If resettlement sites are located adjacent to the reservoir, water pollution problems may be expected in the reservoir owing to the discharge or dumping of wastes into the reservoir. Moreover, soil erosion resulted from agriculture around the reservoir may reduce the reservoir life, due to higher sedimentation rates.

In the case that the resettlement is required,

a. The settlement work should be done prior to the construction in order to assure the resettlers of their future.

b. The wage labor for construction should be recruited from the settlers so that they will have a sense of belonging and achievement through their participation.

c. Close cooperation with Ministry of Agriculture, Fisheries and Natural Resources should be maintained so that the National Agricultural Extension Programme will cover the settlement area.

Fortunately, the proposed reservoir area ,TRO site, does not include any inhabitants, having no troublesome resettlement problems.

5.5 Water Quality

5.5.1 General

An investigation on water quality was made to confirm whether or not, any water quality problem would occur or any special facilities for solving the water quality problem will become necessary.

The water samples for the water quality test were taken at various places and tested in Japan for both Phase I (dry season) and Phase II (rainy season). This section presents the above water quality test results and discussed the possibility of occurrence of water quality

problem.

5.5.2 Study on Water Quality

1) Water samples for water quality test

The followings water samples were taken for water quality testing:

(i) Moka river (at Baptiste)
(ii) Moka river (at Bocage)
(iii) Profonde river
(iv) Cascade river
(v) Terre Rouge river
(vi) Champagne dam reservoir
(vii) Valetta reservoir

The above water samples were selected with the following consideration.

The Moka, Profonde, Cascade and Terre Rouge rivers are major tributaries which will flow into the candidate reservoirs, having the sugarcane field in a large scale in their catchment basin. In view that the future reservoir is presumed to eutrophicate due to the river water containing fertilizers from the sugarcane fields, the content of harmful components in these river water is investigated.

It is considered that the extent of eutrophication in a reservoir will largely be effected by the conditions of reservoir: that is, the shallower reservoir will be subject to the severer eutrophication.

The investigation of water quality in the existing reservoirs in Mauritius will provide a useful indications for forecasting the water quality in the reservoir to be constructed in future. Accordingly, water samples were taken for water quality testing from two existing reservoirs having different conditions, i.e. the Champagne dam reservoir with relatively great water depth and the Valetta reservoir with shallow

water depth and wide reservoir surface area.

2) Result of water quality test

The results of water quality test carried out for the above mentioned water samples are presented in Table 5.4 (Dry season) and Table 5.5 (Rainy season) .

The following are general explanations of the test results:

(1) Nitrogen

The river water contains a considerably high content of nitrogen, indicating the content of around 2 mg/1.

On the other hand, the water in the existing reservoir contains 0.3 - 0.4 mg/1 of nitrogen. In the Valetta reservoir, most of nitrogen is presumed to be related to the phytoplankton in view of low content of inorganic nitrogen. However, the production of phytoplankton may be less in the Champagne dam reservoir in due consideration of small content of inorganic nitrogen.

Referring to Table 5.2 which shows the classification for the degree of eutrophication, these existing reservoirs are classified into the moderate eutrophication.

(2) *Phosphorus*

The river water contains phosphorus of 0.01 - 0.02 mg/1 as seen in Table 5.4.

This content is slightly higher than the river water without contamination in view that the phosphorus of 0.01 mg/1 more or less is usually detected even in the river water without contamination.

The water in the existing reservoir shows the phosphorus content of about 0.02 mg/l. The classification based on the phosphorus content also classified these reservoirs into the moderate eutrophication.

(3) Organic compound

The consumption of potassium permanganate and BOD value, etc. is an indicator of the content of organic compounds. Judging from the consumption of potassium permanganate of about 1 mg/l and BOD less than 1 mg/l, the organic contamination in the river water is recognized to be small.

The phytoplankton is also detected with the consumption of potassium permanganate. The consumption of potassium permanganate for the samples from the Champagne and Valetta reservoirs indicates 2.8 mg mg/l and 9.2 mg/l respectively. The high consumption of potassium permanganate for the water from the Valetta reservoir suggests a high production of phytoplankton in the Valetta reservoir.

In the rainy season, the consumption of potassium permanganate is about 10 mg/l which is a considerable high value compared the those in the dry season.

As for the reservoir and lake water, the value of the organic compound is 12 - 13 mg/l which is something higher in case of Valetta and nearly four times the value in the dry season in case of Champagne.

