dry wells. However, the dry well has also become a wet well. Conditions look poor, due to apparent neglect in maintenance. Some sewage is diverted to the river, before it reaches the pumping station. Thus the structure, as it exists, is not performing as per its design. There is no control over the detention of incoming sewage. Screening does not take place. Hence it will need substantial modifications and repairs, if it is to perform as an efficient component of the sewerage system.

(b) Vakharbag Pumping Station. This structure also was designed for separate wet and dry well. However, the dry well has become a wet well. Condition looks bad, due to apparent neglect in maintenance. The structure, as it exists, is not performing as per its design. There is no control over the detention of incoming sewage. Screening does not take place. It will need substantial modifications and

1 Layout of the system is shown in Figure 2.1. Details of components appear in Fact Sheets in Volume III.

repairs if it is to perform as an efficient component of sewerage system. It is however seen that in the new sewerage system and National River Action Plan proposals, this pumping station will be eventually bypassed and thus will become redundant.

- (c) Kolhapur road pumping station. This pumping station, which is the terminal pumping station, is also not being operated as per the original design. Basic structure is reasonably good but lacks maintenance. Also it is being used on and off. Pumping is done, only if there is some demand of treated sewage for irrigation from the oxidation ponds. Otherwise, the sewage is diverted straight to the river, before it reaches the pumping station. As such, the pumping station is not performing in the manner it is designed. However, the basic structure can be used, after suitable modifications and repairs.

2.5 ***Pumping Machinery.*** The pumps of the original design are completely damaged and not in use in any of the three pumping stations. The pumps, now installed in these pumping stations, are horizontal centrifugal pumps. One pump each is installed at ground level in the open outside the pump houses in Sangliwadi and Vakharbag pumping stations. Three pumps in Kolhapur road pumping station are installed in the pump house over two wells. (Two of these pumps are presently removed for repairs) The pumps do not have good foundation and are vibrating. Maintenance appears to be poor. The pumps are operating with positive suction and are not suitable for pumping sewage. Installation is not properly done. As such, even the pumps, which are in operating condition, will not fit in any new scheme. There is a proposal to use different types of pumps in the NRAP project, since the pumps do not fit in the specifications of a sewage pumping station and need to be replaced.

2.6 ***Pumping Mains.*** Sewage from the two lift stations is pumped to the nearest manholes of the adjacent sewer district and eventually flows to the terminal pumping station. From this pumping station, sewage is pumped to the sewage treatment plant. All the three pumping mains (225 mm humestee pipeline from Sangliwadi, 375 mm cast iron pipeline from Vakharbhag and 600 mm hume steel pipeline from Kolhapur road pumping station), are old, but in use. They are, however, not operated for the full discharge of the sewage from the seweried areas. For their continued use in the new system, detail investigations of their condition and performance needs to be made

Sewage Treatment Plant

2.7 The sewage treatment plant, located in S.No. 334 near Dhamani road, is designed to treat 13.10 MLD sewage and consists of pretreatment works (of intake chamber, screen, detritors) and 10 units of stabilization ponds. The effluent is used for irrigation. However the irrigation command area, which originally covered 900 acres (360 hectares), has substantially reduced due to residential development. Sewage is pumped to this plant only when there is some demand of effluent for irrigation. Otherwise, untreated sewage is diverted to Krishna River before it reaches the pumping station. The basic structure of pretreatment works is in reasonably good condition, but not in use. However, screens are not in place and there is no arrangement to collect the screenings. Detritors do not have grit collection / removal facility. Oxidation ponds are substantially silted. The sidewalls and revetment need repairs. Thus while the treatment plant is able

to receive sewage, whenever it is pumped, it is operative only intermittently and well below its capacity. There is no measurement of quality of influent and effluent and the treatment efficiency cannot be measured. The capacity has been substantially reduced due to heavy silting. The outfall sewer from STP to the river is very old, difficult to access for repairs and not in use. Hence there are limitations on the quantity of sewage pumped to this plant. The plant can however be refurbished and brought in use, provided it is desilted, walls are repaired and arrangement for efficient disposal of treated effluent is done. It is, however, seen that in the NRAP project, this treatment plant is not proposed to be used and will eventually be discarded. This project is not yet approved by the Government of India and the time table of its implementation is still uncertain.

2.8 **Overall Sustainability of Sangli Sewerage System.** The objective of the sewerage scheme in the town is largely not being met, for the reasons stated below.

- (a) Many sewer lines appear to be overloaded and get clogged frequently.
- (b) All the pumping stations are not operated to their full capacity, pumps are not suitable for this function and a large part of the raw sewage is bypassed and flows to the river, before it reaches the pumping station.
- (c) The sewage treatment plant is not operated to its full capacity, most of the units are not maintained properly and there is no satisfactory arrangement for the disposal of treated sewage, when there is no demand for irrigation.

Service Coverage²

2.9 **Coverage of Area.** From the available maps and reconnaissance surveys of the various wards, it is seen that only about 9 sqkm out of 54 sqkm area (i.e. only 16.69% area) in 26 wards of the town has some sewer network.

2.10 **Coverage of Population.** The sewer network appears to serve about 52% of the estimated 258,133 population of Sangli town.

Performance and Quality of Service

2.11 **Performance.** The performance of sewerage system is not satisfactory since it is not meeting the objective with which it has been developed.

- (a) A large part of the sewage, collected in the sewer network does not reach the treatment plant. Untreated sewage flows to the river and pollutes it.
- (b) The design of the pumping stations is not satisfactory and they are not operated to their full capacity.
- (c) The sewage treatment plant is not operated to its full capacity and in a proper manner.

2 Refer Appendix A.

- 2.12 **Quality of Service.** While some facility of disposal of household sewage in the municipal sewer network is available to about 52% of the population, the lack of control on pumping and treatment eventually results in the disposal of the sewage in an unsatisfactory manner and pollution of river water, which happens to be the drinking water supply source of Sangli, Miraj and other towns on the downstream. There is no system of monitoring the quality of the influent and effluent of the sewage treatment plant, hence the treatment efficiency cannot be measured.

B. System Components- Miraj Sewerage³

History

- 2.13 Sewerage system in Miraj town is designed to serve a population of 80,000 in the old town and was commissioned in year 1969. It consists of about 40 km long sewer lines, one sewage pumping station in Timber area and a sewage treatment plant located on Bedag road.

Collection System

- 2.14 The sewer lines mostly cover the old town. The primary and secondary sewers consist of RCC pipe sewers of diameters varying from 225 mm to 675 mm, laid in the year 1968. The tertiary sewers (or laterals) are 150 mm RCC or stone ware pipelines laid at different times from year 1968. Total length of sewers is about 40 km. All the sewers are reported to be functioning without serious problems and difficulty, if regular cleaning is done.

Pumping and Conveyance

- 2.15 **Pumping Station.** The civil structure of the pumping station consists of a circular wet well on which the pumphouse is located. The design is suitable for pumps of wet well design. There are four pump sets of non clog centrifugal pumps coupled to vertical motors, two of them with discharge of 766,800 litres/hour each and run by 150 HP motors and other two with discharge of 180,000 litres/hour each and run by 70 HP motors. The combination of pumps can handle the varying inflow of sewage. The civil structure of the pumping station is quite good and capable of handling the present flows. The pumps and electrical equipment are in operating condition, except one 70 HP which that is undergoing repairs. No serious problems are reported. These pumps are able to serve the system for next 10-15 years, with good maintenance.
- 2.16 **Pumping Main.** The pumped sewage is conveyed to the sewage treatment plant through a 600-mm diameter and 4.8 km long prestressed concrete pipeline. This pipeline is functioning well.

3 Layout of the system is shown in Figure. 2.2. Details of components appear in Fact Sheets in Volume III.

Sewage Treatment

- 2.17 ***Sewage Treatment Plant.*** The plant has pretreatment works consisting of screen chamber and grit channel followed by eight units of stabilization ponds. The plant has a design capacity of 10 MLD. The effluent is used for land irrigation. The screens and grit channels do not have any arrangement for removal of screenings and grit. Hence there is heavy deposition of silt, which does not appear to be removed regularly. There is no velocity control mechanism due to which the tendency of deposition increases. The four stabilization ponds to the right of the inlet are in use. There is heavy deposition of sludge due to which the capacity is substantially reduced. The four ponds to the left appear to have been repaired recently and are in good condition. In general, there is no control on the functioning of the plant. Sewage enters at one end and leaves at the other. The quality of influent and effluent is not measured. The screens and grit channel are not being cleaned regularly, due to which their performance is unsatisfactory. There is no velocity control in the grit channel. Oxidation ponds also are filled with sludge. Hence their capacity must be substantially reduced. Other four ponds have not been brought in use. The basic design of the plant is suitable for use. However, some modifications in the screens and grit channel are required to ensure constant velocity. Also arrangement for periodical removal of screenings and grit needs to be done, and four ponds, which are still not used, are required to be brought in use immediately and other four ponds (which are full of sludge) are cleaned, need to be repaired and recommissioned.
- 2.18 ***Overall Sustainability of Miraj Sewerage System.*** The objective of the sewerage scheme in the town is largely not being met, for the following reasons.
- (a) Some sewer lines are overloaded and get clogged frequently.
 - (b) The sewage treatment plant is not operated properly and there is no control over its performance due to which the use of sewage for irrigation increases the risk of pollution of underground water sources on the downstream.

Service Coverage⁴

- 2.19 ***Coverage of Area.*** Only about 5.59% of the area of the town (viz. 2.46 out of 43.98 sqkm) appears to be covered by the sewer network.
- 2.20 ***Coverage of Population.*** About 81,000 of the present estimated population of 150,000 (i.e. 54.13%) have an access to the sewer network.

Performance and Quality of Service

- 2.21 ***Performance.*** The performance of the sewerage system in Miraj is comparatively better than that in Sangli, in respect of collection and conveyance of the sewage collected in the sewer network to the treatment plant. However, the sewage treatment plant is not being operated properly and there is no control over its performance.

4 Refer Appendix A.

- 2.22 **Quality of Service.** The congested areas in the town have the facility for disposal of the household sewage in the sewer network. However the quality of the disposal of this sewage is not satisfactory due to lack of control over the operation of the sewage treatment plant. There is no system of monitoring the quality of the influent and effluent of this plant, hence the treatment efficiency cannot be measured.

C. System Operation and Maintenance

Schedule of Operation and Maintenance

- 2.23 **Documents and Manuals.** The sewerage systems are comparatively old. As built drawings, plans and the O & M manuals of the installations are not available. Some maps of the sewer network are available, but do not show all the lines and apparently are not updated. The additions done are not fully shown. The individual know-how of the operating staff (fitters and maistries) is the most valuable piece of information.
- 2.24 **Schedule of Daily Operations.** A formal detailed scheme and schedule of unit operations is not prepared and documented. The daily operations of each component of the sewerage schemes are largely planned on the experience of the operating staff. The alterations required to be done in operations due to variation in the flow, interruptions in power, breakdowns etc are also done on the basis of individual experience of the operators.
- 2.25 **Schedule of Inspection and Maintenance of the Installations.** The schedule of periodical maintenance (i.e. preventive maintenance) and inspection is also required to be prepared and should be available with the operating staff and supervisory staff. However such a schedule has not been prepared. The preventive maintenance, being done, also depends on the experience and initiative of the operating staff.
- 2.26 **Maintenance Practices.** The operating staff attends to routine preventive maintenance of electrical and mechanical equipment such as pumps, valves, piping, motors, starters, transformers, oil circuit breakers, panel boards, meters, capacitors, cables, etc. of the pumping stations. The maintenance of civil works such as painting and minor repairs is attended to as and when required. A regular system of monitoring the quality of influent and effluent of the treatment plants is not followed.

Maintenance Facility

- 2.27 **Routine Maintenance and Small Repairs.** Repairs such as routine checking of electrical and mechanical plant and equipment, cleaning, connections, changing contacts, change of oil in transformers, etc. are done by the SMK-MC staff. A register is maintained to record these repairs. The spares required for the repairs are drawn from stores or are locally purchased.
- 2.28 **Special Repairs.** Special repairs like motor winding and repairs to pump shafts, bearings, impellers, sleeves are done through local workshops. These repairs are regularly recorded in the History Sheets or Repair Registers.

D. Key Issues

2.29 The key areas, which require to be improved, are listed below:

- (a) Coverage of sewer network is quite inadequate, both in Sangli and Miraj. Kupwad has not been provided with any sewerage facility.
- (b) Sewers in Sangli and Miraj are possibly being overloaded and get clogged frequently.
- (c) Pumping stations in Sangli require major repairs and rehabilitation measures to make them perform satisfactorily.
- (d) The current practice, in Sangli, of diverting the sewage flow directly to the river needs to be stopped.
- (e) The sewage treatment plants in both Sangli and Miraj require major repairs. Pretreatment units need to have arrangements to measure the flow, control the velocity and remove the screenings and grit. The oxidation ponds also require to be desilted and the earthen bunds need to be repaired. There is no arrangement to measure the quality of influent and effluent and to determine the efficiency of treatment process.

III. INSTITUTIONAL ARRANGEMENTS

A. Organisation of The Corporation

Background

- 3.1 The Municipal Corporation of Sangli, Miraj and Kupwad came into existence according to the provisions of the Government of Maharashtra Resolution No. GEN.1956/258/CR-154/96/UD-24 dated February 9, 1998. The Corporation was formed by merging the local urban areas of Sangli, Miraj and Kupwad, which were then under the administration of individual Municipal Councils.
- 3.2 Immediately after formation, the administration of SMK-MC came under the control of the Administrator. On July 27, 1998, first elections of the Corporation were held to elect the local representatives. The Ward Committees (*Prabhag Samiti*) were formed under the resolution No 41 of SMK-MC dated October 9, 1998 by the elected representatives. The Bombay Provincial Municipal Corporation Act, 1949 (The Act), is now applicable to SMK-MC.