(4) Iron and manganese

The iron and manganic contents in the river water are as low as 0.15 mg/l or less for iron and 0.02 mg/l or less for manganese. However, its content in the water of existing reservoirs increases. The iron and manganese tend to dissolve from the bottom of reservoir when the oxygen in the water reduces. Then, there is a possibility of water quality deterioration due to reduction of oxygen in the reservoir water.

In the rainy season, the iron contents in the river water are as much as 0.01 - 0.4 mg/l which is higher than those in the dry season. As for the reservoir and lake water, the content is as low as 0.05 - 0.1 mg/l which is lower than those in the dry season.

(5) Phytoplankton

Table 5.3 shows the test result for the phytoplankton.

As seen in the table, the water from the Champagne dam reservoir contains only 31 nos./ml of phytoplankton. Besides, the phytoplankton consists mainly of the diatomaceae. Then, it is judged the progress of eutrophication in the Champagne reservoir is not remarkable.

On the other hand, the number of phytoplankton is counted to be as many as 582/ml in the Valetta reservoir. Further, the phytoplankton is mostly composed of the phormidium of cyanophta to cause moldy smell, resulting in the deterioration of water quality.

In the rainy season, according to the results, the total number of phytoplankton is 360 nos./ml in case of Champgne and 1,600 nos./ml in Valetta both of which are ten times those in the dry season. In case of Champagne, the number is limited to 360 nos./ml which is not so serious, but in case of Valetta it is very serious. As for the kind, diatomaceae is very much in number and cyanophta is also contained and it is expected that those might cause moldy smell, resulting in the deterioration of water quality.

5.5.3 Conclusion on Water Quality

a) River water

Value of consumption of potassium permanganate changed remarkably throughout a year, and generally it shows a high value. Hardness, evaporation residue, alkalinity and others decreased something due to the dilution.

Change of turbidity has a tendency that in the rainy season the value increases, but the results of quality analysis show below three degree, and no high values were seen. Under heavy rainfall, however, it is considered that the value must be further increased.

b) Reservoir and lake water

In case of Champagne in the rainy season, the number of phytoplankton increases compared to those in the dry season, so that the value of consumption of potassium permanganate increased. And values of alkalinity and hardness decreased same as the river water.

In case of Valetta, the value of consumption of potassium permanganate was high in the dry season, and also in the rainy season its value increased. And the number of phytoplankton increased to 1,600 nos./ml. Similar to those in case of Champagne, values of alkalinity and hardness decreased.

River water contains phosphorus and nitrogen which show relatively high value, therefore when river water is utilized storing in the reservoir in the future, attention should be paid for eutrophication. In other words, the river water changes to the water quality seen in case of Valetta. As a result it is anticipated that number of phytoplankton increases and hindrance of water quality such as moldy smell and clogging of filter might be caused.

5.5.4 Conceivable Treatment System

As founded from the water quality tests carried out for the water samples from the existing Champagne reservoir, the phytoplankton may increase in the rainy season even in the proposed TRO reservoir. In this case, the water treatment with the direct or slow sand filtratyion will not be effective due to the remarkable clogging of filter,requiring the rapid sand filtration system. Moreover, the prechlorination, and deodrizatin treatments will also be required.

5.6 Environmental Impact Assessment

5.6.1 General

Future environmental pollution should respond to changes in economic and social structure, the diversification of forms of pollution and changes in environmental attitudes of the country. In the meaning, it is desirable, first of all, to boost anti-pollution measures with the aims of attaining and maintaining environmental standards. Second, with respect to the national environment, the pollution control policy should be adopted in accordance with the local natural features and their patterns of utilization. Attention should be paid to conserve the natural environment within the sphere of daily life. Third, in order to forestall environmental pollution from accruing, efforts should be made to rationalize land utilization and promote assessment of the environmental impact.

5.6.2 Environmental Impact Assessment

Until recently, assessment prior to the commencement of development projects was mainly conducted on the basis of special, economic and employment. In the course of rapid urbanization, water pollution due to the accumulation of organic and inorganic substances has increased, and they affect badly both the health and living environment of the public.

As a result many pollution control related laws and decrees have enacted also in Mauritius, and the importance of carrying out environmental assessment prior to the commencement of implementation has been widely reorganized. No law covering environmental impact assessment method has been actually applied for various development projects, but already accumulated various experiences have been widely utilized for the assessment.

In the meantime, it is said that environmental impact assessment is a technical analysis to be provided to inform decision makers and

project designers of the potential environmental impacts in the proposed project area and to evaluation technical alternatives and to identify possible mitigation activities based on the above assessment.

5.6.3 Anticipated Environmental Impacts

The anticipated environmental impacts affected by the Project mainly those by construction of dam, reservoir and related facilities. The following items are conceivable as environmental impacts due to construction of dam, reservoir and related facilities.

- Physical resources

1) Change of the river flow pattern, sediment transportation mechanism and water quality in the river system
2) Increase of groundwater potential in the basin, particularly in the lower basin

- Ecological resources

3) Impact on aquatic fauna and flora
4) Increase of productivity of aquatic life, especially fish population
5) Impacts on terrestrial wildlife
6) Loss of forest resources in the reservoir area

- Human use value

7) Mitigation of flood damages
8) Provision of easy access to domestic water
9) Change of water temperature and effect on irrigation
10) Continuation of muddy condition of water

- Quality of life values

11) Development potential of recreation area in the reservoir
12) Improvement of local transportation

As for the above four items, the outlines are as below.

- Physical resources

Exploitation of water resources by a storage dam will increase the potential or groundwater in the whole basin, particularly in the downstream area of the GRNW. The present observation of groundwater in the area should be continued for future development.

By the operation of the proposed dam, the pattern of river flow will be remarkably changed in the downstream of the damsite. However, it is expected that the future river flow will become more steady than the present natural river flow and contribute to maintain domestic water use. Furthermore the situation of the present river water quality will not turn worse.

A storage dam on a river will change the transportation mechanism of sediment in the river system. In the upstream of the dam, sediment will be trapped in the reservoir and the channel bed of rivers flowing into the reservoir will be elevated because of back sand at the edge of the reservoir. On the contrary, in the downstream of the damsite, reduction in sediment supply will cause degradation of the riverbed.

However, in the case of the Project, the sediment yield in the basin is rather small to such an extent that the balance of sediments is not necessary to be taken as a problem. Furthermore, the dam in the Project will trap the sediments from about half of the total catchment basin, meaning that sediments from residual basin will discharge to downstream reaches. No effect is considered on the balance of sediments.

- Ecological resources

The dam construction will create a new opportunity for fish production in the reservoir. If aquatic culture is made in the reservoir, much production is expected.

The impact on wildlife will be derived from the loss of their habitats in the reservoir area. It is considered, however, from the following facts that the impact on wildlife is relatively small.

a. Most of wildlife in the reservoir area will be able to move toward surrounding area.

b. Forests in the reservoir area have already received the human pressure, and fauna is small in number.

Some loss of timber in the proposed reservoir area will occur, but its natural and commercial value is low. Adverse impact on flora is also considered minor, since the submerged area is limited to a small area of 30 ha confined with the steep gorge.

- Human use value

The regulated water flow resulting from dam construction will improve the water supplies for domestic uses.

Although the proposed plan does not include flood control in its purpose and the effect of flood control is small, operation of reservoir will have incidental effects on flood control through reduction in flood frequency and peak discharge.

The temperature of water to be stored in a reservoir will remarkably be lowered in the deep portion of reservoir, which will give an adverse effect on the irrigation if this cold water has to be supplied for the irrigation. However, no irrigation intakes exist in the downstream reaches of the dam, causing no problem due to the change of water temperature. Fortunately, no irrigation intakes exist in the proposed reservoir area as well. Thus, any troubles will not arise on the irrigation due to the proposed project.

The muddy condition of water caused during flooding may continue due to the reservoir, requiring some countermeasure for the domestic and other water supply purposes.

- Quality of life values

There are no residential houses or agricultural lands in the proposed reservoir area. Thus , no environmental impact will arise in this aspect. Some fabourable effects are expected in such aspects as the development of recreation area in the reservoir and improvement of local transportation.

5.6.4 Proposed Countermeasures for Unfavourable Environmental Impacts

The environmental impacts will give more or less some influence to the Port Louis Water Supply Project area. Most of the anticipated impacts are not so serious. Further, unfavourable impacts will be minimized by taking the following consideration and measures:

1) Dam construction

In constructing the proposed dam, the designs should follow the requirements as mentioned below.

(a) Creating esthetically satisfying structures and land scapes,
(b) Causing minimal disturbance to the areal ecology, and

(c) Keeping natural beauty of the surrounding area intact.

Practically, the following measures should be considered in design and construction stages. First of all, scenic overlooks should be provided for viewing the dam and reservoir. Second, the river diversion works should be such that excessive siltation created during construction will not find its way into the down stream water. Third, the area for spoiling unusable materials from excavation should be selected carefully. Fourth, as much natural vegetation as possible should be left in place. Fifth, borrow are should be vegetated with grasses, trees, and shrubs, soon after the job is completed. Sixth, all slopes cut adjacent to the reservoir area should be reseeded and mulched. Seventh, the intake facilities should be designed to selectively take the water from any part of reservoir.