Existing Organisation Structure of SMK-MC

- 3.3 The functioning of SMK-MC is controlled by the two main wings. The first wing consists of the General Body and the Committees like Standing Committee, Ward Committees (*Prabhag Samiti*) and other (Subject) Committees represented by the elected members. These are mainly responsible for formulating the policies and other administrative matters, that are referred to them according to the provisions of the Act. The second wing is the administrative wing, which is headed by the Municipal Commissioner. The Commissioner controls and supervises the working of various departments and implements the policies formulated by the elected representatives.
- 3.4 **Functional Committees.** As per the provisions of the Act, the following Committees function in SMK-MC.
- (a) Standing Committee. The Standing Committee of SMK-MC has sixteen members including the Chairman, who is appointed by the Corporators. One half of the members of the Standing Committee retire every succeeding year and new members are appointed out of the elected representatives. The members of the Standing Committee appoint one member as the Chairman who holds the office for a period of one year.
- (b) Ward Committees. Following four Ward Committees in SMK-MC represent 68 Wards of SMK-MC.
- | | | |
|------|------------------|------------|
| i. | Ward Committee 1 | ... Sangli |
| ii. | Ward Committee 2 | ... Sangli |
| iii. | Ward Committee 3 | ... Kupwad |
| iv. | Ward Committee 4 | ... Miraj |

Members of these Ward Committees are appointed from the wards falling under the jurisdiction of each Ward Committee. These members, in turn, appoint the Chairperson of the Ward Committee. On the administrative side, each Ward Committee has one Ward Officer. In SMK-MC, Ward Officers of Ward Committees 1 and 2 report to the Assistant Commissioner (Sangli), whereas those of the wards 3 and 4 report to the Assistant Commissioner (Miraj).

The Ward Committees are important components of the administrative set up because they are the main and direct link between the citizens and the Municipal administration. Following main functions assigned to the Ward Committee by the Act.

- i. The speedy redressal of common grievances of citizens, connected with local and essential municipal services like water supply, drainage, sanitation and storm water disposal.
- ii. To consider and make recommendations on the proposals regarding estimates of expenditure pertaining to the wards under different heads of account of the budget before being forwarded to the Commissioner,
- iii. To grant administrative approval and financial sanction to the plans for municipal works to be carried out within the territorial area of the Ward Committee and costing upto Rs. 0.5 million, provided that specific provision exists in the budget sanctioned by the Corporation.

The General Body of the Corporation can delegate additional functions to the Ward Committees. In addition to the budgetary provisions, the Ward Committees can sanction expenditure out of the budget of Rs. 0.4 million allocated to each corporator.

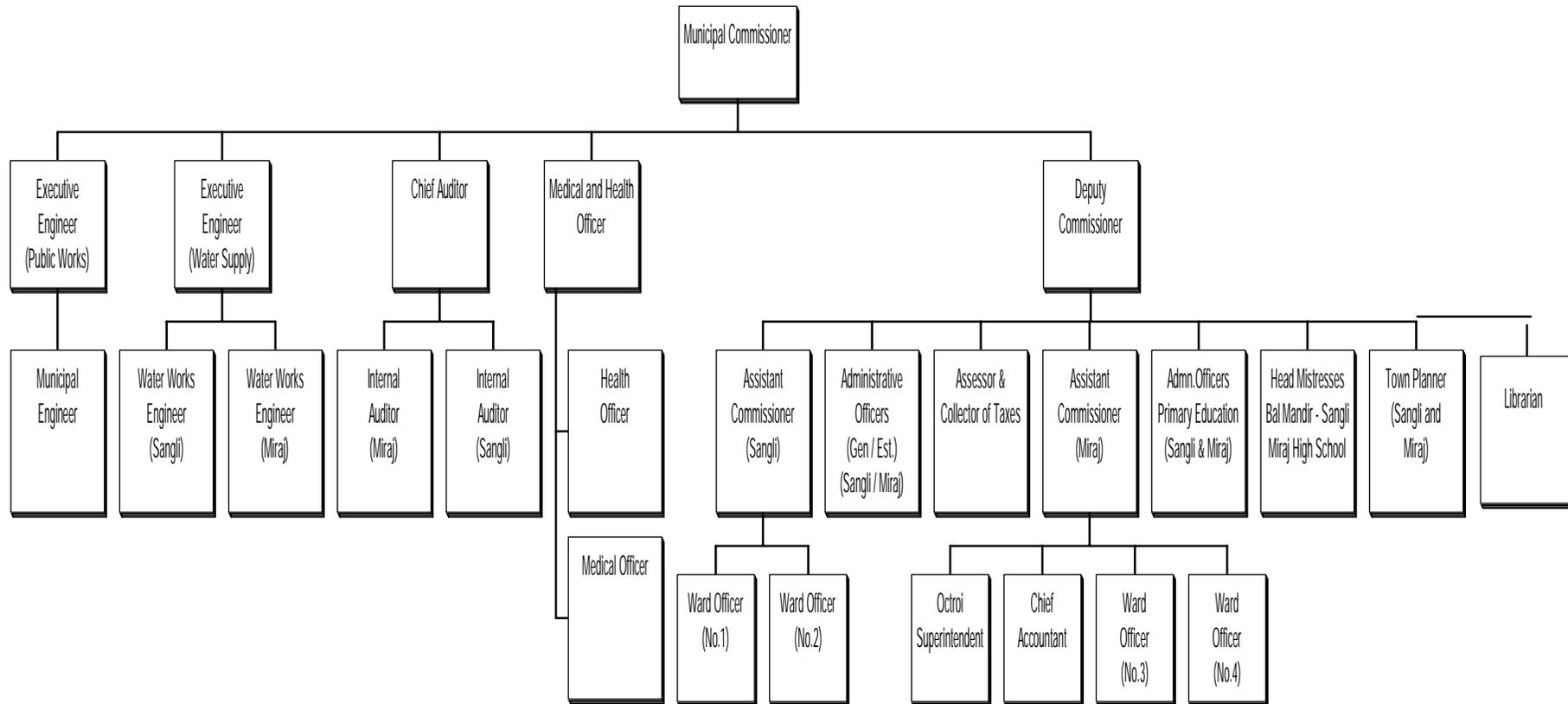
(c) Other Committees. SMK-MC has following other (Subject) Committees.

- i. City Improvement and Law Committee
- ii. Women and Child Welfare Committee
- iii. Backward Class Committee

3.5 ***Administrative set up.*** The Municipal Commissioner is appointed by the State Government. The tenure of his office is for three years, which can be extended for a further period of three years. He functions according to the powers assigned by the Act. The organisation chart of SMK-MC is presented in Figure 3.1.

3.6 As can be seen in the organisation chart, the Deputy Municipal Commissioner, Executive Engineer (Public Works), Executive Engineer (Water Supply), Chief Auditor and Medical and Health Office report directly to the Municipal Commissioner. Other departmental heads report to the Commissioner through these officers.

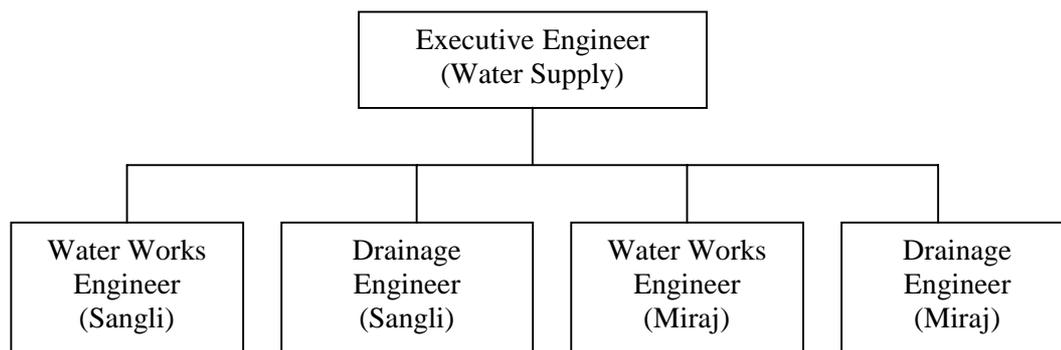
Figure 3.1: Organisation chart of Sangli-Miraj-Kupwad Municipal Corporation



B. Organization of Drainage Department²

3.7 Before formation of SMK-MC, drainage operations of Sangli and Miraj towns were managed by the respective Municipal Councils. After formation of SMK-MC, these two operations were brought under the control of the Executive Engineer (Water Supply) along with the water supply operations. The Organisation structure of SMK-MC is now as shown in Figure 3.2.

Figure 3.2 Existing Organisation Set-up of Water Supply and Drainage Services of SMK-MC



3.8 Operations and maintenance of sewerage systems are controlled and supervised by Drainage (Sanitary) Engineers of Sangli and Miraj. Office of the Drainage Engineer (Sangli) is located in the Hirabag Water Works complex. Office of the Drainage Engineer (Miraj) is located in the Municipal Corporation's office at Miraj.

3.9 Even though the Drainage Departments of Sangli and Miraj are functioning under the control of Executive Engineer (Water Supply), they still have retained their original forms / structures. Both these departments have independent sections / departments³ to take care of all functions like granting and installing new connections, operations and maintenance of the sewer lines, pumping stations etc.

3.10 **Sangli Drainage Department.** The operations of the department are grouped in Civil and Mechanical sections. In addition, office staff is provided to take care of routine office functions. The Civil Section is headed by a Junior Engineer and Mechanical Section by a Mechanical Engineer. While the Junior Engineer reports to Drainage Engineer, the Mechanical Engineer is accountable to the Water Works Engineer.

Activities carried out by different sections are presented in Table 3.1

² As per the practice followed in SMK-MC the department responsible for sewerage operations is called Drainage Department. In the report, the word Drainage is used to address the Drainage Department and sewerage is used to describe the operations.

³ Refer Figures 3.3 and 3.4 for organisation charts of Sangli and Miraj Drainage Departments respectively.

Figure 3.3: Organisation structure of Sangli Drainage Department

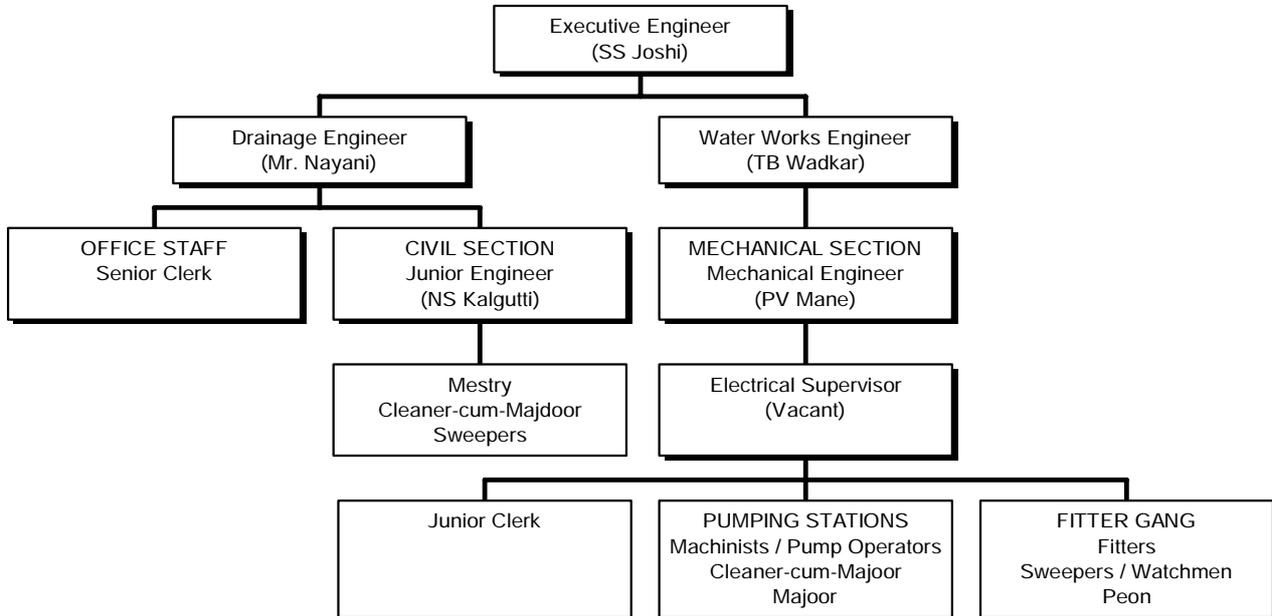


Figure 3.4: Organisation structure of Miraj Drainage Department

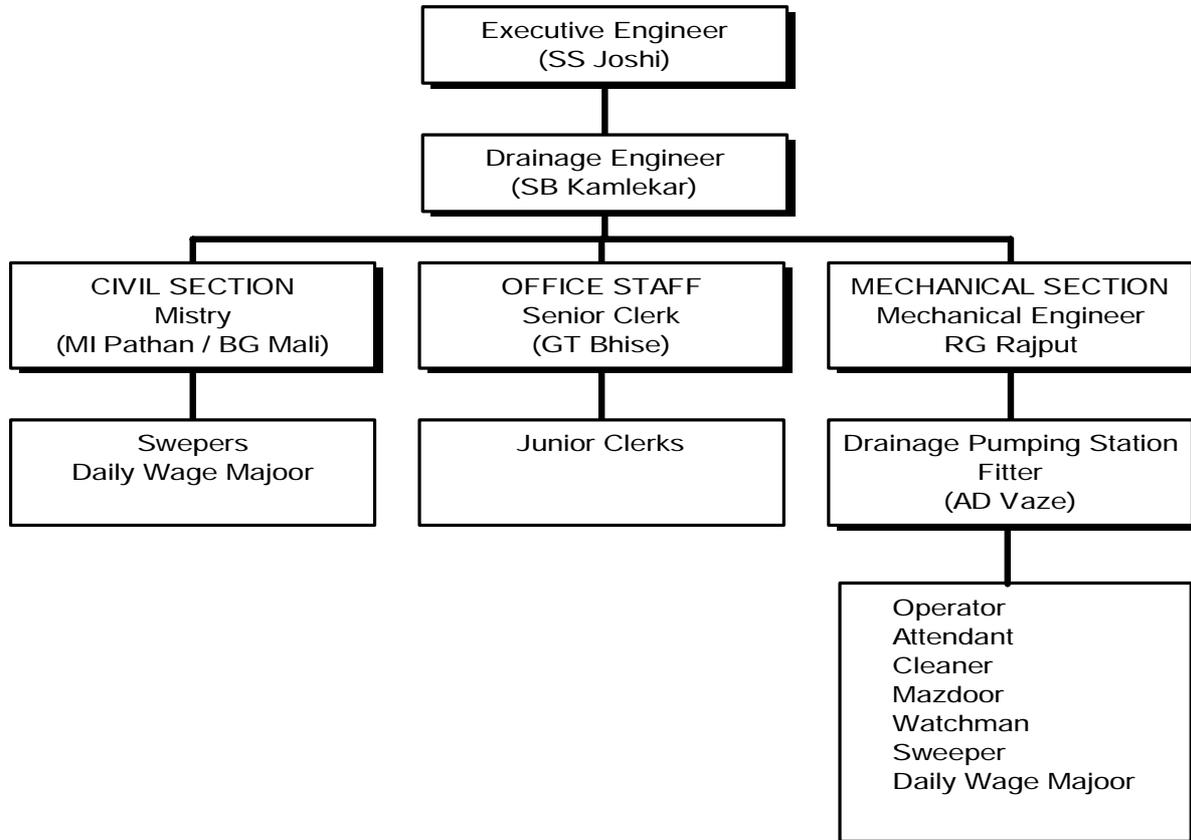


Table 3.1: Sections and activities of Sangli Drainage Department

Section / Sectional Head	Major activities performed by the Section
<i>(a) Civil Section</i>	
1. Providing new drainage connections	<ul style="list-style-type: none"> i. Scrutinize applications received for new drainage connections ii. Visit site where connection is to be given and prepare estimate for work to be carried out iii. Issue permission letters to the applicant after receiving all prescribed documents and proof of depositing connection fees iv. Maintain necessary records of the new connections
2. Recording and attending to the complaints	<ul style="list-style-type: none"> i. Receive and record complaints regarding drainage lines ii. Visit sites and depute necessary staff for attending to the complaints
3. Daily maintenance work	<ul style="list-style-type: none"> i. Inspect and ensure that pipe lines are not blocked ii. Clean chambers iii. Repair / replace pipelines if necessary
4. Prepare estimates and obtain sanctions for the maintenance and repairs works and minor capital works	<ul style="list-style-type: none"> i. Prepare estimates and obtain sanction for works from the appropriate authorities ii. Invite and process offers received iii. Obtain approval and issue work orders
<i>(b) Mechanical Section</i>	
1. Operations and maintenance of pumping machinery	<ul style="list-style-type: none"> i. Maintenance of pumping machinery ii. Prepare performance reports of the operations of pumps iii. Maintain log books and other registers
2. Prepare estimates and obtain sanctions for the maintenance and repairs works and minor capital works	<ul style="list-style-type: none"> i. Prepare estimates and obtain sanction for works from the appropriate authorities ii. Invite and process offers which are received iii. Obtain approval and issue work orders iv. Monitor expenditure budgets
3. Stores control	<ul style="list-style-type: none"> i. Receive demands for the material, complete paper work and arrange for the procurement of material ii. Maintain necessary registers like stock register, repairs register etc.

3.11 **Miraj Drainage Department** Drainage Engineer, Miraj is in-charge of this department. Two Maistries supervise Civil Section whereas Mechanical Section is headed by one Mechanical Engineer. Functions and activities of Miraj Drainage Department are mentioned in the Table 3.2.

Table 3.2: Sections and activities of Miraj Drainage Department

Section / Sectional Head	Major activities performed by the Section
<i>(a) Civil Section</i>	
1. New Drainage connections	<ul style="list-style-type: none"> i. Process applications received for new drainage connections ii. Inspect the sites and issue NOC to connect the property to main line iii. Supervise work of actual connection
2. Complaints	<ul style="list-style-type: none"> i. Receive and record complaints ii. Undertake site inspection iii. Take appropriate measures to sort out the problems
3. Maintenance of existing lines and installations	<ul style="list-style-type: none"> i. Prepare estimates and obtain sanction for works from the appropriate authorities ii. Invite and process offers which are received iii. Obtain approval and issue work orders
<i>(b) Mechanical Section</i>	
1. Pumping station operations	<ul style="list-style-type: none"> i. Control and supervise pumping operations ii. Maintain log books and other records to monitor operations of the pumping machinery iii. Control and supervise water distribution for irrigation
<i>(c) Office Section</i>	
	<ul style="list-style-type: none"> i. Inward and outward registers ii. Correspondence with Government and other agencies iii. Work related to salary and establishment iv. Maintain stock registers v. Prepare contractor's bills vi. Maintain Budget Register

3.14 Above Table reveals that 15% (13 out of 87) posts in Sangli Drainage Department are vacant, three of them are in supervisory category. In Miraj, only one post is vacant. It is observed that in the absence of availability of the staff at the appropriate category, usually the trend is to assign the functions to the staff functioning in the lower cadre.

3.15 Based on the above staff strength, ratio of number of drainage connections per staff works out as mentioned below.

Table 3.4: Number of connections per employee

Drainage Department	Connections (Number)	No of staff		Staff / 1000 connections	
		Sanctioned	Filled	Sanctioned	Filled
Sangli	NA	87	74	NA	NA
Miraj	13,744	43	42	3	3
Total	NA	130	116	NA	NA

3.16 Similarly, the ratio of number of persons served by each staff member is as mentioned below.

Table 3.5: Persons served per employee

Drainage Department	Persons Served	No of staff		Persons served / Staff	
		Sanctioned	Filled	Sanctioned	Filled
Sangli	134,493	87	74	1,545	1,817
Miraj	65,697	43	42	1,528	1,564
Total	200,190	130	116	1,540	1,726

Ratio of persons served per operating staff is more or less same in Sangli and Miraj.

Staff Profiles

3.17 Profiles of the employees working in drainage departments both at Sangli and Miraj are developed to facilitate further analysis of their background and the adequacy for the functions they perform. For this purpose, information of the staff members working in these sections covering aspects such as - name, age, education, number of years of experience, training completed if any and salary scale is analysed.⁵ Following Tables present the staff profiles developed on different parameters.

(a) **Age profile.** Age profile presents the age groups of the staff working in different hierarchical groups as given in Table 3.6

⁵ Refer Appendices B for details of staff at Sangli and Miraj Drainage Departments

Table 3.6: Age profile

Particulars	Age groups					Total
	Upto 25	26 to 35	36 to 45	46 to 55	Above 56	
	(Years)					
1. Managers						
Sangli	0	0	0	0	1	1
Miraj	0	0	1	0	0	1
Sub-total (1)	0	0	1	0	1	2
2. Supervisors						
Sangli	0	1	0	4	0	5
Miraj	0	0	3	1	0	4
Sub-total (2)	0	1	3	5	0	9
3. Operating staff						
Sangli	0	0	7	8	1	16
Miraj	0	0	3	1	2	6
Sub-total (3)	0	0	10	9	3	22
4. Helper staff						
Sangli	3	11	26	11	1	52
Miraj	2	3	14	12	0	31
Sub-total (4)	5	14	40	23	1	83
Total	5	15	54	37	5	116

It can be observed from the above analysis that,

- i. A large number of staff members (78%) are between the age group of 36 and 55.
- ii. One out of the 2 managers, 1 manager will retire in next two years.
- iii. In supervisory and operation categories, about 50% staff will retire within 10 years.

The employees in the Drainage Departments are fairly senior in age.

- (b) **Experience profile.** Experience profile (Table 3.7) presents the level of experience acquired by the employees working in different hierarchical groups. About 58% employees have more than 15 years of experience. 42% employees are in a bracket of 5 to 15 years of experience. Employees of Sangli and Miraj Drainage Departments have average experience of about 16 years.

The analysis further reveals that,

- i. Both the managers have more than 18 years of experience
- ii. Most of the supervisors (7 out of 9) have more than 16 years of experience
- iii. 15 out of 22 operating staff members have more than 16 years of experience

Thus, at all the three levels the staff is reasonably experienced.

Table 3.7: Experience profile

Particulars	No of years of experience					Total
	Upto 5	6 to 15	16 to 25	26 to 35	Above 36	
	(Years)					
1. Managers						
Sangli	0	0	0	1	0	1
Miraj	0	0	1	0	0	1
Sub-total (1)	0	0	1	1	0	2
2. Supervisors						
Sangli	1	0	3	1	0	5
Miraj	0	1	3	0	0	4
Sub-total (2)	1	1	6	1	0	9
3. Operating staff						
Sangli	0	6	6	4	0	16
Miraj	0	1	4	1	0	6
Sub-total (3)	0	7	10	5	0	22
4. Helper staff						
Sangli	14	15	23	0	0	52
Miraj	2	9	15	5	0	31
Sub-total (4)	16	24	38	5	0	83
Total	17	32	55	12	0	116

(c) **Education profile.** Analysis of the formal education levels of the staff working in drainage departments of Sangli and Miraj is presented in Table 3.8.

Table 3.8: Education profile

Particulars	Education level							Total
	PG	GD	VT	SSC	HS	PS	NE	
1. Managers								
Sangli	0	1	0	0	0	0	0	1
Miraj	0	1	0	0	0	0	0	1
Sub-total (1)	0	2	0	0	0	0	0	2
2. Supervisors								
Sangli	0	3	0	2	0	0	0	5
Miraj	0	2	0	1	1	0	0	4
Sub-total (2)	0	5	0	3	1	0	0	9
3. Operating staff								
Sangli	0	0	15	1	0	0	0	16
Miraj	0	0	0	4	1	1	0	6
Sub-total (3)	0	0	15	5	1	1	0	22
4. Helper staff								
Sangli	0	0	0	0	7	8	37	52
Miraj	0	0	0	5	11	13	2	31
Sub-total (4)	0	0	0	5	18	21	39	83
Total	0	7	15	13	20	22	39	116

Note. PG - Post graduate, GD - Graduate / Diploma, VT - Vocational training, S.S.C. - Secondary School Leaving examination, HS- High School level, PS - Primary School level and NE - No education

The statistics presented in the above Table indicates that,

- i. Only 6% of the employees of Sangli and Miraj Drainage Departments have diploma or degree level education. However, both the managers have acquired formal education upto diploma / graduation level in engineering.
- ii. Almost all supervisors have undergone formal education from SSC to graduate levels, with the exception of one supervisor (Maistry) in Miraj, who has only a nominal formal high school level education
- iii. About 68% of the operating staff have acquired some vocational training such as ITI or short courses in the trades like electrician, plumbing, fitter's course etc.
- iv. Also 23% of the operating staff members have formal education above SSC level.
- v. All the staff in the category of helpers are educated only upto 10th standard level in the schools, making them mostly unsuitable for the posts in the higher cadre.

(d) **Salary profile.** Analysis of the basic salary levels is presented in the Table 3.9. For the purpose of salary profile, the salary scales are grouped as below.

Group A	..Helpers	Rs. 750-900 to 975-1660
Group B	..Operators	Rs. 1200-1800 to 1400-2600
Group C	..Supervisors	Rs. 1640-2900 to 2000-3500
Group D	..Managers	Rs. 6500-10500 and above

Table 3.9: Salary profile

Particulars	Salary Groups				Total
	A	B	C	D	
1. Managers					
Sangli	0	0	1	0	1
Miraj	0	0	1	0	1
Sub-total (1)	0	0	2	0	2
2. Supervisors					
Sangli	0	4	1	0	5
Miraj	0	3	1	0	4
Sub-total (2)	0	7	2	0	9
3. Operating staff					
Sangli	1	15	0	0	16
Miraj	4	2	0	0	6
Sub-total (3)	5	17	0	0	22
4. Helper staff					
Sangli	52	0	0	0	52
Miraj	31	0	0	0	31
Sub-total (4)	83	0	0	0	83
Total	88	24	4	0	116

The salary profile presented above indicates that 76% of the staff of Drainage Departments are in the lowest salary scale and 21% in the next higher scale. Thus,

almost all staff members (97%) are in the lowest two categories/groups of salary scale.

Staff Profiles - co-relation

- 3.18 In addition to the general analysis of the background of the staff working in various categories, analysis is also done co-relating different parameters like age, education and experience and is presented in the following tables.

Table 3.10: Co-relation between age and education

Education	Age					Total
	Upto 25	26 to 35	36 to 45	46 to 55	Above 55	
	(Years)					
1. Post graduate						
Sangli	0	0	0	0	0	0
Miraj	0	0	0	0	0	0
Sub total (1)	0	0	0	0	0	0
2. Graduate / Diploma						
Sangli	0	1	0	2	1	4
Miraj	0	0	3	0	0	3
Sub-total (2)	0	1	3	2	1	7
3. Vocational Training						
Sangli	0	0	7	7	1	15
Miraj	0	0	0	0	0	0
Sub-total (3)	0	0	7	7	1	15
4. S.S.C.						
Sangli	0	0	0	3	0	3
Miraj	1	0	7	1	1	10
Sub-total (4)	1	0	7	4	1	13
5. High School						
Sangli	1	0	3	3	0	7
Miraj	1	3	4	5	0	13
Sub-total (5)	2	3	7	8	0	20
6. Primary School						
Sangli	0	2	2	4	0	8
Miraj	0	0	6	7	1	14
Sub-total (6)	0	2	8	11	1	22
7. No Education						
Sangli	2	9	21	4	1	37
Miraj	0	0	1	1	0	2
Sub-total (7)	2	9	22	5	1	39
Total	5	15	54	37	5	116

Table 3.11: Co-relation between experience and education

Education	No of years of experience					Total
	Upto 5	6 to 15	16 to 25	26 to 35	36 and above	
	<i>(Years)</i>					
1. Post graduate						
Sangli	0	0	0	0	0	0
Miraj	0	0	0	0	0	0
Sub-total (1)	0	0	0	0	0	0
2. Graduate / Diploma						
Sangli	1	0	2	1	0	4
Miraj	0	1	2	0	0	3
Sub-total (2)	1	1	4	1	0	7
3. Vocational Training						
Sangli	0	6	5	4	0	15
Miraj	0	0	0	0	0	0
Sub-total (3)	0	6	5	4	0	15
4. S.S.C.						
Sangli	0	0	2	1	0	3
Miraj	1	2	7	0	0	10
Sub-total (4)	1	2	9	1	0	13
5. High School						
Sangli	1	0	6	0	0	7
Miraj	1	4	4	4	0	13
Sub-total (5)	2	4	10	4	0	20
6. Primary School						
Sangli	3	2	3	0	0	8
Miraj	0	3	9	2	0	14
Sub-total (6)	3	5	12	2	0	22
7. No Education						
Sangli	10	13	14	0	0	37
Miraj	0	1	1	0	0	2
Sub-total (7)	10	14	15	0	0	39
Total	17	32	55	12	0	116

3.19 The comparison of age with the education shows that,

- (a) Young employees upto age of 25 have only high school level education
- (b) Only 7% employees in the age group of 26 to 35 have formal education upto the graduate level
- (c) Out of 7 employees who have education upto diploma / graduation level, 3 have the age above 46 years and will be retiring within next 10 years. Similarly, 50% employees having vocational training will also retire within next 10 years. Considering the fact that 90% of the employees have educational background only upto high school level, a void of qualified people in the managerial, supervisory and operating cadres will be felt in next 10 years.
- (d) The employees in the Drainage Departments would, thus, need support of formal

training to enhance their skills and abilities to handle improvement measures efficiently.