2) Forests in the reservoir

In order to sustain the water quality in the reservoir, the forests should be lumbered before inundation. Since the forests that the economically valuable are found in some parts of the reservoir area, it is possible to gain the some profits be selling the merchandable timber trees. Clearing of the forests in the reservoir area should therefore be considered.

3) Ecological resources

Quality, temperature, and mobility of water are critically important to the survivals of fish and wildlife. The quantity of pollutants which will enter the stream during construction period should be kept to the minimum. The forests along the anticipated waterfront of the reservoir should partially be maintained for the future fisheries. Certain aquatic plants may be desirable for water birds feedings. Prior to the inundation, forest clearing of the reservoir area should be started from damsite towards the upstream, in order to evacuate wildlife from inundation.

4) Recreation

The increase of population around the proposed reservoir will cause a significant increase in the use of reservoir for recreational activities. Provision might be made to obtain the maximum recreational benefits from the completed reservoir.

TABLES

TABLE 5.1 LIST OF MAIN ENVIRONMENTAL LEGISLATION PRESENTLY IN FORCE IN MAURITIUS

1. Pas Geometriques Act
2. Removal of Sand Act
3. Town and Country Planning Act
4. Public health Act
5. Rivers and Canals Act
6. Stone Crusher & Block Making Regulations
7. Chemical Fertilizers Control Act
8. Fisheries Act
9. The Wildlife Act
10. The Forests & Reserves Act
11. Advertisements Regulation Act
12. Plaines Wilhelms Sewerage Act
13. Port Louis Sewerage Act
14. Roads Act
15. Local Government Act
16. Noise Prevention Act
17. Development Incentives Act
18. Export Processing Zones Act
19. Standards Act
20. Control Water Authority Act
21. Electricity Act
22. Ground Water Act
23. Ports Act
24. Ancient Monuments Act
25. Continental Shelf Act
26. Road Traffic Act

TABLE 5.2 CLASSIFICATION OF EUTROPHICATION BY VOLLENWELDER

Degree of Eutrophication	Total Phosphorus (mg/m^3)	Inorganic Nitrogen (mg/m^3)
1. Extremely Low	< 5	< 200
2. Low - Moderate	5 - 10	200 - 400
3. Moderate	10 - 80	300 - 600
4. Moderate - High	80 - 100	500 - 1500
5. High	> 100	> 1500

TABLE 5.3 BIOLOGICAL TEST RESULT FOR RESERVOIR WATER

Items	Champagne Dam Reservoir	Valetta Dam Reservoir
Diatomaceae:		
Cyclotella	16	2
Nitzschia	2	2
Synedra	4	2
Gomphonema	1	2
Melosira	-	64
Green Algae:		
Scenedesmus	2	-
Staursturum	-	84
Chlorella	4	-
Cosmatium	-	2
Cyanophta		
Phormidium	-	420
Flagellate:		
Trachelomonas	2	-
Total	31	582

Table 5.4 WATER QUALITY TEST RESULT

(Dry season)

Unit: mg/l

Samples	Consumption Potassium Permanganate	T-N	T-P	NH_4-N	NO2,NO3-N	PH	Turbidity	Hardness
Moka River (Baptiste)	1.4	2.4	0.024	0.10	2.31	7.20	0.4	39.0
" (Vocage)	1.2	2.3	0.012	0.04	2.25	7.76	0.1	46.4
Profonde River	1.4	3.4	0.022	0.10	1.57	7.80	0.2	56.5
Cascade "	1.1	2.1	0.022	0.10	1.91	7.83	0.5	47.3
Terre Rouge "	3.0	1.7	0.024	0.06	1.57	7.23	0.9	55.5
Champagne Dam Reservoir	2.8	0.4	0.022	0.08	0.34	7.03	1.6	25.0
Valetta Reservoir	9.2	0.3	0.017	0.04	0.01	7.10	3.9	22.5

Samples	Chlorine Ion	Alkalinity	Ferrum	Managanese	Residua	BOD	Colour
Moka River (Baptiste)	16.3	30.1	0.02	0.00	118	0.1	< 5
" (Vocage)	16.3	35.5	0.06	0.01	113	0.2	< 5
Profonde River	19.1	39.0	0.06	0.01	155	0.3	< 5
Cascade "	13.5	37.3	0.08	0.01	122	0.5	< 5
Terre Rouge "	12.5	53.3	0.15	0.02	133	1.0	< 5
Champagne Dam Reservoir	9.1	22.0	0.35	0.05	71	0.2	8
Valetta Reservoir	9.1	18.1	0.27	0.03	71	0.5	13