- 3.20 The comparison of experience with education shows that,
- (a) About 85% of the staff having less than 15 years of experience have formal education upto SSC level only
 - (b) In the group of 16 to 25 years of experience, only 16% employees have acquired either vocational training or degree/diploma.
 - (c) At the senior level, only 5 out of 12 employees with more than 26 years of experience have either vocational training or diploma/graduate level education to their credit.
 - (d) Thus the proportion of qualified persons is low in all the age groups.

Employees with less than 25 years of experience will need formal training to enhance their operating skills.

Adequacy of qualifications and experience

3.20 **Managerial cadre** The functions in managerial cadre are basically of technical (engineering) nature. Both the officers working in this cadre have engineering degree or diploma and they have worked in water supply / sewerage field for more than 18 years. They are, thus, suited to perform their designated functions.

3.21 **Supervisory cadre** The supervisory cadre, however, has a variety of functions to perform like technical, administrative and accounting. The three supervisors performing engineering functions are adequately qualified and experienced for the posts. Among other technical supervisors, 2 out of 3 Maistries have formal education upto SSC level only and do not have the necessary (formal) education or training in the respective functions and are performing these functions merely through their experience. On the administrative side, both the supervisors are graduates with adequate level of experience to handle their responsibilities.

3.22 **Operating cadre** In operating cadre, there is a large variation in nature of functions. For example, technical functions cover posts like pump operators, electricians, fitters, etc. Non-technical functions are mostly of clerical nature. Adequacy of the operating staff in respect of qualifications and experience is summarized in the following Table.

Table 3.12: Qualifications and experience of operating staff

Category of operating staff	Number of operating staff			Total experience (Years)
	Total	Adequate qualifications	No qualification	
Technical				
Sangli	15	15	0	13 to 29
Miraj	4	0	4	15 to 29
Non-technical				
Sangli	1	1	0	21
Miraj	2	2	0	17 to 22
Total				
Technical	19	15	4	13 to 29
Non-technical	3	3	0	17 to 22

Thus, a large number of technical persons in operating cadre have suitable qualifications in the respective trades. For the staff members having no qualifications in the trade, specific training can be arranged, so that the skills of this otherwise experienced staff can be enhanced to perform their functions in a better manner.

Adequacy in the respect of promotion to senior cadre

- 3.23 ***Promotions to managerial cadre*** There is a distinct possibility of engineers in supervisory cadre being promoted to the managerial cadre, which consists of engineering posts. As stated before, one out of two officers in the managerial cadre one officer is retiring in the next 2 years. There are three engineers currently working in the supervisory cadre. Out of them 2 have mechanical engineering background and the third is a civil engineer. Any suitable engineer out of these can be groomed for the manager's post.
- 3.24 ***Promotions to supervisory cadre*** The functions in supervisory cadre are multifarious - engineering functions in O&M of pumping stations and sewage treatment plants, other technical functions in O&M of the facilities and administrative and stores functions. The engineering functions will need qualified engineers and the persons from lower (operating) cadre will not qualify for these functions with an exception for the post of Maistry. There are many operators having formal vocational training who may qualify to man the posts of Maistries.
- 3.25 ***Promotions to operating cadre*** For promotion from helper cadre to operating cadre, requirements of minimum qualifications in a particular trade need to be followed. In both Sangli and Miraj, not a single employee working in the helper category has formal technical training suitable to man the operator's position. There are three pump attendants in Miraj having formal education upto SSC level. These operators can be trained with formal technical training to man the posts of pump operators or can be trained to perform the clerical functions.

Human Resource Development (HRD) policies

- 3.26 The policies followed by SMK-MC for human resource development are not yet documented. Information regarding various aspects of HRD policies was collected from the Assistant Commissioner (Sangli) who also heads the *Kamgar Kalyan Vibhag* (Labour Welfare Department) of SMK-MC. The policies followed for different components of HRD (described in the following sections) are mostly based on the provisions and guidelines given in the Bombay Provincial Municipal Corporations Act, 1949, The Maharashtra Civil Service Rules and Bylaws of Sangli Municipal Council.
- 3.27 **Manpower Planning** The concept of manpower planning is not practiced in its real sense in SMK-MC. In the absence of a documented business plan, the qualitative and quantitative requirements of staff cannot be projected. The only criteria followed for deciding the requirements of the additional staff (and skills) is the comparison of actual staff deployment with the "sanctioned" posts. The vacancies resulting due to retirements and transfers of employees are filled in either by recruitment or by transfers. However, there are delays in the process. It is observed that in water supply and drainage departments there are many positions which are not yet filled (and are still vacant) or managed by junior level employees.
- 3.28 There is no system available to monitor the career of individual staff member. The promotions are made on the basis of seniority. As a result, individual staff member do not have any incentives to work hard. He is also unaware of his future career. Introduction of scientific manpower planning system which is based and backed by a business plan and proper assessment of workload and skill requirements for the future is, therefore, essential in water supply and drainage departments.
- 3.29 **Recruitment.** The Recruitment rules framed by SMK-MC are followed for the recruitment of the staff. The requirements of staff are conveyed by the departmental heads to the Commissioner. The Commissioner has power to appoint staff on a temporary basis for a period of six months. The permission for extension of his services beyond six month is obtained from the Standing Committee. For permanent appointment, approval of the General Body is required.
- After a decision of recruitment is made, an advertisement is published in the newspapers. Similarly, availability of suitable candidate in the Employment Exchange is also determined After scrutiny of applications, interviews of the short-listed candidates are conducted by the Selection Committee formed as per the provisions under Section 54 of the Act. The Selection Committee does the final selection of candidate.
- 3.30 **Training.** There is no formal policy for training in the Corporation. SMK-MC, from time to time, receives circulars/letters from the Government departments announcing training courses arranged for the local body staff. With the approval of the Standing Committee, the staff is deputed for such training.
- 3.31 **Promotions.** The Promotion Committee of SMK-MC has the powers of promoting the staff. The promotions are based on a confidential report, service record and seniority.

Interviews are, however, not conducted for promotions. Promotions are done only on the basis of verification of these records.

- 3.32 **Transfers** The Commissioner has the authority to transfer the staff. For transfers, approval of the Standing Committee or the General Body is not required.
- 3.33 **Rewards and Incentives** There is no system of giving rewards and incentives to employees. Although advance salary increments are permissible, such increments are so far not given to any employee of SMK-MC.
- 3.34 **Contract Staff.** Departmental heads have powers to appoint contract staff for a maximum period upto one year. Usually such appointments are done for Class IV category of staff.

Labour relations

- 3.35 The labour relations in SMK-MC have been generally cordial since its formation. The staff went on strike on one occasion for five days (October 26, to October 30, 1999) for pressing the demand of making 5th Pay Commission applicable to SMK-MC staff.

Following three unions are active in SMK-MC

- (a) Sangli Miraj Kupwad Mahapalika Kamgar Union
- (b) Nagarpalika Kamgar Union, and
- (c) Mahapalika Kamgar Sabha

- 3.36 The major demands of these unions are:

- (a) Application of the recommendations of 5th Pay Commission
- (b) Making the temporary employees permanent in SMK-MC
- (c) Giving residential accommodation to the staff
- (d) Providing residential accommodation to Sweepers
- (e) Opposition to downsizing measures
- (f) Opposition to privatisation

C. Systems, Procedures and Records

- 3.37 Analysis of the current operating practices and broad workflow of the Drainage Departments at Sangli and Miraj was carried out to study the present status of the systems, procedures and records. This was accomplished by reviewing the records used in the backdrop of discussions with the managerial, supervisory and operating staff. The records reviewed included the forms and registers used for carrying out various functions in these departments. Brief description of the major systems and procedures followed in the Drainage Departments is given below⁶.

⁶ Description of the formats of the forms and registers in use is presented in Appendix C.

- (a) **Acts, rules and manuals** . SMK-MC has not yet prepared a systems manual or framed the by-laws pertaining to the systems and procedures to be followed. Present systems and procedures in use are adopted from different sources like the Maharashtra Municipal Accounts Code 1971 and the by-laws of Sangli and Miraj Municipal Councils (according to the provisions of the Maharashtra Municipal Act, 1965 old by-laws remain in force till such time new by-laws are adopted).
- (b) **Procedure for introduction of new system.** The Corporation can introduce any new system and procedure that would facilitate convenience of operation and generation of required information. However, certain formats which are prescribed by the Act cannot be changed drastically. If any change is required in such formats, permission of the Urban Development Department of the Government of Maharashtra is necessary.
- (c) **Methods of record keeping.** Most of the records maintained in Water Supply and Drainage Departments are in the form of the registers. These registers are written manually. Some of the registers in use are prescribed in the Maharashtra Municipal Account Code 1971. Use of pre-designed forms is also a common feature for collecting and disseminating information. This has reduced the clerical work considerably.
- (d) **Use of computers.** There is a scope for computerisation of systems and procedures in both the Water Supply and Drainage Departments. However, except billing and demand register, other records are not yet computerised. For example, elaborate database of properties connected with water supply and sewerage connections can be developed on computer to monitor the service levels and revenues effectively.

There are plans for introduction of computerisation in the working of SMK-MC. The contract is already awarded to the National Informatics Centre (NIC) and the required software is being developed. Data-entry work is also in progress. The Corporation has already purchased necessary hardware.

Computerisation is proposed to be introduced in a phased manner. In the first phase, operations of the Public Works Department, Workshops, Water Works, Property Tax will be computerized, whereas in the second phase operations of the Octroi Department will be computerised.

The important procedures followed in the Drainage Department are described in the following paragraphs.

Procedure for obtaining new sewerage connections

- 3.38 The steps involved in the procedure of obtaining new sewerage connection are listed below.
- (a) Applicant submits his application for new connection in Form 'A' which incorporates the detail information on the technical matters and material to be used for the work.
 - (b) Drainage Engineer then directs the Maistry to inspect the site to confirm technical feasibility and take the measurement to work out estimates of the work.
 - (c) After visiting the site, the Maistry submits his report and estimates of cost on the form itself by filling the relevant columns. The Drainage Engineer visits the site for inspection.
 - (d) After the site visit, Drainage Engineer accords his sanction to connect the property to the drain / sewer line of the Corporation and the Drainage Department issues a certificate of commence of work to the owner.
 - (e) Actual work of connecting the property to the main line is undertaken by the licensed plumber and inspected by the Maistry. After completion of the work, certificate of completion of work is issued.
 - (f) The details of the allotted connection are recorded in the connection register.

The above procedure is followed in Miraj and Sangli Drainage Departments with slight variations.

Customer grievances and complaint redressal

- 3.39 **System.** A formal system of recording complaints and the follow up action is followed, in the Drainage Departments at Sangli and Miraj. The complainant attends the office and registers his complaint in the complaint book kept in the department. He could also register his complaints through the telephone. A register is maintained⁷ to record the complaints received in the office either personally or on phone. (There are small variations in the format at each place)

There is a system of all the operating staff in the maintenance sections such as Maistries, Cleaners and Sweepers etc. to meet daily in the morning in the office of the Drainage Department, when the work of attending to the complaints and other repairs for the day is allotted to them. It usually takes the fitter a day or two to attend to the complaints. The following day, the report of previous day's work is recorded in the register.

⁷ Refer Appendix C for format of complaint register

- 3.40 **Number and nature of complaints.** Record of complaints received and attended during the year 2000-2001 was reviewed. The monthly summary is indicated in Table 3.13. As seen from the Table, the average number of complaints received in Drainage Department is 4 in Sangli and 16 in Miraj.

Table 3.13: Monthly summary of consumer complaints (Year 2000-2001)

Sr.No.	Month	Sangli ⁸	Miraj
		<i>(Numbers)</i>	
1	April 2000	NA	478
2	May 2000	NA	540
3	June 2000	NA	560
4	July 2000	NA	431
5	August 2000	NA	456
6	September 2000	NA	507
7	October 2000	NA	460
8	November 2000	NA	412
9	December 2000	NA	500
10	January 2001	NA	378
11	February 2001	NA	413
12	March 2001	NA	599
	Total	1,617	5,734
	Average / Day	4	16

- 3.41 The complaints regarding the drainage system mainly pertain to the blockages and choking of the drainage lines resulting in overflow of sewage on streets and bad odour. Complaints also relate to stagnation of water near the stand post taps, public latrines and urinals.

Periodical Reports

- 3.42 The Municipal Commissioner reviews the work of all the departments every week. The Executive Engineer (Water supply) submits a weekly report to the Commissioner.

It is observed that there is no formal management information system in operation at the Executive Engineer's level. In order to have proper control on operations, it is essential to have a periodical feedback on the important issues related to the operations and management of the drainage systems. The feedback should be in a form of a formal report generated at various sections and should include, among other things the details like:

- (a) Performance monitoring of pumping stations, drainage network and sewage treatment plants;
- (b) Functioning of various equipment / gadgets;
- (c) New connections;
- (d) Billing and collection performance;

⁸ Month-wise break-up of complaints received in Sangli Drainage Department is not available.