Table 5.5 WATER QUALITY TEST RESULT

(Rainy season)

	Consumption of Potassium Permanganate	T-N	T-P	NH_2-N	NO_3-N	PH	Turbidity
Moka wo 3	10.1	0.9	0.024	0.05	0.52	6.7	0.8
Moka wo 4	9.4	1.1	0.013	0.01	0.09	6.6	1.2
Moka wo 5	11.1	1.9	0.020	0.00	1.56	6.6	2.4
Moka wo 8	11.2	2.0	0.009	0.01	1.64	6.8	0.4
Moka wo12	11.9	2.2	0.013	0.00	1.98	6.9	0.3
Champagne	12.3	0.1	0.028	0.00	0.00	6.3	0.8
Valetta	12.9	0.6	0.020	0.00	0.15	6.6	4.3
Pailbs	13.2	2.1	0.015	0.00	1.32	6.7	2.3

	Hardness	Choric Ion	Alkalinity	Ferrum	Manganese	Evaporation Residue	BOD	Color
Moka wo 3	71.5	12.3	59.1	0.01	0.001	119	1.5	5
Moka wo 4	20.5	15.3	20.3	0.28	0.000	56	0.9	7
Moka wo 5	36.5	15.6	25.7	0.33	0.003	98	0.3	7
Moka wo 8	46.2	19.4	33.2	0.08	0.003	110	0.5	5
Moka wo12	41.5	16.9	26.9	0.22	0.001	107	0.2	7
Champagne	14.1	9.9	11.4	0.05	0.003	36	1.1	5
Valetta	18.3	11.7	12.6	0.1	0.011	48	1.0	5
Pailbs	39.5	18.5	26.5	0.37	0.011	99	0.3	8

6. CONCLUSION AND RECOMMENDATION

(1) It has been revealed through the Feasibility Study that the Project will be justifiable technically, economically and financially. In view that the water supply shortage occurring in Port Louis City almost every year has to be solved urgently, the Project should be promoted for its implementation at the earliest possible time. Prior to the implementation, the Project requires the detailed design, preparation of tender documents, tendering and contracting, etc. It is strongly recommended to proceed with necessary procedures for executing these works as soon as possible.

(2) The local currency portion of the construction cost amounting to Rs. 294 millions (Rs. 393.3 including the price escalation) has to be borne by CWA or the Government of Mauritius. It is recommended to duly take the above into consideration and make necessary arrangement in advance in CWA's or the Government's financing.

(3) It is noted that the financial soundness can be kept under the condition that the water tariff be duly revised in accordance with the consumer price index, which should be taken into account. Taking into consideration that the household income will also increase together with the consumer price index, the reasonable ratio of household expenditure on water consumption (2 %) for the household income is considered to be maintained.

(4) The operation and maintenance has to be executed by CWA after the completion of Project. Since CWA has no experience on the operation and maintenance for a dam and appurtenant facilities, the staffs should duly be trained for the purpose. It is recommended to plan that the staffs be well trained by an operation and maintenance engineer who will execute the operation and maintenance together with the staffs and train them during one year after the completion of Project. It is also recommended that a satisfactory operation and maintenance manual sufficiently in detail be prepared by the operation and maintenance engineer.

(5) The Project does not includes any purposes other than the water supply to Port Louis City, aiming to limit the project cost to the minimum. However, it is recommended to consider that a power generation utilizing the supply water from the dam and reservoir be installed if the financing arrangement allows it in future. A preliminary study indicates that the annual net revenue to be obtained by the power installation will amount approximately to Rs. 6.0 to 7.0 millions, which will favourably improve the financial state of CWA.

7. WORKS IN NEXT DETAILED DESIGN STAGE

7.1 Objectives of Detailed Design

The detailed design work in next stage will have the following objectives:

(i) to conduct additional field investigations for obtaining adequate data for detailed design,

(ii) to perform the detailed design for project components for the project implementation, and

(iii) to prepare the inception report, design report, technical specification, prequalification and tender documents, cost estimate, detailed implementation program for implementation of the Port Louis Water Supply Project.

7.2 Scope of Work

The detailed design work will include the following work items:

(1) Preparation of Inception Report

The Inception Report shall be prepared after study/review of feasibility study and all the relevant data obtained. The Inception Report shall include findings and recommendation to be obtained through study/review of feasibility study, detailed scope of work, its plan of operation, work schedule and staffing, etc.

(2) Investigation Work and Analysis

Detailed investigations and analyses shall be carried out as follows:

(i) Detailed geological investigation

Detailed geological investigation shall at least include the following:

a. Detailed reconnaissance to confirm any existence of continuous opening in the reservoir area by providing footpaths at an appropriate interval

b. Additional core drillings with field tests at main structure sites including the dam, spill-way, diversion tunnel, intake structure, pipe line and water treatment plant for collection of data for detailed design, and on left bank of the reservoir for further confirmation of its geological condition,

c. Test aditings at both abutments of damsite for direct observation of foundation rocks and in-situ rock test,

d. In-situ rock shear tests and loading tests in the test adit for collection of informations on strength of foundation rocks,

e. Test groutings at the damsite for confirmation of groutbility of the foundation rocks,

f. Laboratory tests on recovered core samples for collection of informations on physical and mechanical properties of foundation rocks,

Locations and approximate quantities of geological investigation in damsite are shown in Fig. 7.1. Test aditting planed in damsite is shown in Fig. 7.2.

(ii) Detailed investigation on construction materials

For further clarifying the properties of rock embankment, filter, impervious core and concrete aggregates materials, detailed investigation on construction materials shall include the following:

a. Two (2) core drilling of 30 m each in depth and sampling at proposed quarry site,

b. Five (5) test pittings and sampling at proposed earth borrow area,

c. Physical and mechanical tests for the samples from proposed quarry site and earth borrow area,

d. Test embankment of quarry rock and direct shear test to determine the dam design value,

e. Concrete mixing test to determine the concrete mix proportion.

(iii) Topographic survey

Topographic survey shall prepare the topographic map of 1 to 500 in scale for detailed design of respective project components.

The topographic map shall cover the areas for all structures including the damsite, haul road route, access roads, pipeline route, water treatment plant area, and temporary facilities area.

(iv) Meteo-hydrological survey

Additional meteo-hydrological data shall be collected and analyzed for reviewing and determining the design values.

(v) Hydraulic model test

Hydraulic model tests shall be carried out to conclude the design of spillway and energy dissipator.

(vi) Inspection of Municipal Dike

A detailed inspection will be carried out for necessary rehabilitation of the existing Municipal Dike.

(3) Detailed Design

Following the detailed investigations, analyses and conclusion of various design values, the detailed design shall be prepared, including the followings:

(i) Design criteria and basic design

Prior to commencement of detailed design work, the design criteria on which the structural design will be based shall be set up.

Based on the criteria, the basic design of all the structural components of the project, including the haul road/bridge, construction access roads, base camp and other facilities, shall be prepared through necessary structural and economic analyses.

(ii) Detailed design

The detailed design for the purpose of international tendering and construction shall be prepared based on the basic design and through examinations from structural and economic aspects. Detailed design shall include all the structural components of the project as follows:

a. Preparatory works: the base camp, workshop, warehouse, laboratory, medical facilities, electric power supply

system, water supply system, communication facilities, haul roads/bridge, access roads, concrete and aggregates plants, etc.

b. Civil work structures: the diversion tunnel, coffer dams, main dam, spillway, intake structure, river outlet system with diversion closure, provision for future power installation if any, and civil works for pipeline and water treatment plant.

c. Mechanical and electrical equipment: the intake facilities, river outlet facilities, pipeline and water treatment plant.

(iii) Preparation of Design Report

Design Report on the mentioned detailed design shall be prepared.
The Design Report shall contain the design criteria established, basic design considerations and conditions, analyses and results, and layout and structural drawings prepared.

(4) Preparation of construction plan

The construction plan for a smooth progress of construction work and successful completion of the project in time shall be prepared.

The construction plan shall contain the construction schedule indicating the key dates/mile stones and particularly the critical paths, schedule of necessary construction equipment together with its type, capacity, number and period, and construction method and sequence.

(5) Project cost estimate

The project cost estimate shall be prepared based on the technical specifications/dimensions of all the structural components including the preparatory works for construction, engineering and administration cost,

compensation cost, physical contingency, price contingency and interest during construction.

The unit prices used shall be those prevailing at the time when the cost estimate is prepared.

(6) Preparation of implementation program

An implementation program of the project shall be prepared. The program shall include the descriptions of project, project cost, financing arrangement, economic & financial justification, overall construction schedule, construction method and sequence of all structural components, and all the relevant maps/drawings.

(7) Preparation of prequalification documents

For each of (i) the river diversion work, (ii) main civil work, and (iii) pipeline and water treatment plant work, the prequalification questionnaire documents for selecting firms to be invited for the International tender shall be prepared.

(8) Preparation of tender and contract documents

The tender and contract documents for the International tender shall be prepared separately for the river diversion work, main civil works, and pipeline and water treatment plant works.