- (e) Report on physical progress of the schemes under execution, if any; and
- (f) Staff related matters like category-wise staff deployment, leave, absenteeism, etc.

Maintenance of sewerage network system

- 3.43 The Drainage Engineer receives reports from the Maistry with regards to the need for replacement of pipe line if the fault is not rectified through regular maintenance measures. In such an event, procedure for procurement and laying of new pipeline is initiated by the Drainage Engineer. He prepares estimates of such works and obtains approval from the Executive Engineer. By following a regular tendering procedure, the contract is awarded to the contractor. The details of such works completed are recorded in the Register of Works Completed.

Other Records⁹

- 3.44 *Sewage pumping stations.* In the Sewage Pumping Stations, Pump Log Books are maintained to record the following details.

- (a) Date
- (b) Pump set no
- (c) Starting time
- (d) Shut off time
- (e) Running hours
- (f) Voltage
- (g) HT side meter reading
- (h) KWH
- (i) KVAH
- (j) KVARH
- (k) Power Factor

In Miraj, treated water is sold for the use of irrigation. For this purpose, the farmers are required to apply giving details of the water requirement and site map. Two attendants working on the Oxidation Plant control the distribution of water. Registers are maintained to record the quantity of water released to the farmers.

Stores

- 3.45 There are stores both in Sangli and Miraj Drainage Departments for storing the material required for the civil and mechanical sections. These stores do not carry large inventories but are primarily used to stock the frequently required miscellaneous consumable items such as grease, oil, bearings, electrical spares etc. Normally material required for any repair or maintenance work is purchased as and when required. The stock registers are maintained as per the format given in Appendix C. Similarly, repairs registers are maintained to record the details of repairs done to pipe lines or other facilities like pumping stations. There is no system of audit and valuation of inventory. There is also no formal system of reconciliation of stock as per the stock book and

⁹ Appendix C gives details of other forms and registers maintained in the Drainage Department

actual quantity.

Record of revenue and capital expenditure

3.46 The bills pertaining to the revenue expenditure such as electricity bill, bills of suppliers of material etc are recorded in the bill registers before they are forwarded to the Accounts Department for further processing. Expenditure incurred on capital works such as purchase of pumps, pipe lines, contractor's bills etc is recorded in a register called budget control register. This facilitates monitoring of the budget provisions (account budget head-wise) and the balance of the budget available against a particular budget head is worked out after every expenditure. Following information is recorded in the budget control register.

- (a) Budget head
- (b) Budget provision (Rs.)
- (c) Serial Number
- (d) Nature of work
- (e) Estimated expenditure
- (f) Balance provision

Employee related records and other administrative work

3.47 The employee related records maintained in the Drainage Departments are musters rolls (attendance sheets) and leave records. The junior clerk also prepares monthly salary sheets. Other administrative work assigned to the clerical staff is the miscellaneous correspondence with the government, maintenance of stock registers, inward/outward work etc.

D. Key Issues

3.48 Improvements are required in respect of following important aspects.

- (a) Drainage Departments in Sangli and Miraj continue to function as independent units, rather than parts of a homogeneous department.
- (b) Advance manpower planning needs to be done considering the situation in near future (of say five years).
- (c) Lack of formal education in the respective disciplines needs to be corrected by a sustained scheme of formal training.
- (d) There is no element of incentive in the present personnel policies.
- (e) Records and registers are not appropriately designed and maintained.
- (f) There is no formal system of reporting and monitoring the key indicators of the operational performance to the Executive Engineer (Water Supply).
- (g) There is no system of audit and valuation of inventory.

IV. MUNICIPAL FISCAL STATUS

A. Municipal Accounts and Financial Reporting

- 4.1 SMK-MC's budget is prepared in two main parts. Budget 'A' covers general administration and all other services provided by the Corporation except water supply and sewerage. The budgets for water supply and sewerage services are covered separately in Budget 'C'. Both the budgets have revenue and capital accounts. Revenue account covers income from taxes, duties and fees etc. and expenditure on establishment, operations and maintenance of the services and debt servicing. The capital account includes the capital income (various grants and other income) and expenditure on capital works such as water supply, sewerage, etc.
- 4.2 After providing for all the expenditure, surplus of revenue income over expenditure is transferred to the General Reserve. In addition to the General Reserve, the Corporation maintains ten other funds, which include -
- (a) Pension Fund,
 - (b) Salary Reserve Fund,
 - (c) Provident Fund,
 - (d) Cremation Fund,
 - (e) 10th Finance Commission Fund,
 - (f) ICDS Scheme Fund,
 - (g) Depreciation Fund,
 - (h) Development Fund,
 - (i) Suvarna Jayanti Urban Employment Scheme Fund, and
 - (j) Slum Improvement Programme Fund.
- 4.3 The financial performance of the Corporation is reported in the form of an annual budget report. The budget report covers actual revenue earned and expenditure incurred in the last two years and budget estimates for the next financial year. The report is prepared by the Commissioner and placed before the Standing Committee for sanction. After obtaining necessary clarifications and explanations to the budget proposals made by the Commissioner, the Standing Committee accords its sanction. The budget estimates approved by the Standing Committee are then laid before the Corporation (General Body) for consideration.
- 4.4 The accounts of the Corporation are, at present, maintained on a cash basis. The actual expenditure and budget estimates presented in the annual budget reports are also on cash basis. A study has been recently undertaken for introduction of accrual accounting system in the Corporation.
- 4.5 All financial transactions of the Corporation are routed through the municipal funds created as per the provisions of the Section 82 of the Act. All the money received by the Corporation in the form of taxes, disposal of properties and from Government or public bodies etc. is deposited in the funds. The payment is also made from these funds as per the provisions of the Act. The balance of the funds reported in the budget report represents actual funds available with the Corporation as on that date. As per the

provisions of the Act, the excess fund is invested in the fixed deposits.

B. General Accounts

Financial Performance of the Corporation

4.6 The total income (revenue and capital) of the Corporation was Rs.394.28 million in the year 1998-1999, increased to Rs.477.11 million in the year 2000-2001, thus registering an average growth of 10.2%. On the other hand, total expenditure (revenue and capital) of the Corporation has increased by 10.6% over this period i.e. from Rs.397.28 million to Rs.439.96 million in the year 1998-1999 and 2000-2001 respectively. This includes all services of the Corporation including water supply and sewerage (Budget 'A' and 'C'). The summary of the financial performance is presented in Table 4.1¹.

Table 4.1: Summarized income and expenditure of the Corporation

Details	1998-99	1999-00	2000-01	Average	Share
	(Rs. Million)				(%)
INCOME					
Revenue income					
Budget 'A'	255.58	327.16	359.76	314.17	70.84%
Budget 'C'	54.16	75.91	78.12	69.39	15.65%
Sub-total (I)	309.74	403.07	437.88	383.56	86.49%
Capital income					
Budget 'A'	0.41	0.05	0.09	0.18	0.04%
Budget 'C'	0.01	0.27	0.20	0.16	0.04%
Sub-total (ii)	0.42	0.32	0.29	0.34	0.08%
Debt heads ¹⁰	84.12	55.65	38.94	59.57	13.43%
Total income	394.28	459.04	477.11	443.47	100.00%
EXPENDITURE					
Revenue expenditure					
Budget 'A'	180.06	199.53	225.82	201.80	45.90%
Budget 'C'	74.03	91.93	96.09	87.35	19.87%
Sub-total (I)	254.09	291.46	321.91	289.15	65.77%
Capital expenditure					
Budget 'A'	62.74	89.01	112.07	87.94	20.00%
Budget 'C'	6.67	9.55	8.30	8.17	1.86%
Sub-total (ii)	69.41	98.56	120.37	96.11	21.86%
Debt heads	73.78	45.80	43.68	54.42	12.37%
Total expenditure	397.28	435.82	485.96	439.68	100.00%

Source: Budget 2000-2001 and Accounts Department of SMK-MC

4.7 The growth in the revenue income from year 1998-1999 to 1999-2000 was 30%, whereas in the subsequent year, the revenue income increased only by 9%. The higher rate of growth in the year 1999-2000 could be due to the impact of the revisions in the

¹ Details of income and expenditure on revenue and capital account are presented in Appendix D.

² Debt heads are un-adjusted deposits and advances both for receipts and payments.

rates of taxes done by the Corporation immediately after formation. In the subsequent year, i.e. 2000-2001, the rate of growth of revenue income stabilized to 9%. Share of the capital income in the total income of the Corporation is very negligible both in case of Budget A and C.

- 4.8 As regards expenditure, out of the total expenditure, on an average the expenditure on revenue account has been 66% and 22% on capital account. From the revenue income, average 25% of the funds were utilized for the capital investments during the last three years. 12% of the expenditure is in the form of adjustments in the debt heads.

C. Revenue Account

- 4.9 Over the period under review, the corporation could consistently achieve revenue account surplus in Budget 'A'. Revenue income of Rs.255.58 million generated in the year 1998-1999, increased to Rs.359.76 million in year 2000-2001 with average growth rate of 19%. Revenue expenditure during this period increased from Rs.180.06 million to Rs.201.81 million, thus registering a growth of 12%. (Refer Tables 4.2 and 4.5).

Revenue income.

- 4.10 SMK-MC generates its revenue income from property tax, octroi, income from own property, income from fees and other miscellaneous sources. In addition to taxes, charges and fees for the services, the Corporation also receives revenue grants from the Government.

Table 4.2: Summary of revenue income

Income groups	1998-99	1999-00	2000-01	Average	Share
	<i>(Rs. Million)</i>				<i>(%)</i>
Income from taxes					
Property tax					
General tax	31.32	38.28	36.04	35.21	
Water supply benefit tax	2.18	4.34	4.97	3.83	
Sewerage benefit tax	2.90	5.68	6.47	5.02	
Education tax - MC	2.88	3.51	3.43	3.27	
Road tax	0.74	1.41	1.58	1.24	
Firefighting tax	0.72	1.69	1.58	1.33	
Tree tax	1.09	1.55	1.65	1.43	
Sub-total (i)	41.83	56.46	55.72	51.33	17%
Octroi	157.80	184.11	217.76	186.56	59%
Income from property	0.32	0.30	0.66	0.43	-
Health tax	0.01	0.02	0.02	0.02	-
Sub-total (I)	199.96	240.89	274.16	238.34	76%
Income from properties	14.81	18.57	21.09	18.15	6%
Grants	34.99	61.94	44.11	47.01	15%
Miscellaneous income	5.81	5.78	20.40	10.66	3%
Total Revenue Income	255.57	327.18	359.76	314.16	100%

4.11 The composition of revenue income is explained below:

(a) **Income from taxes.** The Corporation generates income from various taxes and duties and also from the fees charged for the services provided. This income is clubbed under the head of income from taxes. These include property tax, octroi, income from property, grants and other miscellaneous income.

i **Property tax.** Property tax is one of the major components of the taxes levied by the Corporation. Average income from the property tax is 11.6% of the total revenue income under Budget 'A'. Share of property tax in revenue income is 17%. Property tax is levied as per the provisions of the Section 127(1) of the Act. The basis for the property tax valuation is the Annual Rateable Value

(ALV)¹¹. The ALV is determined on the basis of the principles of 'standard rent'.

The property tax consists of the components as mentioned in the following table.

Table 4.3: Components of the property tax

Component	% of ALV
General tax	22%
Water supply benefit tax	3%
Sewerage tax	5%
Sewerage benefit tax	4%
Education tax	2%
Road tax	1%
Fire fighting tax	1%
Tree tax	1%
Education tax *	2% to 12%
Employment guarantee tax * (on commercial properties only)	3%
Total property tax	39% to 44%

Note: * taxes are collected on behalf of Government of Maharashtra for which the Corporation receives commission.

Out of these components, revenue from the sewerage tax is allocated to Budget 'C' for the sewerage operations and considered as income of sewerage services. The revenue from the sewerage benefit tax and water supply benefit tax is not allocated to Budget 'C' and is treated as a part of the revenue income in Budget¹² 'A'. However, considering the provisions of the Act, it appear to be possible to allocate these taxes to Budget 'C' in case

¹¹

In case of SMK-MC instead of ARV, the term Annual Letable Value (ALV) is used.

¹²

According to the Section 129 of the BPMC Act, the Corporation, in addition to water tax and sewerage tax, can levy additional water benefit tax and sewerage benefit tax as a part of property tax to meeting the whole or part of the expenditure incurred or to be incurred on the capital works of water supply and sewerage facilities respectively.

water supply and sewerage operations are separated from the Corporation.

The current ALV was last revised in the year 1992 in Sangli and Miraj. Before the merger, Kupwad was a Gram Panchayat and hence property tax was not applicable. The Corporation, at present, is in the process of revising the ALV and standard rents. For this purpose, a survey of the properties has been undertaken and the properties are grouped into following groups depending on their year of construction:

- i. before 1971;
- ii. between 1972 to 1992;
- iii. between 1993 to 1997; and,
- iv. after 1998.

For deciding the standard rent, the Corporation has divided the entire city into 30 zones. Out of these, Sangli and Kupwad each have 9 zones and 12 zones are in Miraj. The standard rates for these zones are decided depending on the development of the area and market rates. The sanction of the Standing Committee for these standard rents is yet to be obtained.

The property tax bills as per the new assessment will be sent to the property owners after February 15, 2002 onwards. The bills sent for the year 2001-2002 are prepared at the old rates and will be treated as provisional bills. It is reported that the likely increase in the revenue from the property tax will be approximately 25%.

The property tax bills are generally sent to the consumers in the month of October-November. However, for delayed payment or non payment there is no penalty. The collection performance of the property tax has therefore been on a lower side, as seen in the following table.

Table 4.4: Collection performance of property tax

Particulars	1998-1999	1999-2000	2000-2001
	<i>(Rs. Million)</i>		
Opening balance / arrears *	50.0	42.0	39.0
Current demand	47.0	68.0	48.6
Total demand	97.0	110.0	87.6
Recovery	55.0	71.0	48.0
Closing arrears	42.0	39.0	39.6
Collection performance (%)	57%	65%	55%

Source: The Assessor and Collector of Taxes, SMK-MC

* Note: Estimated arrears from Government and arrears due to court cases amounting to Rs. 1.5 million are not included in the above figures

It is reported that, about 20% of the property owners pay their bills on their own within the prescribed time limit. For recovery of tax from the remaining 80% property owners, the Corporation's staff has to make considerable efforts. Some kind of incentives (concessions for early payment) or penalty (for late/non-payment) incentives in the property tax

collection system may improve the collection performance.

- ii. **Octroi.** Octroi is the main revenue earner for the Corporation. The share of octroi in the total income of the Corporation is 42.1% and that in revenue income is 59%. After formation of the Corporation, the first schedule of octroi was introduced on January 1, 2000. On certain items, octroi is charged on weight basis, while on others it is charged on percentage basis. The rates of octroi vary from 0.5% to 6%¹³. There are 28 octroi check-posts around the Corporation limits, which are manned by 186 persons in all the three shifts.

Between 1998-1999 and 2000-2001, income from octroi rose by an average 17.5% (Rs.157.8 million to Rs. 217.76 million). It is reported that the Corporation is planning to re-classify the octroi schedule and rationalise the octroi rates. Due to economic slow down, the income from octroi does not show any increase.

- iii. **Income from theatre and show taxes.** The Corporation has earned an annual income from theatre and show taxes and advertisement taxes to the tune of Rs.428,000 (average) during the last three years. This income has increased at an average rate of 57.2% mainly due to a revision in the tax rates.
- (b) **Income from municipal properties and fees.** The Corporation generates income from the properties owned and rented out. Similarly, there are other components of income from integrated city development scheme, fees and other miscellaneous income, which is grouped under this head. The share of such income in the total income¹⁴ is 4%. The share of this income in revenue income is 6%.
- (c) **Income from grants.** The Corporation receives revenue grants from the Government and other sources. Out of the grants received from the Government, the major share is of dearness allowance grant. Other government grants include grants for the construction and maintenance of the roads, share in entertainment tax, grants for family welfare centres at Sangli and Miraj and for urban health scheme. Other grants include grants received from the Police Department for providing traffic facilities etc. The share of grants in total income of the Corporation is 10.6% and in revenue income it is 15%. The revenue grants received from the government have increased at the rate of 24% over the period under the review. This appears to be mainly due to increase in the dearness allowance grants.
- (d) **Miscellaneous income.** This component of the revenue income includes income from interest on the deposits (funds invested by the Corporation), interest on loans given by the Corporation, cartage and gutter fees, income of sale of scrap, sale of voters lists, birth and date certificate fees, income from library etc. The income under this head in the year 2000-2001 is Rs. 20.39 million as compared to the previous years income of Rs. 5.78 million. The substantial rise could be due to the

¹³

Maximum rate of 12% octroi is on Gutka (chewing tobacco).

¹⁴

Total income is revenue plus capital income in Budget A and C.

rise in the income from interest on the funds invested by the Corporation and receipts from the telephone department. The share of this component in the total income is only 2.4% and in revenue income it is 3%.

Revenue expenditure.

4.12 Items of revenue expenditure consist of expenditure incurred on the establishment and operations of the departments that provide various kinds of services to the citizens. This includes expenditure on general administration of the Corporation, octroi, property tax, pension, fire fighting services, public health services, public gardens and town planning works, educational services etc¹⁵. Total revenue expenditure of the Corporation in the year 1998-1999 was Rs. 180.06 million, which rose to Rs.225.82 million in the year 2000-2001, thus registering a growth rate of 12%.

The Corporation follows a practice of reporting revenue expenditure in different groups in the budget report. The summary of expenditures, as reported in different groups in the Budget 2000-2001, is summarized in Table 4.5.

Table 4.5: Summary of revenue expenditure

Expenditure group	1998-99 (Actual)	1999-00 (Actual)	2000-01 (Actual)	Average	Share
	<i>(Rs. Million)</i>				<i>(%)</i>
Group** - A (General administration, audit department, secretarial, octroi, property tax, refunds, pension, provident fund interest etc.)	43.62	68.70	75.02	62.45	31%
Group - B (Fire fighting and electrical departments)	19.84	20.79	21.79	20.81	10%
Group - C (Public health, workshop, medical services, public gardens and works, town planning and development)	90.69	85.74	94.06	90.16	45%
Group - D (Education, Montessori, library, women and child welfare, backward class committee, city development committee)	11.25	18.21	27.34	18.93	9%
Group - E (Other expenses)	0.40	0.00	0.30	0.23	-
Group - F (Miscellaneous expenses)	13.15	5.07	5.84	8.02	4%
Group - M (Property department)	1.11	1.00	1.47	1.20	1%
Total revenue Expenditure	180.06	199.51	225.82	201.80	100%

Note: ** Grouping of expenditure heads as presented in Budget 2000-2001.

¹⁵

Head-wise details of the revenue expenditure are presented in Appendix D.

It is seen that the departments/functions covered in Group A and C have maximum share in the revenue expenditure of the Corporation. Group A covers expenditure on salary and general administration whereas Group C pertains to the expenditure relating to the obligatory services provided the Corporation.

Revenue surplus.

- 4.13 The total revenue income of the Corporation (Budget 'A' and 'C') was Rs.309.74 million in the year 1998-99, which increased to Rs.437.88 million in the year 2001-02, thus registering an average growth of 19% per annum. During the same period, total revenue expenditure increased at an average rate of 13% per annum from Rs.254.09 million in the year 1998-1999 to Rs. 321.91 million in the year 2001-2002. The debt servicing (interest + repayment)¹⁶ during these years accounted for less than a 1% share in the total revenue expenditure. This indicates that most of the investments (capital expenditure) have been undertaken with internal accruals or grants.

Table 4.6: Revenue surplus / deficit

Details	1998-99	1999-00	2000-01	Average
	<i>(Rs. Million)</i>			
Revenue Income				
Budget 'A'	255.58	327.16	359.76	314.17
Budget 'C'	54.16	75.91	78.12	69.39
Sub-total (i)	309.74	403.07	437.88	383.56
Revenue Expenditure				
Budget 'A'	180.06	199.53	225.82	201.80
Budget 'C'	74.03	91.93	96.09	87.35
Sub-total (ii)	254.09	291.46	321.91	289.15
Surplus / (Deficit)				
Budget 'A'	75.52	127.63	133.94	112.37
Budget 'C'	(19.87)	(16.02)	(17.97)	(17.96)
Net Surplus / (Deficit)	55.65	111.61	115.97	94.41

Note: Opening balances of revenue income are ignored in the above table and revenue and expenditure pertaining to the respective years only are compared.

- 4.14 The average revenue surplus generated by Budget 'A' is Rs. 112.37 million, which is 36% of the average annual revenue income of Rs. 314.17 million. The Corporation, over these years, has consistently generated revenue surplus from Budget 'A'. However, in Budget 'C', the water supply and sewerage operations have resulted in revenue deficit during all the three years under review. This indicates that the operations of water supply and sewerage services are dependent on the Budget 'A' for financial support.
- 4.15 Average annual deficit generated by Budget 'C' is Rs. 17.96 million. This is 15% of average annual revenue surplus (Rs. 112.37 million) generated by Budget 'A'.

¹⁶

Details of the present loans of the Corporation appear later in this Chapter.

D. Capital Account

4.16 Expenditure on capital account covers investments for capital works and development of assets. As mentioned above, these investments are mainly funded out of transfers from the revenue surplus, government grants and borrowings. The capital income and expenditure performance under Budgets 'A' and 'C' is presented in Table 4.7.

Capital Income

4.17 The sources of capital income, as indicated in Budget 'A', are only government and other grants. However, it is evident from Table 4.7 that these grants are not sufficient to meet the expenditure. There are other sources like transfers from general fund (revenue surplus) and term loans, which are used for funding the expenditure.

Table 4.7: Capital account performance

Details	1998-99	1999-00	2000-01	Average
	<i>(Rs. Million)</i>			
Capital income				
Budget 'A'	0.41	0.05	0.09	0.18
Budget 'C'	0.01	0.27	0.20	0.16
Sub-total (i)	0.42	0.32	0.29	0.34
Capital expenditure				
Budget 'A'	62.74	89.01	112.07	87.94
Budget 'C'	6.67	9.55	8.30	8.17
Sub-total (ii)	69.41	98.56	120.37	96.11
Surplus / Deficit				
Budget 'A'	(62.33)	(88.96)	(111.98)	(87.76)
Budget 'C'	(6.66)	(9.28)	(8.10)	(8.01)
Net surplus / Deficit	(68.99)	(98.24)	(120.08)	(95.77)

Source: Budget 2000-2001 and Accounts Department of SMK-MC

4.18 Other sources of funding of the capital expenditure are mentioned below.

- (a) **Internal resources.** As mentioned earlier, the Corporation transfers its revenue surplus (after meeting establishment and operations and maintenance expenditure of various services) to the funds established for specific purposes. These funds are established as per the provisions of the Act. Separate bank accounts are maintained for each of these funds. Surplus amount is invested in fixed deposits to take advantage of better interest rates. The funds in operation and balances as on 31st January 2001 appear in Table 4.8 below:

Table 4.8: Municipal corporation funds

Name of the fund	Amount
	<i>(Rs. Million)</i>
1. General fund	72.46
2. Pension fund	1.76
3. Salary reserve fund	18.17
4. Provident fund	54.19
5. Cremation fund	0.50
6. 10 th Finance Commission fund	11.81
7. ICDS scheme fund	10.50
8. Depreciation fund	0.40
9. Development fund	6.51
10. Suvarna Jayanti urban employment scheme fund	11.46
11. Slum improvement programme fund	0.49
Total	188.25

Source: Budget 2000-2001

- (b) **Borrowings.** The Corporation has borrowed funds from LIC and the Government of Maharashtra for investment in water supply scheme and purchase of fire fighting equipment respectively, as shown below:

Table 4.9: Details of loans

Agency	Purpose of Loan	Date of Loan	Loan Amount	Interest Rate	Period (years)
			<i>(Rs. million)</i>	<i>(%)</i>	<i>(Years)</i>
LIC	Water supply	30/3/79	5.00	8.5	22
LIC	Water supply	1/4/80	3.30	8.5	22
LIC	Water supply	12/8/81	7.90	8.5	22
LIC	Water supply	1/4/84	3.10	8.5	22
GoM	Fire fighting	N.A.	1.15	12	20
GoM	IUDP	N.A.	4.23	11	20
GoM	IUDP	N.A.	7.00	11	20

Note: LIC - Life Insurance Corporation of India, GoM - Government of Maharashtra
IUDP - Integrated Urban Development Program

Balance amounts of these loans as on 31-1-2001 are as mentioned below:

- i. LIC - Rs. 3.79 million
- ii. GoM - Rs. 11.26 million

Capital Expenditure

4.19 Break-up of capital expenditure is as below¹⁷.

Table 4.10: Details of capital expenditure

Particulars	1998-1999	1999-2000	2000-2001	Average	Share
	<i>(Rs. Million)</i>				<i>(%)</i>
Budget 'A'					
Town planning	12.10	4.98	6.00	7.69	
Building schemes	7.80	14.75	9.90	10.82	
Other scheme	42.76	36.79	37.91	39.15	
Ward Committees	0.08	32.49	58.26	30.28	
Sub total (a)	62.74	89.01	112.07	87.94	91.5%
Budget 'C'					
Water supply	6.67	5.43	5.27	5.79	6.0%
Sewerage	0.00	4.12	3.03	2.38	2.5%
Sub-total (b)	6.67	9.55	8.30	8.17	8.5%
Total (a+b)	69.41	98.56	120.37	96.11	100.0%

4.20 Thus, as the above figures reveal, 91.5% of the capital expenditure is incurred on the services covered in Budget 'A' (other than water supply and sewerage). The share of water supply and sewerage services in total capital expenditure is 6% and 2.5%, respectively.

E. Financial Status

4.21 It is thus clear that the capital income (as presented in the Budget) is not sufficient to meet the capital expenditure. The extent to which the surplus generation on revenue account (after meeting the revenue expenditure) is sufficient for financing the capital expenditure, can be studied from the following table.

Table 4.11: Summarised financial status

Details	1998-1999	1999-2000	2000-2001
	<i>(Rs. Million)</i>		
1. Opening balance	15.10	12.10	35.32
2. Surplus / (Deficit) on revenue account	55.65	111.61	115.97
3. Debt Heads - (Income)	84.12	55.65	38.94
4. Debt Heads - (Expenditure)	73.78	45.80	43.68
5. Surplus / (Deficit) on capital account	(68.99)	(98.24)	(120.08)
Net Surplus / (Deficit) (1+2+3-4-5)	12.10	35.32	26.47

4.22 It can be seen that the Corporation generated net surplus of Rs.35.32 million in the year 1999-2000, approximately three times the surplus generated in the year 1998-1999. The main reason could be the impact of additional taxes and duties and revisions in the tax

¹⁷ Detailed break-up of the capital expenditure of water supply and sewerage services is presented later in this chapter.

rates introduced after formation of the Corporation. The performance in the subsequent year, however, was not as good as the previous year. The net surplus declined by Rs. 8.85 million in that year (2000-2001). In future, the Corporation will have to make efforts to consistently achieve at least 20% compound growth in the generation of net surplus. This is essential for meeting the demands of the service levels / facilities which are likely to emerge from the growth of the population and expectation of better service.

F. Sewerage Account¹⁸

4.23 Revenue and expenditure patterns of water supply and sewerage operations are presented in Budget 'C'¹⁹. As illustrated in Table 4.6, the revenue account has been in deficit since 1998-99, (Rs. 19.87 million in 1998-99 and Rs. 17.97 million in 2000-2001). There is also the capital account deficit as indicated in Table 4.7. Budget 'C' has been receiving transfers from the general budget (Budget 'A') for the past three years.

Revenue Account - Income

4.24 During last three years, the revenue from sewerage sector accounted for about 6 percent of the revenue income of Budget 'C' and it has remained more or less stagnant over these years. The composition of revenue income of sewerage operations is presented in the Table 4.12.

Table 4.12: Details of revenue income from sewerage operations

Particulars	1998-1999	1999-2000	2000-2001	Average	Share
	(Rs. Million)				(%)
Irrigation charges	0.37	0.06	0.09	0.17	4.0
Drainage license fees	0.01	0.01	0.01	0.01	0.2
Connection fees	0.00	0.12	0.04	0.05	1.3
Private latrines / cover	0.00	0.03	0.07	0.04	0.8
Drainage tax	3.73	4.32	3.82	3.96	92.1
Other income	0.11	0.00	0.09	0.07	1.6
Total revenue income	4.22	4.54	4.12	4.30	100.0

4.25 **Sources of income.** Revenue income of sewerage operations is generated from the following sources:

(a) Income from irrigation charges. After treatment, treated waste water is released for the use of irrigation. The Corporation levies following charges for use of such water for irrigation purpose.

- i. Rs. 60 per acre for sugarcane crop; and
- ii. Rs. 40 per acre for other crops

Average income generated on this account over the period of last three years is Rs.0.17 million which is 4% of the total revenue income.

¹⁸ For the purpose of this report word sewerage is used in place of drainage, which is the nomenclature used by the Corporation.

¹⁹ Appendix D presents income and expenditure pattern of sewerage operations

- (b) License fees. License fee of Rs.500 per license holder plumber is levied by the Corporation. Share of this component in the revenue income is negligible.
- (c) Sewerage connection charges. Following connection charges are levied at the time of giving new sewerage connection.

Table 4.13: Schedule of sewerage connection charges

Type of property to be connected	Charges per connection
Shop, Dispensary, Hotel, Restaurant	Rs. 300/-
Clinic, Laboratory	Rs. 100/-
Marriage hall	Rs. 500/-
Lodging and Boarding	Rs. 100/- per sanitary unit
Apartment building	Rs. 50/- per flat
Domestic and institutional	Rs. 50/- per floor

Previously, there was a flat rate of Rs.10/- for connecting the property to sewerage system irrespective of use of property. Share of income generated from this source is also not very significant.

- (d) Construction of private latrines and covers. The Corporation generates some income from the construction of private latrines and covers. The charges are levied as per the schedule of rates decided for this purpose.
- (e) Sewerage tax. Sewerage tax is the main source of income for the sewerage operations. It is levied as a percentage of property tax which ,at present ,is 5% of rateable value. Tax collection department is responsible for preparing and issuing the property tax bills. The income generated from sewerage operations is assigned to Budget C as revenue income. There is one more item viz. sewerage benefit tax which is also a part of property tax. However, it is not assigned directly as income to Budget C and treated as a part of common revenue income of the Corporation. During the last three years, the Corporation has generated an average annual income of Rs.3.96 million from the sewerage tax. The share of this component in the revenue income from sewerage operations is 92.1%.
- (f) Miscellaneous income. Miscellaneous income in the form of sale of tender documents, private sewer cleaning charges and road cutting charges is generated by the Drainage Departments. Share of this income in the revenue income from sewerage operations is not significant.

Revenue Account - Expenditure

4.26 Revenue expenditure, as presented in the Budget, is grouped in the following groups for further analysis²⁰.

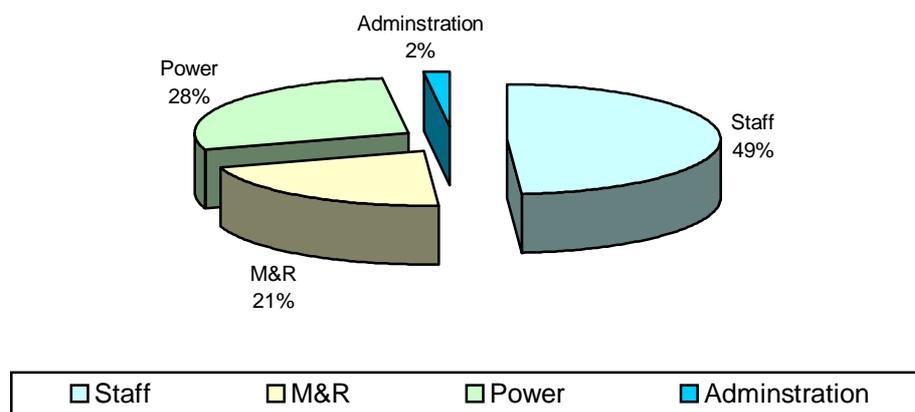
- (a) Establishment;
- (b) Maintenance and repairs (M&R);
- (c) Power and fuel;
- (d) Administrative and other expenses; and
- (e) Financial expenses.

4.27 Summary of revenue expenditure on sewerage operations is presented in Table 4.14 and Figure 4.1.

Table 4.14: Details of revenue expenditure on sewerage operations

Particulars	1998-1999	1999-2000	2000-2001	Average	Share
	(Rs. Million)				(%)
Establishment	5.90	7.12	7.52	6.84	48.8
Maintenance & Repair	4.53	1.94	2.41	2.96	21.1
Power and fuel	3.37	3.53	4.88	3.93	28.0
Administration	0.14	0.65	0.06	0.29	2.0
Financial expenses	0.00	0.00	0.00	0.00	0.00
Total expenditure	13.94	13.24	14.87	14.02	100.0

Figure 4.1: Composition of cost components of sewerage operations



4.28 The analysis of the revenue expenditure pattern reveals the following.

- (a) Revenue expenditure has increased at an average rate of 4% over a period of three years of analysis. The average growth in revenue expenditure at 4%, is more than the growth of revenue income, which has remained stagnant during this period.

²⁰

Refer Appendix D for details of revenue expenditure of sewerage operations.

- (b) Staff cost forms a major portion of the total expenditure (49%). The higher percentage of staff cost in total revenue expenditure of sewerage appears to be due to the labour intensive nature of the operations. If the salary scales are revised, the staff cost is likely to escalate further.
- (c) Expenditure on power and fuel account is about 28% of the total revenue expenditure. This component is very sensitive because any hike in the power tariffs would result in increase in the total revenue expenditure. Considering the possibility of revision in power tariffs by the Maharashtra State Electricity Board (MSEB), it is essential to keep watch on this item of expenditure.
- (d) The third major component is cost of M&R of sewerage operations, which constitutes 21% share of the revenue expenditure.
- (e) By controlling the expenditure on these three major components (staff, power and M&R), 98% of the revenue expenditure on the sewerage operations can be controlled.

Operating ratio

- 4.29 Operating ratio is used as an indicator to examine whether the revenue income from the services is adequate to cover the operating costs (excluding debt servicing and depreciation). It is a ratio of annual O&M cost divided by total annual billing. Operating ratio of sewerage operations is presented in Table 4.15.

Table 4.15: Operating ratio (sewerage operations)

Particulars	1998-1999	1999-2000	2000-2001	Average
	<i>(Rs. Million)</i>			
Revenue Income	4.23	4.54	4.12	4.30
Revenue Expenditure	13.95	13.28	14.87	14.02
	<i>(Times)</i>			
Operating Ratio	3.30	2.93	3.61	3.26

- 4.30 As compared with the year 1998-1999, the operating ratio improved in the year 1999-2000, but again deteriorated in the year 2000-2001. The ratios indicate that income generated from the sewerage operations is not sufficient to meet the operating expenses and the sewerage operations need very substantial subsidization from other sources of revenue.
- 4.31 There are limitations on increasing the sewerage tax component in the property tax. For recovering all revenue expenditure on the sewerage operations, some portion of these costs can be recovered through water supply tariffs.

Capital Account - Income

- 4.32 Budget 2000-2001 indicates income generated by sale of treated water for irrigation purpose as the only source of 'capital income' from the sewerage operations. The annual average of three years income generated from this source is only Rs.0.16 million.

Capital Account - Expenditure

4.33 For the purpose of analysis, individual expenditure heads listed in the Budget²¹ as capital expenditure are grouped as below:

- (a) Land acquisition and survey work;
- (b) Civil works;
- (c) Augmentation / expansion of facilities / new schemes; and
- (d) Purchase of equipment and material.

Summary of capital expenditure incurred during the period under review is presented in the following table.

Table 4.16: Details of capital expenditure on sewerage operations

Particulars	1998-1999	1999-2000	2000-2001	Average	Share
	<i>(Rs. Million)</i>				<i>(%)</i>
Land acquisition	0.00	0.04	0.00	0.01	1
Civil works	0.00	0.00	0.00	0.00	0
Expan. / new schemes	0.00	4.08	1.49	1.86	78
Equip. and material	0.00	0.00	1.54	0.51	21
Total expenditure	0.00	4.12	3.03	2.38	100

4.34 It can be seen that maximum capital expenditure has been incurred on the expansion of existing facilities and new schemes. The total expenditure, however, has remained more or less constant during the period under review.

Collection performance

4.35 Collection performance is expressed in terms of ratio of recovery and demand. It indicates the efficiency of the agency in recovering the arrears and the demands raised for the services provided to the consumers. Collection performance of drainage tax collection at Sangli and Miraj is analysed on the basis of the available data for the years 1998-1999 through 2000-2001. The information required for assessing the collection performance is collected from the office of Assessor and Collector of Taxes at Sangli and Miraj.

4.36 As mentioned earlier, sewerage tax is collected as a part of property tax. There is a practice of giving remissions to the consumers in sewerage tax if the property is not connected to the main sewer line, being away from the property. Every year, therefore, the amounts of remissions are deducted from the total of arrears and current demand of sewerage tax. For working out collection performance, amount recovered is compared with the net demand after adjusting such remissions.

4.37 The collection performance, both in Sangli and Miraj, is not satisfactory as seen from the following analysis.

²¹ The details of capital expenditure are presented in Appendix D.

- (a) Sangli. Analysis of collection performance of sewerage tax at Sangli is presented in Table 4.17. In the absence of the data pertaining to the recovery against arrears and current demand (separately), collection performance of current demand alone could not be worked out in case of Sangli.

Table 4.17: Collection performance - Sangli

Particulars	1998-1999	1999-2000	2000-2001
	<i>(Rs. Million)</i>		
1. Demand			
Arrears	1.90	1.54	1.24
Current demand	2.16	2.38	2.61
Less: Remissions	0.04	0.01	0.02
Total demand	4.02	3.91	3.83
2. Recovery	2.48	2.65	2.45
3. Closing balance	1.54	1.26	1.38
Collection performance	62%	68%	64%

Collection performance that was improved in the year 1999-2000 again slowed down in the year 2000-2001.

- (b) Miraj. Collection performance of drainage tax at Miraj is presented in Table 4.18. In case of Miraj, information of recovery against current demand and arrears is available separately hence, collection performance of current demand and total demand, has been worked out.

Table 4.18: Collection performance - Miraj

Particulars	1998-1999	1999-2000	2000-2001
	<i>(Rs. Million)</i>		
1. Demand			
Arrears	1.96	2.05	1.84
Current demand	1.32	1.46	1.56
Less: Remissions	0.01	0.04	0.00
Total demand	3.27	3.47	3.40
2. Recovery			
Arrears	0.66	0.78	0.43
Current demand	0.56	0.85	0.93
Total recovery	1.22	1.63	1.36
3. Closing balance			
Arrears	1.30	1.27	1.41
Current demand	0.75	0.57	0.63
Total balance	2.05	1.84	2.04
Collection performance			
Current demand	43%	60%	60%
Total demand	37%	47%	40%

It is seen that while collection performance of current demand has improved, that of total demand has reduced in the year 2000-2001. This indicates that more efforts are

essential on the part of Corporation to recover old dues.

G. Procedure of Billing and Collection

Procedure.

- 4.38 Drainage tax being a part of total property tax, billing and collection procedures of the property tax are applicable to the drainage tax also. These procedures are discussed in paragraph 4.11 (a) i above.

Sewerage connections

- 4.39 **Sewerage Connections.** Information regarding sewerage connections in Sangli and Miraj is shown in Table 4.19.

Table 4.19: Sewerage connections

Particulars	1998-1999	1999-2000	2000-2001
	(No.)		
Sangli			
Connections at the beginning of the year	NA	NA	NA
New connections during the year	106	108	NA
Connections at the end of the year	NA	NA	NA
Miraj			
Connections at the beginning of the year	NA	NA	NA
New connections during the year	37	52	53
Connections at the end of the year	NA	NA	13,744

In Miraj, there are 19,316 properties out of which drainage tax is recovered from 13,744 properties. Out of 13,744 properties that pay drainage tax, 1,000 properties are shops and the remaining 12,744 are domestic connections.

H. Key Issues

- Collection performance of property tax needs to be improved, possibly by providing some incentives or introducing penalty.
- Cost of staff and power cost need critical control, as they together form about 77% of the total expenditure on sewerage operations.
- Operating ratio of sewerage operations is negative and the income generated by way of sewerage tax is not sufficient to meet the revenue expenditure.
- There is no comprehensive database of sewerage connections in Sangli and Miraj.

V. FUTURE PROPOSALS, INVESTMENT PLANS AND RECOMMENDATIONS

A. Status of Planned Proposals

Sangli Sewerage

- 5.1 **Need.** While the town is growing fast, the present coverage of sewerage system is limited to only about 52 % population. Secondly, a large part of waste water flowing in Sheri nalla pollutes the Krishna river, which happens to be the source of drinking water supply. The local body has planned some proposals to extend the benefit to some uncovered areas and eliminate the danger of pollution of drinking water source.
- 5.2 **Augmentation Proposals.** A master plan of sewerage scheme was prepared by Sangli Municipal Council to take care of the population in year 2021. The project has been, however, shelved for the time being. Only a part of this project is now being taken up in Phase I. Also, the problem of pollution of Krishna river is proposed to be tackled by another project under National River Action Plan, to be taken up with the financial assistance from the Government of India.
- 5.3 **Master Plan.** The plan envisages extension of the sewerage facility to the entire Sangli town. The features of this master plan, estimated to cost Rs. 421.901 million, are:
- (a) coverage of 425,00 population, expected in year 2021, with anticipated sewage flow of 63.75 MLD;
 - (b) strengthening of existing primary sewers and laying new sewers in uncovered areas;
 - (c) rehabilitating existing pumping stations and adding four new pumping stations; and
 - (d) rehabilitating and augmenting the existing sewage treatment plant on Dhamni road to handle 37 MLD flow and providing a new treatment plant near Karnal road for a capacity of 27 MLD.
- 5.4 **Phase I of Master Plan¹.** Two primary sewers (R & U sewer) with some branches are proposed to be taken up in this project with an estimated investment of Rs. 88.05 million. The sewerage facility will be extended to some uncovered areas like new developments along 100 ft wide road in the south, areas north of railway line and east of Madhavnagar road and to intercept two major polluting points along Sheri nalla.
- 5.5 **National River Action Plan (NRAP) Project².** This is one of the four projects taken up in Maharashtra under National River Action Plan. Its main objective is to prevent pollution of Krishna river by the wastewater flowing through Sheri nalla and other

1 Details are given in Appendix E. Layout of the system is given in Figure 5.1.

2 Details are given in Appendix E. Layout of the system is given in Figure 5.1

streams. The principal components of the project, which is estimated to cost Rs. 22 million, are:

- (a) Interception of the wastewater flow in Sheri nalla and in other areas like Amardham and J. J. Maruti mandir;
- (b) Collection of the wastewater in two existing and two new pumping stations;
- (c) Pumping the wastewater to the proposed sewage treatment plant in Dhulgaon village through two stages; and
- (d) Treating the wastewater in stabilization ponds in Dhulgaon village area and using the treated wastewater for irrigation.

5.6 **Present Status of the Proposals.** The Government has approved the phase I project of R and U sewers and the pre-construction activities (like bidding process) are in progress with Maharashtra Jeevan Pradhikaran. The NRAP project is being reviewed by the Government of India and is to be implemented in near future.

Miraj Sewerage

5.7 The municipal corporation has requested Maharashtra Jeevan Pradhikaran to take up the surveys and design of the augmentation project and has also deposited funds required for this purpose. The project is yet to be prepared.

B. Demand Supply Assessment.

5.8 **Parameters for Demand Assessment.** The demand is estimated by assuming the following parameters.

- (a) Rate of water supply of 135 lpcd.
- (b) Rate of sewage flow at 80% of water supply ie. 108 lpcd.

5.9 **Estimated Demand.** The demand of sewerage facility is estimated below:

Table 5.1: Estimated demand of sewerage facility.

Area	Year 2001		Year 2016		Year 2031	
	Population	Sewage (MLD)	Population	Sewage (MLD)	Population	Sewage (MLD)
1. Sangli	258,136	27.879	383,000	41.364	570,000	61.560
2. Miraj	149,978	16.198	213,000	23.004	292,000	31.536
3. Kupwad	42,297	4.568	83,950	9.067	136,150	14.704

Sangli Sewerage

5.10 The capacity of the various components of the existing sewerage scheme is compared with the present demand in following table.

Table 5.2: Assessment of demand, supply and shortfall of Sangli Sewerage Scheme.

No.	Component	Demand	Quantity		Remarks
			Supply	Shortfall	
1.	Sewer network	27.879 MLD	Sewerage scheme can carry 13.10 MLD flow. Only 52% population and 16.69 % area is covered.	Capacity of existing scheme does not cover entire area and population. The sewers are overloaded.	Sewer network needs to be extended and strengthened.
2.	Sewage pumping stations	27.879 MLD	Sewage pumping stations are largely non-operational. No adequate arrangement to pump even the flows from existing sewers.	27.879 MLD	Complete overhauling of existing pumping stations and provision of new pumping stations in unsewered areas will be required.
3.	Sewage pumping mains	27.879 MLD	13.10 MLD. (The main from Kolhapur road pumping station to STP not likely to be used).	14.779 MLD	Reallocation of flows to existing and new pumping stations and laying new mains will be required.
4.	Sewage treatment plant	27.879 MLD	13.10 MLD installed capacity, but not fully operational	14.799 MLD, provided existing STP is made fully operational.	Rehabilitation of existing plant and providing additional treatment plant essential. Outfall from existing STP to river needs to be replaced.

Miraj Sewerage

- 5.11 The comparison of the capacities of the components of the existing sewerage scheme is done with the estimated demand in following table.

Table 5.3: Assessment of demand, supply and shortfall of Miraj Sewerage Scheme.

No.	Component	Quantity			Remarks
		Demand	Supply	Shortfall	
1.	Sewer network	16.198 MLD	about 10 MLD	6.198 MLD. It covers only 5.59 % area and 54.13 % population.	Required to be extended and strengthened.
2.	Sewage pumping station	16.198 MLD	about 10 MLD (exact capacity not known)	6.198 MLD	Assessment of capacity of existing pumping stations and provision for additional pumping facility required.
3.	Sewage pumping main	16.198 MLD	Present pumping main of 600 mm may have some spare capacity.	Needs to be ascertained	Additional main from new pumping station may be required.
4.	Sewage treatment plant	16.198 MLD	10 MLD, provided rehabilitation work is taken up	6.198 MLD	Existing plant requires revamping and cleaning.

Kupwad Sewerage

- 5.12 Sewerage facility is not available in any parts of Kupwad town.

C. Adequacy of the Augmentation Proposals.

- 5.13 **Sangli.** Even with the two projects (Phase I of stage II and NRAP), the capacity of the sewerage facility will improve from present 13.10 MLD to 23.19 MLD. Thus compared to the demand of 41.364 MLD in year 2016 and 61.560 MLD in year 2031, the coverage and capacity will be grossly inadequate.

- 5.14 **Miraj and Kupwad.** As stated above, the projects for augmentation of existing system in

Miraj and new system in Kupwad are still not prepared.

D. Potential Areas of Improvement.

- 5.15 The study of the condition and performance of the components of the sewerage systems and the institutional and financial aspects are used to identify the areas of improvements in the existing systems and to suggest the rehabilitation measures, as listed in table 5.4 attached at the end of this chapter. The improvements, which will take place with the implementation of the two projects, discussed in paras 5.5 and 5.6 above, are taken into consideration while proposing the rehabilitation measures. However, a long-term plan of providing sewerage facility to uncovered areas is also required to be prepared.

E. Investment Plans.

- 5.16 *Interim measures.* Long term augmentation schemes for extending the coverage of sewerage services to the entire population are still not planned. Two short-term measures are planned to be implemented in Sangli. For taking full benefit of these measures, it will be necessary to strengthen the existing sewer network and add some new sewers in areas, which are going to be served, by the two new sewers (R and U) proposed in Phase I of the augmentation project. In Miraj also, some strengthening and rehabilitation of sewer network will be necessary. The sewage treatment plants in both towns also require some urgent improvements.
- 5.17 *Investment.* The investment required to rehabilitate the components of the existing schemes is broadly estimated below. It will supplement the investment plans of two schemes in Sangli being undertaken with GOM & GOI assistance.

Table 5.4: Estimated investment for rehabilitation works

No.	Component	Investment for Rehabilitation (Rupees)
(a)	Sangli	
1.	Strengthening of existing sewers.	2,500,000
2.	Laying new lateral sewers in zones of R and U sewers	20,000,000
3.	Sewage treatment plant	2,000,000
	Subtotal (Sangli)	24,500,000
(b)	Miraj	
1.	Strengthening of existing sewers	1,000,000
2.	Pumping station	
	(i) Civil works	100,000
	(ii) Pumps	50,000
3.	Sewage treatment plant	1,000,000
	Subtotal (Miraj)	2,150,000
	Total	26,650,000

F. Financial Implications and Investment Assistance

5.18 **Time Table.** The measures suggested to rehabilitate the existing facilities may be implemented in a period of about two years, to coincide with the implementation of the two projects (of R and U sewers and NRAP), so that all these improvements can be optimally used.

5.19 **Requirement of Funds.** The requirement of funds to implement these rehabilitation measures is likely to be as under:

- (a) in year 2002-03 : Rs. 10.000 million.
- (b) in year 2003-04 : Rs. 16.650 million.

5.20 **Investment assistance.** Grant in aid from the Government of Maharashtra may be available to the extent of 23 1/3% of the capital cost. Balance may be raised by the municipal corporation, either through its internal funds or by raising some loan. The probable investment pattern may be as under:

Table 5.5: Funding plan for the investments

No.	Component	Investment for Rehabilitation (Rs. Million)
1	Government grant in aid	6.23
2	Loan	17.74
3	SMK-MC contribution	2.68
	Total	26.65

Table 5.6: Potential areas of improvement in existing systems.

Issues	Potential Areas of Improvement	Suggestion for Improvement
A. TECHNICAL ASPECTS		
(a) Sangli Sewerage		
1. Sewers	Some sewers get overloaded and clogged.	Possibility of strengthening the undersize sewers or diverting some flow to other sewers needs to be studied and an interim scheme for relief sewers needs to be formulated and implemented.
2. Pumping stations	(a) Pumping stations in Sangli need major rehabilitation measures. (b) Practice of diverting the sewage flow directly to the river needs to be stopped.	NRAP proposals of improvements in the pumping stations at Sangliwadi and on Kolhapur road need to be implemented early. The practice of diverting the flow before it reaches the Sangliwadi and Vakharbag pumping stations and allowing it to flow to the river needs to be banned. Pumping from Kolhapur road pumping station should not be restricted to the quantity used for irrigation and an interim solution to lead the treated effluent from STP to the river should be found out.
3. Treatment Plant	(a) Pretreatment works require major rehabilitation. (b) Oxidation ponds require repairs and desilting. (c) Arrangement to measure the flow and quality monitoring are required.	(a) Pretreatment works should be repaired, flow measuring device should be installed and they should be brought in use. (b) Oxidation ponds should be repaired and desilted. (c) Arrangement for disposal of effluent should be done.
(b) Miraj Sewerage		
1. Sewers	Sewers require frequent cleaning as they get clogged due to overloading.	Possibility of strengthening the undersize sewers or diverting some flow to other sewers needs to be studied and an interim scheme for relief sewers needs to be formulated and implemented.
2. Pumping station	One pumpset is not working.	Repairs are required.

Issues	Potential Areas of Improvement	Suggestions for Improvement
3. Sewage treatment plant.	(a) There is no arrangement to measure the flow, to control the velocity and to remove the screenings and grit.	(a) Flow measuring device, Parshall flume and scraping arrangements for collecting the screenings and grit need to be installed.
	(b) The four-oxidation ponds are silted, repairs are required to the earthen bunds and stone pitching.	(b) Four oxidation ponds, which are recently repaired, should be pressed in service and other four ponds should be repaired.
	(c) The quality of influent is not measured and monitored.	(c) A formal system of physical, chemical and biological analysis of influent and effluent needs to be introduced and practiced regulatory
B. INSTITUTIONAL ASPECTS		
1. Drainage Departments in Sangli and Miraj function as independent units and not as a homogenous department.	Even after merger under the control of the Executive Engineer (Water Supply), these units still do not function as one homogeneous unit. Optimum utilization of the available human resources and sharing of the expertise developed by these units does not happen.	A sense of team work and optimum use of resources, by transferring the employees from one unit to another, frequent interactions of the employees through periodical meetings etc. are essential.
2. Manpower planning needs to be done considering the situation in near future.	This applies particularly to the supervisory cadre. There are no qualified employees available in the lower (operating) cadre for promotion to the supervisory cadre.	A systematic plan for recruitment and grooming of suitable candidate with necessary training is essential to man the key positions in supervisory cadre.
4. Lack of formal education.	The level of education at the operating and helper cadre is very poor. This field staff should have at least some minimum exposure to the technical aspects.	Suitable scheme will have to be designed for this staff to train them in the new techniques.

Issues	Potential Areas of Improvement	Suggestions for Improvement
5. Personnel policies	The HRD policies in respect of recruitment and training, promotions and transfers, rewards and incentives are followed on the basis of the provisions of the Act and By-laws. These policies in their present form do not provide any incentive to the employees to do their best.	System of rewarding hard work, efforts and talents of the employees by implementing measures like performance linked incentives for groups and individuals needs to be introduced.
6. Records and registers	Records are based on the formats prescribed in the Municipal Accounts Code 1971. All the columns in these registers are not utilized / filled in and in some cases registers prescribed for specific use or function are used for recording different type of details. There is lot of duplication in recording the information in the forms.	A detailed study of systems and procedures is required to eliminate redundant records, modify and improve the formats of existing registers and forms, and identify the areas suitable for computerization.
7. Formal system of reporting and monitoring of key indicators of operational performance.	At present there is no formal system of reporting the key issues / indicators of the operational performance to the Executive Engineer (Water Supply).	A system of periodical reporting to the Executive Engineer in the important aspects like the operational performance of all installations, new connections, capital and revenue expenditure compared with budget provisions, demand, collection and recovery performance, staff related matters, progress about new schemes etc should be introduced.
C. FINANCIAL ASPECTS		
1) Collection performance of property tax needs further improvement.	The collection performance of property tax improved from 57% in the year 1998-99 to 65% in the year 1999-2000, but again dropped down to 55% in subsequent year. There is no penal charge for delayed payment.	Some kind of positive or negative incentive should be introduced to encourage the property owners to pay the taxes in time (for example, some concessions / discounts for early payment and delayed payment charges or higher notice fee).

Issues	Potential Areas of Improvement	Suggestions for Improvement
2) Controlling energy and staff costs.	The expenditure on energy and staff cost forms 49% and 28% of the total operating cost of water supply operations. In view of the increasing MSEB power charges, the power cost is likely to rise continuously in future. Similarly, there is demand of the Unions to apply the Fifth Pay Commission's recommendations, which is also likely to affect the staff cost.	By adopting the measures like energy audit and utilizing the available staff in an optimum manner with the measures like internal transfers (between Sangli and Miraj and also between water supply and sewerage departments), these costs should be controlled.
3) Adverse operating ratio of sewerage operations	It is observed that during all the three years reviewed, the operating ratio of sewerage operations is very adverse. The revenue generated is not at all sufficient to meet even the O&M costs. The tariffs, which are charged at present, need a critical review in this respect.	Detailed review of the system of recovering drainage tax as a part of the property tax and the rates should be undertaken.
4) There is no comprehensive database of sewerage connections in Sangli and Miraj	Manual system of maintaining records of the data pertaining to the properties connected with the sewerage connections has limitations.	While introducing the use of computer in drainage department, priority should be given for creation of database of properties with the details of connections according to the consumer type, size etc. It should ideally be linked with the main property tax database to ensure that each and every property is connected and billed for the sewerage services.