The tender and contract documents shall include the description of project, general condition, instruction to tenderers, condition of contract, technical specifications, bill of quantities and price lists, maps, drawings and all the relevant documents (survey/investigation data), and the overall schedule of the project in terms of bar chart schedule and key dates/mile stones.

(9) Assistance in prequalification, tendering and contract negotiations (option)

The prequalification evaluation, written answers on the tenderers' written questions, evaluation report on the bid proposal, etc. shall be prepared if required by the Employer.

Assistance in contract negotiations with successful tenderers shall also be made if required by the Employer.

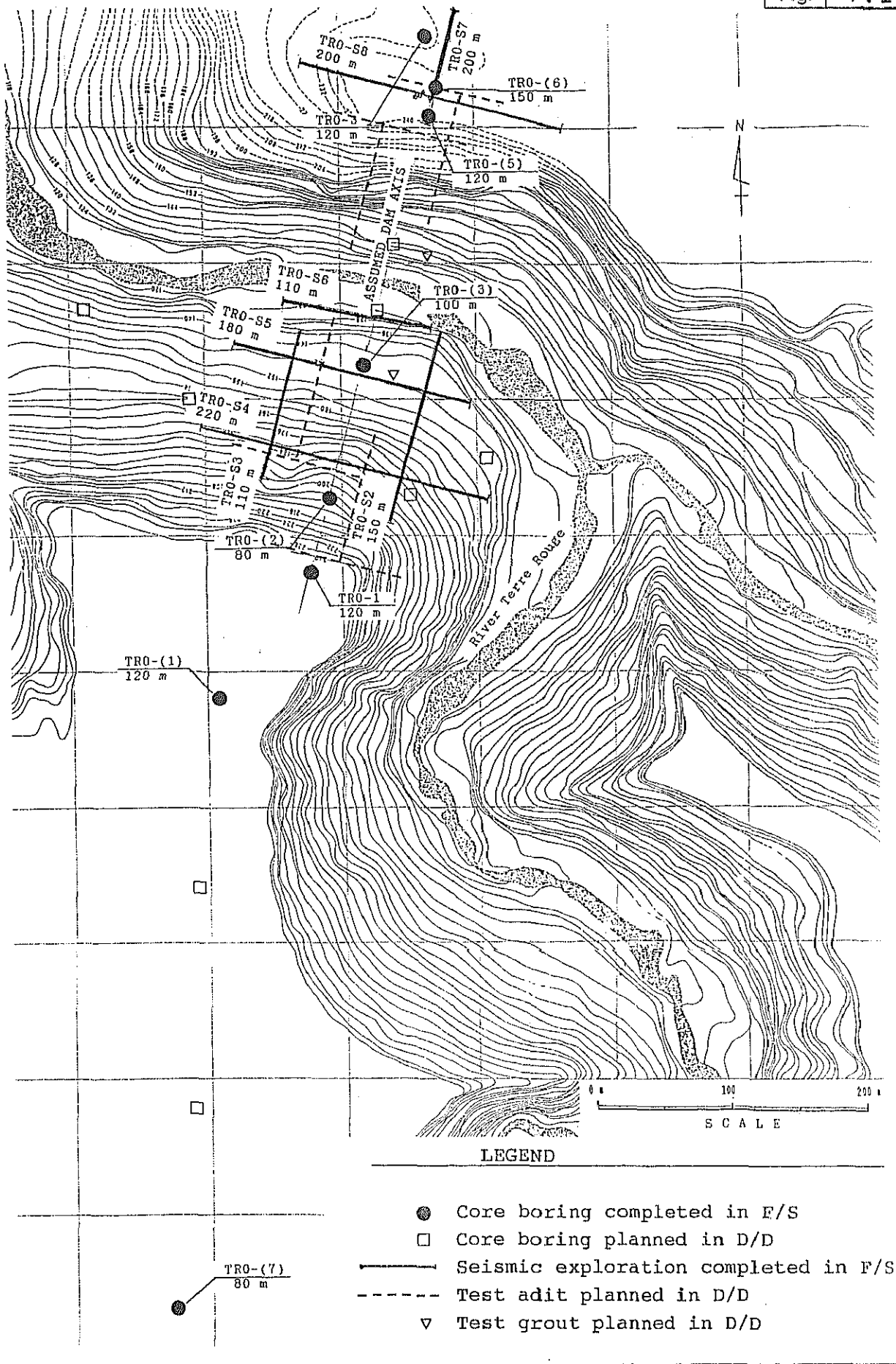
(10) Documents to be submitted

The following documents shall be prepared and submitted.

(a) Inception Report,
(b) Specification and program for site investigation work,
(c) Detailed design for all the structural components,
(d) Design report,
(e) Project cost estimate,
(f) Construction plan,
(g) Implementation program,
(h) Prequalification documents for each of the river diversion work, main civil work, and pipeline & water treatment plant work,
(i) Tender and contract documents for each of the river diversion, main civil work, and pipeline & water treatment plant work,
(j) Terms of reference for construction supervision
(k) Prequalification evaluation report,
(l) Tender evaluation report, and
(m) Bi-monthly progress reports.

FIGURES

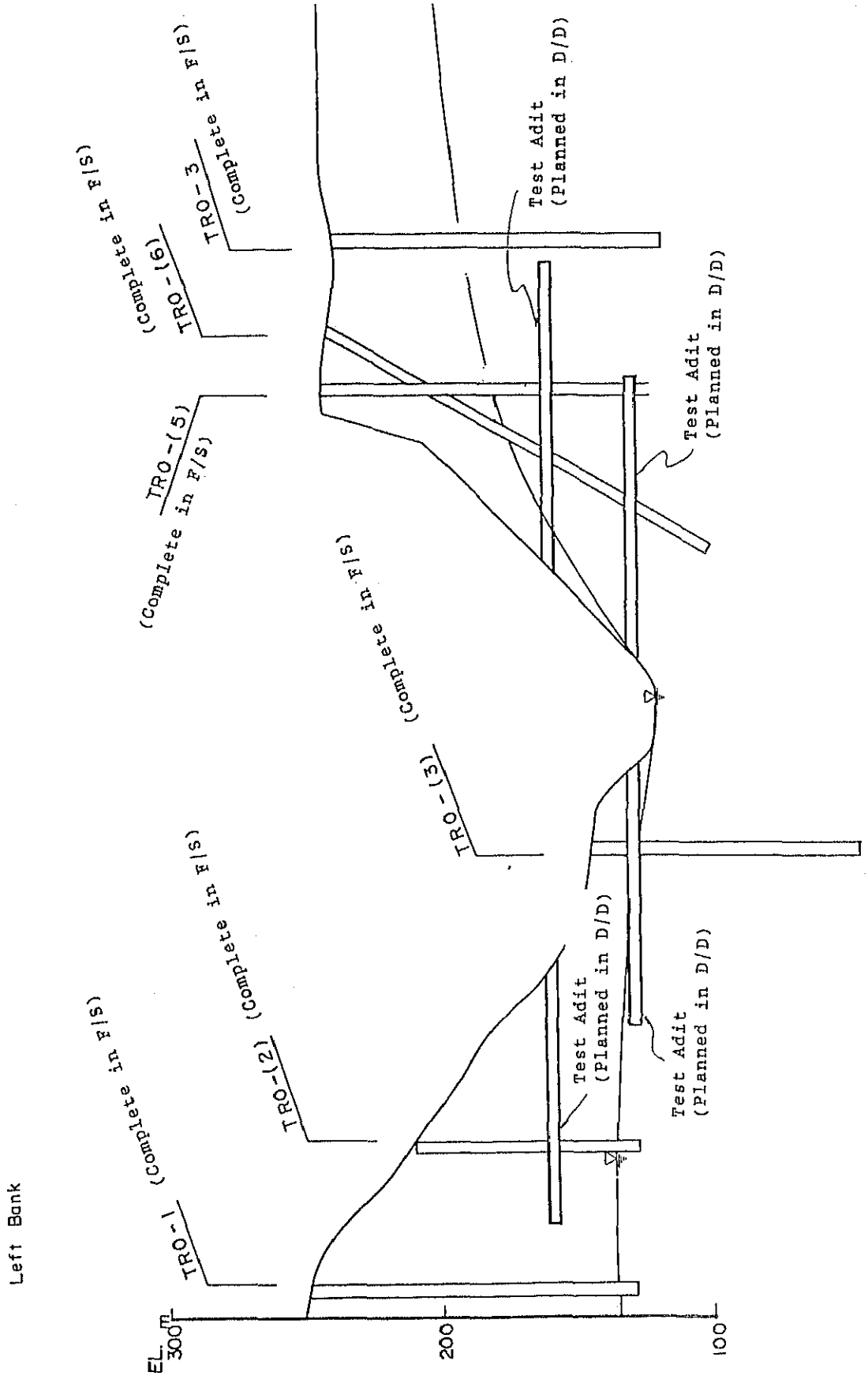
Fig. 7.1



GEOLOGICAL INVESTIGATION IN DAMSITE

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 7.2



TEST ADITTING PLANNED IN DAMSITE

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY