THE PROJECT FOR CONSTRUCTION OF
PRIMARY SCHOOLS
IN THE KINGDOM OF LESOTHO

PACIFIC CONSULTANTS INTERNATIONAL

Perspective

## LIST OF FIGURES



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**ABBREVIATION**

| | |
|---|---|
| DRWS | Department of Rural Water Supply |
| DTEP | Distance Teacher Education Programme |
| DWA | Department of Water Affairs |
| EFU | Education Facilities Unit |
| EMIS | Education Management Information System |
| E/N | Exchange of Notes |
| ESDP | Educational Sector Development Program |
| FPE | Free Primary Education Programme |
| JICA | Japan International Cooperation Agency |
| JOCV | Japan Overseas Cooperation Volunteers |
| LCE | Lesotho College of Education |
| M/D | Minutes of Discussion |
| MOFDP | Ministry of Finance and Development Planning |
| MOET | Ministry of Education and Training |
| MOFA | Ministry of Foreign Affairs |
| MONR | Ministry of Natural Resources |
| SABS | The South African Bureau of Standard |
| SSRFU | School Self Reliance and Feeding Unit |
| SSRP | School Self Reliance Program |
| SSU | School Supply Unit |
| TSD | Teaching Service Department |
| VIP | Ventilated Improved Pit Latrine |
| VLOM | Village Level Operation and Maintenance |
| WASA | Water and Sewerage Authority |
| WFP | The United Nations World Food Programme |
| WHO | World Health Organization |

# SUMMARY

# SUMMARY

The Kingdom of Lesotho (hereinafter referred to as "Lesotho") is one of the Least Developed Countries, which do not benefit from any particular natural resources except some diamond and hydropower resources. Although agriculture is the main industry, land is mostly cultivated by small scale farmers and no other resource have been developed. Lesotho participates as Southern African Custom Union ("SACU") along with the Republic of South Africa (hereinafter referred to as "South Africa"), Botswana, Namibia, Swaziland and a few others, and trades mainly within the union. Lesotho is highly dependent on South Africa economically and most commodities are imported from South Africa. In an effort to rid itself of such economical circumstances, Lesotho is currently advocating "Lesotho Vision 2020 (2001)", a long-term national vision which aims at realizing "Lesotho's economy will be strong, its environment well managed and its technology well established" and is in the midst of national reform focusing on developing human resources in particular.

In the education sector, Lesotho has been developing the educational system since the 1970s, with special emphasis on primary education. "The Education Sector Development Plan (1996-2001)" was announced in 1996 and the quality of primary education was upgraded therefrom. As a result, the adult literacy rate in Lesotho (males 74%, females 94% in 2000) is the highest of all South African countries. "The Constitution of Lesotho (1993)" states "Primary education is compulsory and available to all" and, "the Free Primary Education Programme ("FPE")" was introduced in 2000 to enable all Lesotho children to receive primary education gratis and the programme commenced by admitting children from standard 1.

Although the aforementioned plans and programme greatly contributed to increase the number of children who wish to attend school, many students were forced to study in overcrowded classrooms (63.8 students per classroom in 2002) or to study in tents in lieu of the classroom or to study outside the classroom, due to the shortage of the classrooms. The Government of Lesotho (hereinafter referred to as the "GOL") is apprehensive that internal efficiency such as the promotion ratio may drop further because of such inferior educational environment. However, the shortage of the classrooms continued to be become chronic as the GOL was unable to secure sufficient budget for construction of additional classrooms. (Maseru and Berea districts are the target areas of this Project. The shortage of classrooms in both districts are estimated at around 450 based on the number of students enrolled in 2002. This number would reach around 1,100 if school age children not enrolled from approximately 33,000

currently residing in both districts were included.) At the same time, increase in students brought shortage of teachers, and consequently, quality of education has declined, as such, the shortage prompted supplemental consequence by recruiting many unqualified teachers, (ratio of unqualified teachers to all teachers was 27.4% in 2002).

In Maseru and Berea districts, industrial areas are developing quite rapidly. On the other hand, in the surrounding districts, the standard of living became worse because of the drought. Those factors brought a flow of the population into Maseru and Berea from surrounding districts, and consequently, an educational/learning environment in the districts has deteriorated. Therefore, improvement of the educational/learning environment including school facilities are required immediately.

In order to improve such educational environment, the GOL came up with "the Strategic Plan (2001-2006) for the implementation of the FPE" in 2001 which stipulated improving/expanding educational facilities, providing teaching materials, implementing school feeding gratis, etc. aiming at achieving the targets of access/impartiality for primary education, improving on the quality of education. Furthermore, "The Education Sector Strategic Plan" was announced in October 2002 aiming at improving the quality of education, ensuring access to school for all children in all districts, achieving gender equality, and so on.

Under these circumstances, GOL have request the Government of Japan (hereinafter referred to as "GOJ") for construction of primary schools and procurement equipment for the schools in January 2003. In response to the request, GOJ decided to conduct a Basic Design Study on the Project for Construction of Primary Schools in the Kingdom of Lesotho ("the Project"), and, on two occations between 22 February and 13 June 2003, the Japan International Cooperation Agency ( " JICA " ) dispatched a Basic Design Study Team ("the Team") to Lesotho to perform required surveys. The Team held a series of discussion on the Project with officials of GOL and conducted a field survey and gathered relative materials. Based on the results of such survey, the appropriate components, details and cost estimate of the Project were examined, and the Draft Final Report of the Basic Design Study was prepared. Based thereon, JICA dispatched the Draft Final Report Explanation Team to Lesotho from 29 July to 9 August 2003 to explain and consult with Lesotho officials concerned.

The requested school sites number twenty sites in Maseru and Berea Districts. Some changes were made at the time of the first field survey but the Memorandum dated 31 March 2003 have finally confirmed the requested sites. Amongst schools subjected to the survey, the number was ultimately reduced to 17 based on the selection criterion enumerated hereunder.

a) Priority of the Government of Lesotho
b) Number of the enrolled of students around the site
c) Projections of school age population around the site
d) Duplication of projects by other donors in the site
e) Preparation of number of teachers to be assigned in the site
f) Ownership of the site
g) Geographical and topographical conditions/Availability of enough space for construction of school facilities
h) Availability of water supply resources
i) Availability of electrical supply resources
j) Accessibility to the request site
k) Availability of operation /maintenance/Management system
l) Security of the site during the implementation period.
m) Availability of water and electricity for construction use

The details and scale of schools to be constructed under the Project shall be planned based on the following basic design policies:

1) The target year shall be 2006, the year when the use of the facilities will commence.
2) The number of students in 2006 shall be estimated from the following three indicators based on 1996's population: (1) the growth rate of population, (2) the ratio of school age population, and (3) the enrollment ratio in the primary education.
3) The number of classrooms shall be calculated based on the following conditions: the number of students per classroom is 50; a primary school has seven standards; and schools have a full-time schooling system.
4) Usable classrooms in existing schools around the site shall be used as they are. The number of classrooms to be designed shall be the difference between the number of necessary classrooms in the area and the number of usable classrooms of existing schools in the area.
5) If the area and shape of the site has physical constraints and/or certain limitations, the number of classrooms to be designed shall be the maximum number of classrooms that can be built.
6) The minimum number of classrooms for each school to be designed shall be 7.
7) The maximum number of classrooms for each school to be designed shall be 24.
8) The headmaster's room, the staff room, and the store shall be one room each for all schools. And, the staff room shall be designed for multipurpose use and used as a classroom in the future.
9) A necessary number of latrines shall be built according to the Ministry of Education and Training's Standard ("MOET Standard"). And, toilet waste shall be vacuumed out from pits by vacuum suction cleaner.

10) GOL requested Kitchen / Store Unit, however, as a sustainable school cooking/feeding system (including maintenance and management) was of a matter of concern, therefore, it was decided to be out of scope of the Project.
11) A playground shall be designed as practical as possible with careful site planning. Pit latrines shall be separated from the classrooms and the well placed far away as possible.
12) Each room shall have appropriate numbers of desks, chairs, and cabinets.
13) Water supplied by the Water and Sewerage Authority ("WASA") is to be used wherever available. Water either scooped or pumped up from wells will be used at sites where municipal water is not available. A full-time schooling system (no schooling at night) is to be adopted, therefore, electrical facilities are not considered[1].
14) Although the GOL requested primary science kits, basic sports equipment, and garden tools and equipment, no such equipment shall be supplied because the MOET will be able to procure them with their own budget.

The components of the Project are shown in Table 1. Furniture for schools planned for construction is to be the minimum required for each individual facility as shown in Table 2.

The Responsible Organization for the Project is the Ministry of Finance and Development Planning ("MOFDP") which looks after development aid and financial affairs of the country, but the Implementing Organization will be the MOET. All matters executed by the Project will be performed by the departments and/or sections concerned within MOET, but relevant responsibility will lie with the MOFDP. As water supply from wells are included in the Project, the Ministry of Natural Resources ("MONR") which provides technical cooperation regarding maintenance and management of water supply facilities will act as a support organization to the MOET.

As for the Operation and Maintenance ("O&M") of the schools subsequent to the implementation of this Project, the current inspection system of MOET shall be followed which means that conditions of buildings and water supply facilities of each school will be inspected by the district field inspectorate officer. The district inspectorate officer who visits the school will submit the inspection report to the chief inspectorate officer, then maintenance and/or repair works will proceed based on the inspection reports and after prioritizing such maintenance and/or repair works. In addition, any decision for the management of the schools shall be made by the management committee to be organized in each school. Any matters concerning the management of the school shall be decided and implemented through discussions between the management committee and the district field inspectorate officer.

[1] When the schools for field survey 2 were selected, 'supply of electricity' was one of the criteria. However it was confirmed that all schools in Lesotho have full-time schooling system, therefore electrical facilities are not considered by this Project.

The total cost of about 131,200 Maloti, the annual sum required for O&M of the 17 school facilities under the Project (repair expenses, O&M expenses for water supply facilities, running cost for water supply, expenses for collecting excreta) will be approximately 0.074% of the FPE budget in 2006 (derived from about 176,563,500 Maloti for the period 2003 to 2006 and fixed at 3.67% per annum from actual results) and such O&M expenses are within a range which can be distributed by the Government. As the MOET has made known its policy that the government will pay all O&M expenses for governmental schools, the Project will not encounter any problems in regard to payment of O&M expenses.

In case the Project is executed by Japan's Grant Aid, the time necessary for completion is assumed to be about 19 months; detailed design will require 4 months, 3 months for the tender process, 12 months for construction. Estimated project expense will amount to 971 million yen (935 million yen to be shouldered by Japan and 36million yen by Lesotho).

Effects that can be anticipated from the implementation of the Project are as follows:

1) It is expected to improve a learning environment for students by reducing the number of students per classroom as the Project would provide leaning environment/facilities for a projected enrollment of 11,450 school-aged children within target area by constructing new schools and because the Project will improve a shortage of classrooms for a projected enrollment of 98,700 school-aged children; {(229 new classrooms + 1,745 existing classrooms) x 50} for the new schools and existing neighboring schools. And, consequently, it is expected to improve the quality of education as well as its internal efficiency.
2) It would become possible to supply safe water for a projected enrollment of 11,450 school-aged children as well as their teachers by providing a water supply facility.
3) The Project includes the construction of a headmaster's room and a staff room for all 17 schools of which is incorporated into the classroom building. It means that each dedicated space for headmasters to conduct a day-to-day affair for running school and for teachers/staff to prepare for a class and to mark test papers as well as to exchange information among themselves would be provided. Consequently, it would provide a firm basis for running schools smoothly.
4) Hygienic and sanitary conditions in schools would be improved by educating all school children of school hygiene, such as strict observance of washing hands after using the toilet each time, would be practiced by providing toilet buildings and hand washing water taps either attached to the toilet buildings or provided nearby. And consequently, it is expected to spread the concept of hygiene to school children and teachers.

5) It is expected to activate local resident participation in various activities organized by the parents and/or by the community, as the Project would raise interest to the parent in education for those living within the subject school districts.

According to the above-mentioned circumstances, the effects of executing the Project can be expected to contribute towards improving the educational environment of the Maseru and Berea Districts in Lesotho; therefore executing the Project with Japan's Grant Aid is most important and appropriate to the situation.

# Table -1 Facilites List by site

| | Prototype | Stories | Floor Area (㎡) | 1. Mahlabatheng | 2. Lihaseng | 3. Ha Tlhakanelo | 4. Sowe | 5. Senyotong | 6. Maseru East | 7. Khubelu | 8. Thetsane | 9. Likotsi | 10. Maseqobela | 11. Leqele | 12. Mabote | 13. Ha Ntjabane | 14. Ha Mpiti | 15. Ramaqhanyane | 16. Semphetenyane | 17. Abia | 18. Tsolo | 19. Lenono | 20. Lancers Gap | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASSROOM | 3-C | 2 | 514.56 | | | | - | | | - | | - | | 1 | | | | | | | 1 | | 1 | 3 |
| | 3-D | 2 | 552.96 | 1 | | | - | | | - | | - | | 1 | | | | 1 | 1 | | 1 | | 1 | 6 |
| | 4-A | 1 | 307.20 | | | 1 | - | | | - | | - | | | 1 | 2 | 1 | | | | | 1 | | 6 |
| | 4-B | 1 | 353.28 | | | 1 | - | | | - | | - | | | | 1 | 1 | | | | | 1 | | 4 |
| | 4-C | 2 | 668.16 | 1 | 1 | | - | | 1 | - | | - | | 1 | 1 | | | 1 | 2 | 1 | | | 1 | 10 |
| | 4-D | 2 | 706.56 | | 1 | | - | | 1 | - | | - | 1 | | 1 | | | | | 1 | | | | 5 |
| | 5-A | 1 | 384.00 | | | | - | | | - | | - | 1 | | 1 | | | | | | | | | 2 |
| | 5-B | 1 | 430.08 | | | | - | 1 | | - | 1 | - | | | | | | | | | | | | 2 |
| | 6-A | 1 | 460.80 | | | | - | 1 | | - | 1 | - | | | | | | | | | | | | 2 |
| | Number of Classrooms | | | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| | Head Master's Room | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Staff Room | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Store | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Total Floor Area (㎡) | | | 1,221.12 | 1,374.72 | 660.48 | - | 890.88 | 1,374.72 | - | 890.88 | - | 1,090.56 | 1,735.68 | 2,065.92 | 967.68 | 660.48 | 1,221.12 | 1,889.28 | 1,374.72 | 1,067.52 | 660.48 | 1,735.68 | 20,881.92 |
| Projection of Enrollment (A) | (50 Students per Class Room) | | | 650 | 750 | 350 | - | 500 | 750 | - | 500 | - | 600 | 950 | 1200 | 550 | 350 | 650 | 1050 | 750 | 550 | 350 | 950 | 11,450 |
| Type of Latrine | L- I | M (Sd + B) | 21.84 | 2 | 0 | 1 | - | 0 | 2 | - | 1 | - | 2 | 3 | 3 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 0 | 24 |
| Legend | L- II | F (Sd + B) | 21.84 | 2 | 0 | 1 | - | 0 | 2 | - | 1 | - | 2 | 3 | 3 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 0 | 24 |
| M (Male) | L-III | M (Sd) | 21.84 | 0 | 2 | 0 | - | 1 | 0 | - | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 7 |
| F (Female) Sd (Students) Sf (Staff) B (Basin) | L-IV | F (Sd) | 21.84 | 0 | 2 | 0 | - | 1 | 0 | - | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 7 |
| | L-S | Sf | 6.72 | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Total Floor Area (㎡) | | | 94.08 | 94.08 | 50.40 | - | 50.40 | 94.08 | - | 50.40 | - | 94.08 | 137.76 | 137.76 | 50.40 | 50.40 | 94.08 | 137.76 | 94.08 | 50.40 | 50.40 | 137.76 | 1,468.32 |
| Latrine Facilites Required | Female : (6/Building) | | | 12 | 12 | 6 | - | 6 | 12 | - | 6 | - | 12 | 18 | 18 | 6 | 6 | 12 | 18 | 12 | 6 | 6 | 18 | 186 |
| | Male Booth : (2/Building) | | | 4 | 4 | 2 | - | 2 | 4 | - | 2 | - | 4 | 6 | 6 | 2 | 2 | 4 | 6 | 4 | 2 | 2 | 6 | 62 |
| | Urinal : (5/Building) | | | 10 | 10 | 5 | - | 5 | 10 | - | 5 | - | 10 | 15 | 15 | 5 | 5 | 10 | 15 | 10 | 5 | 5 | 15 | 155 |
| | Staff : (Male-1, Female-1) | | | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |
| Grand Total Floor Area / per site (㎡) | | | | 1,315.20 | 1,468.80 | 710.88 | - | 941.28 | 1,468.80 | - | 941.28 | - | 1,184.64 | 1,873.44 | 2,203.68 | 1,018.08 | 710.88 | 1,315.20 | 2,027.04 | 1,468.80 | 1,117.92 | 710.88 | 1,873.44 | 22,350.24 |
| Water Tank | Type A | 2.0m³ | | 1 | | 1 | - | | | - | | - | 1 | | | | | 1 | | | | 1 | | 5 |
| | Type B | 2.0m³ | | | | | - | 1 | | - | | - | | | | | 1 | | | | | | | 2 |
| | Type C | 4.0m³ | | | 1 | | - | | | - | | - | | | | | | | | | | | 1 | 2 |

## Table -2 Furniture List by Site

| | 1. Mahlabatheng | 2. Lihaseng | 3. Ha Tlhakanelo | 4. Sowe | 5. Senyotong | 6. Maseru east | 7. Khubelu | 8. Thetsane | 9. Likotsi | 10. Moseqobela | 11. Leqele | 12. Mabote | 13. Ha Ntjabane | 14. Ha Mpiti | 15. Ramaqhanyane | 16. Semphetenyane | 17. Abia | 18. Tsolo | 19. Lenono | 20. Lancers Gap | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Students' Tables and Benches | 100 | 125 | 50 | - | 100 | 125 | - | 100 | - | 100 | 150 | 200 | 100 | 50 | 100 | 150 | 125 | 100 | 50 | 150 | 1,875 |
| Students' Desks | 225 | 250 | 125 | - | 150 | 250 | - | 150 | - | 200 | 325 | 400 | 175 | 125 | 225 | 375 | 250 | 175 | 125 | 325 | 3,850 |
| Teachers' Tables | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| Teachers' Chairs | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| Meeting Tables | 14 | 16 | 14 | - | 14 | 16 | - | 14 | - | 14 | 16 | 16 | 14 | 14 | 14 | 16 | 16 | 14 | 14 | 16 | 252 |
| Standard Chairs | 32 | 35 | 22 | - | 27 | 35 | - | 27 | - | 30 | 36 | 36 | 29 | 22 | 32 | 36 | 35 | 29 | 22 | 36 | 521 |
| Book Shelves | 5 | 5 | 3 | - | 5 | 5 | - | 5 | - | 5 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 3 | 5 | 79 |
| Head Masters Tables | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| Head Masters Chair | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| Standard Chairs | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |
| Filing Cabinets | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |

Basic Design Study for
the Construction of Primary Schools in the Kingdom of Lesotho

**<Final Report>**

# CHAPTER 1
# BACKGROUND OF THE PROJECT

# CHAPTER 1 BACKGROUND OF THE PROJECT

## 1-1 Background and Outline of Grant Aid Request

### (1) Background of the Request

The Kingdom of Lesotho (hereinafter referred to as "Lesotho") is one of the Least Developed Countries, not enjoying any particular benefits from their natural resource except from meager diamond and hydropower resources. Although agriculture is the main industry, land is mostly cultivated by small scale farmers and no other industry has been developed. Lesotho participates the Southern African Custom Union ("SACU") along with the Republic of South Africa (hereinafter referred to as "South Africa"), Botswana, Namibia, Swaziland and a few others, and trades mainly within the union. Lesotho is highly dependent on South Africa economically and most commodities are imported from South Africa. In an effort to rid itself of such economical circumstance, Lesotho is currently advocating "Lesotho Vision 2020 (2001)", a long-term national vision which aims at realizing "Lesotho's economy will be strong, its environment well managed and its technology well established" and is in the midst of national reform focusing on developing human resources in particular.

In the education sector, Lesotho has been developing the educational system since the 1970s, with special emphasis to the primary education. "The Education Sector Development Plan (1996-2001)" was announced in 1996 and the quality of primary education was upgraded thereby. From such consequence, the adult literacy rate in Lesotho (males 74%, females 94% in 2000) is the highest of all South African countries. "The Constitution of Lesotho (1993)"states "Primary education is compulsory and available to all" and, "the Free Primary Education Programme ("FPE")" was introduced in 2000 to enable all Lesotho children to receive primary education gratis and this programme commenced by admitting children from the standard 1.

This programme greatly increased the number of children who want to attend school. However under this rapid increase in students, the present education system is suffering from several serious problems in quality such as uncomfortable school facilities (e.g. tents, outside classrooms) caused by insufficient budget. In addition, shortage of teachers and low level of teachers (ratio of qualified teachers to students was 1:65 in 2002) is obvious and the educational environment in which children attend school (63.8 students per classroom in 2002) is inferior. Furthermore, there are many parents who are reluctant to send their children to school until they are old enough to go by themselves. For this reason, the age for entering primary school and drop-out rate is high (drop-out rate : male 7.5%, female 4.2% in 2001).

Under these circumstances, GOL requested to the Government of Japan ("GOJ") for construction of primary schools and procure equipment for the schools in January 2003

in order to improve primary education in Lesotho, in particular, in Maseru and Berea District where the population is increasing rapidly and a shortage of classrooms is obvious.

**(2) Outline of the Request and Main Components**

The outline and main components of the request from the Government of Lesotho regarding this Project are shown below ;

| [ Outline of the Project ] | | |
|---|---|---|
| (1) Overall Goal | : | To improve the education environment in Lesotho. |
| (2) Project Goal | : | To solve the shortage in primary school facilities in Maseru and Berea District. |
| (3) Expected Outputs | : | To construct classrooms and pit latrines for the 17 target schools. |
| (4) Activities and Inputs | | |
| a. Contents of the Request to Japanese side | : | 1) Construction of 20 primary schools<br>- 7 classrooms<br>- Headmaster's office<br>- Staff room / Administration area / Book Store<br>- Kitchen / Storage area<br>- Toilets (Staff, Children)<br>2) Equipment<br>- Furniture and standard equipment (Desks, Chairs, etc.) |
| b. Execution plan by Lesotho side | : | - Acquisition of land ownership of the sites<br>- Operation and maintenance of the facilities and equipment<br>- Employment and allocation of teachers<br>- Sanitary education |
| c. Activities plan | : | - Allocation of teachers : Ministry of Education<br>- Operation and Maintenance of the schools : GOL or communities, etc. |
| (5) Target area | : | Maseru and Berea District |
| (6) Direct / Indirect Beneficiaries | : | Direct beneficiaries :<br>Approx. 7,000 students / year in the target schools<br>Indirect beneficiaries :<br>Approx. 500,000 students in the target area |

# CHAPTER 2
# CONTENTS OF THE PROJECT

# CHAPTER 2 CONTENTS OF THE PROJECT

## 2-1 Basic Concept of the Project

### (1) Overall goal and Project goal

Lesotho places importance on the development of human resources, and has introduced in 2000 "Free Primary Education Programme ("FPE")", which was aimed at ensuring that "Primary education is compulsory and available to all". The number of students is increasing under the implementation of FPE. However under this rapid increase in the number of students, the present education system is suffering from several serious problems in quality such as unsuitable school facilities due to insufficient budget. In addition, a shortage of qualified teacher deteriorates the quality of primary education. In order to improve such educational environment, GOL came up with "the Strategic Plan (2001-2006) for the implementation of the Free Primary Education Programme" in 2001, which stipulated improving/expanding educational facilities, providing teaching materials, implementing school feeding gratis, etc. aiming at achieving the targets of access/impartiality for primary education, improving on the quality of education, etc.

This Project is to be carried out as part of the plan, covering Maseru and Berea Districts, where the number of classrooms is remarkably insufficient due to significant increase in population. The goal of the Project is "to solve the shortage of classrooms in Maseru and Berea Districts", and the overall goal is "to contribute to improve the educational environment in Lesotho".

### (2) Outline of the Project

To achieve the overall goal, this Project will be implemented to construct 17 schools in Maseru and Berea Districts. The Project is expected to solve a shortage in primary school facilities, increase school enrollment rate, and improve the educational environment. The scope of works of the Project is the construction of 17 primary schools (including pit latrines and water supply facilities) and the procurement of desks, chairs, and other furniture.

## 2-2 Basic Design of the Requested Japanese Assistance

### 2-2-1 Design policy

The basic design policy for the construction of schools is based on the following policies, comprehensive consideration of the natural, social, and educational situations in Lesotho and in each school site, the conditions for construction, the characteristics of the project, and the implementing body's maintenance and management abilities, all of which have been grasped and analyzed through the first and second field surveys for the schematic design.

#### (1) Basic policy

##### a. Changes in school sites

(a) Changes in the first field survey

The GOL thus far submitted Request Application four times. Each time, the schools requested in the lists were partly changed.

It was confirmed that the target area would be Maseru and Berea Districts and that GOL replaced nine schools among the 20 schools listed in the latest Request Application, by the Minutes of Discussions (M/D) signed on 27th February 2003. Based on the revised list of which was attached to the M/D, the Team made inspection at all the sites and consulted with the GOL. As a result, of the 20 schools in the list agreed by the M/D, five schools were replaced because of correction of the name of the site in one case (*1) and problems concerning land ownership, site conditions in three cases (*2) and access condition in one case (*3). The following table shows the details.

Table 2-1　Transition of Requested Schools List

| Request Application（Jan, 2003） | | | Minutes of Discussion（Feb,2003） | | | Field Survey 1（19 Mar, 2003） | | |
|---|---|---|---|---|---|---|---|---|
| No. | School | Pref. | No. | School | Pref. | No. | School | Pref. |
| 1 | Mahlabatheng | M | 1 | Mahlabatheng | M | 1 | Mahlabatheng | M |
| 2 | Lihaseng | M | 2 | Lihaseng | M | 2 | Lihaseng | M |
| 3 | Masite NEK | M | 3 | Masite NEK | M | 3 | Ha Tlhakanelo*1 | M |
| 4 | Bots' Abelo | M | 4 | Masowe | M | 4 | Masowe | M |
| 5 | Senyotong | B | 5 | Senyotong | B | 5 | Senyotong | B |
| 6 | Sankoe | M | 6 | Sankoe | M | 6 | Maseru East*2 | M |
| 7 | Khubelu | M | 7 | Khubelu | M | 7 | Khubelu | M |
| 8 | Thetsane | M | 8 | Thetsane | M | 8 | Thetsane | M |
| 9 | Likotsi | M | 9 | Likotsi | M | 9 | Likotsi | M |
| 10 | Maseqobela | B | 10 | Maseqobela | B | 10 | Maseqobela | B |
| 11 | Khokhotsaneng | M | 11 | Leqele | M | 11 | Leqele | M |
| 12 | Khubetsoana | M | 12 | Khubetsoana | B | 12 | Mabote*2 | B |
| 13 | Falimehang | M | 13 | Mantjabane | B | 13 | Ha Ntjabane | B |
| 14 | Fika-Le-Mohala | M | 14 | Ha Mpiti | M | 14 | Ha Mpiti | M |
| 15 | Kopanang | M | 15 | Khokhotsaneng | M | 15 | Ramaqhanyane*3 | M |
| 16 | Moruthoane | B | 16 | Semphetenyane | M | 16 | Semphetenyane | M |
| 17 | Ha Ntsi | M | 17 | Abia | M | 17 | Abia | M |
| 18 | Tsolo | M | 18 | Tsolo | M | 18 | Tsolo | M |
| 19 | Liboping | B | 19 | Katlehong | M | 19 | Lenono*2 | M |
| 20 | Mothoane | M | 20 | Lancers Gap | M | 20 | Lancers Gap | M |

Legend M:　Maseru
B:　Berea

Schools Changed by the time of Minutes of Discussion
Schools Changed as the Result of Field Survey1
Schools requested since the Request Application
（Indicating only in the column of　" Field Survey1"）

**b. Selection of the schools for field survey**

At the first stage of the field survey 2, the Team held several conferences with the Ministry of Education and Training ("MOET"). On March 31, when sufficient evidences for the land ownership certificates for all the sites were collected, GOL and the Team exchanged the Memorandum. As a result, the following 20 sites were selected for field survey 2.

Table 2-2 The List of Schools for Field Survey 2 (31 Mar, 2003)

| No. | School | District |
|---|---|---|
| 1 | Mahlabatheng | Maseru |
| 2 | Lihaseng | Maseru |
| 3 | Ha Tlhakanelo | Maseru |
| 4 | Sowe | Maseru |
| 5 | Senyotong | Berea |
| 6 | Maseru East | Maseru |
| 7 | Khubelu | Maseru |
| 8 | Thetsane | Maseru |
| 9 | Likotsi | Maseru |
| 10 | Maseqobela | Berea |
| 11 | Leqele | Maseru |
| 12 | Mabote | Berea |
| 13 | Ha Ntjabane | Berea |
| 14 | Ha Mpiti | Maseru |
| 15 | Ramaqhanyane | Maseru |
| 16 | Semphetenyane | Maseru |
| 17 | Abia | Maseru |
| 18 | Tsolo | Maseru |
| 19 | Lenono | Maseru |
| 20 | Lancers Gap | Berea[1] |

In selection of the target schools, the Study Team examined the results of the field survey 1 with consideration of the followings:

1) Priority of the Government of Lesotho
2) Number of the enrollment of students around the site
3) Projections of school age population around the site
4) Duplication of projects by other donors in the site
5) Preparation of number of teachers to be assigned in the site
6) Ownership of the site
7) Geographical and topographical conditions/Availability of enough space for construction of school facilities
8) Availability of water supply resources
9) Availability of electrical supply resources
10) Accessibility to the request site
11) Availability of operation /maintenance/Management system
12) Security of the site during the implementation period.
13) Availability of water and electricity for construction use

[1] District of Site No.20 (Lancers Gap) was described "Maseru" in the list of M/D according to MOET's request. However through detailed location survey in the field survey 2, it was confirmed that No.20 belonged to Berea District. Therefore, the Study Team continued the survey with recognition "No.20 (Lancers Gap) is in Berea District" after the field survey 2.

### c. Basic design policy

The target schools shall be planned based on the following basic design policies:

1) The target year shall be 2006, the year when the use of the facilities will start.
2) The number of students in 2006 shall be estimated from the following three indicators based on 1996's population: (1) the growth rate of population, (2) the ratio of school age population, and (3) the enrollment ratio in the primary education.
3) The number of classrooms shall be calculated based on the following conditions: the number of students per classroom is 50; a primary school has seven standards; and schools have a full-time schooling system.
4) Usable classrooms in existing schools around the site shall be used as they are. The number of classrooms to be designed shall be the difference between the number of necessary classrooms of the area and the number of usable classrooms of existing schools in the area.
5) If the area and shape of the site has physical constraints and/or certain limitations, the number of classrooms to be designed shall be the maximum number of classrooms possible to build.
6) The minimum number of classrooms for a school to be designed shall be 7.
7) The maximum number of classrooms for a school to be designed shall be 24.
8) The headmaster's room, the staff room, and the store shall be one room each for all schools. And, the staff room shall be designed for multipurpose use, so as to be used as a classroom in the future.
9) A necessary number of pit latrines shall be built according to the Ministry of Education and Training's Standard ("MOET Standard"). And, toilet waste shall be vacuumed out from pits by vacuum suction cleaner.
10) GOL requested Kitchen / Store Unit, but as a sustainable school cooking / feeding system (including maintenance and management) was of a matter of concern, it was decided to be out of scope of the Project.
11) A playground shall be secured, as practical as possible, with careful site planning. Pit latrines shall be separated from the classrooms and the well as far away as possible.
12) Each room shall have appropriate numbers of desks, chairs, and cabinets.
13) Water supplied by the Water and Sewerage Authority ("WASA") is to be used wherever available. Water either scooped or pumped up from wells will be used at sites where municipal water is not available. A full-time schooling system (no schooling at night) is to be adopted so electrical facilities are not considered[2].
14) Although the GOL requested primary science kits, basic sports equipment, and garden tools and equipment, no such equipment shall be supplied because the MOET will be able to procure them with their own budget.

[2] When the schools for field survey 2 were selected, 'supply of electricity' was one of the criteria. However it was confirmed that all schools in Lesotho have full-time schooling system, therefore electrical facilities are not considered by this Project.

The flowchart in Fig. 2-1 shows a series of procedures from the selection of schools to the calculation of the number of classrooms to be designed.

**d. Selection of target schools for the Project**

To select the target schools to be designed, the Team evaluated the 20 school sites based on the above basic design policies 1) thru 7) in consideration of the estimated number of students and the number of classrooms. As a result, the Team decided to exclude the following three schools and selected the remaining 17 schools. We will describe the details of the selection in paragraph "e". Discussion on the scale of the Project" below.

Schools excluded from the Project: No.4 Sowe
No.7 Khubelu
No.9 Likotsi

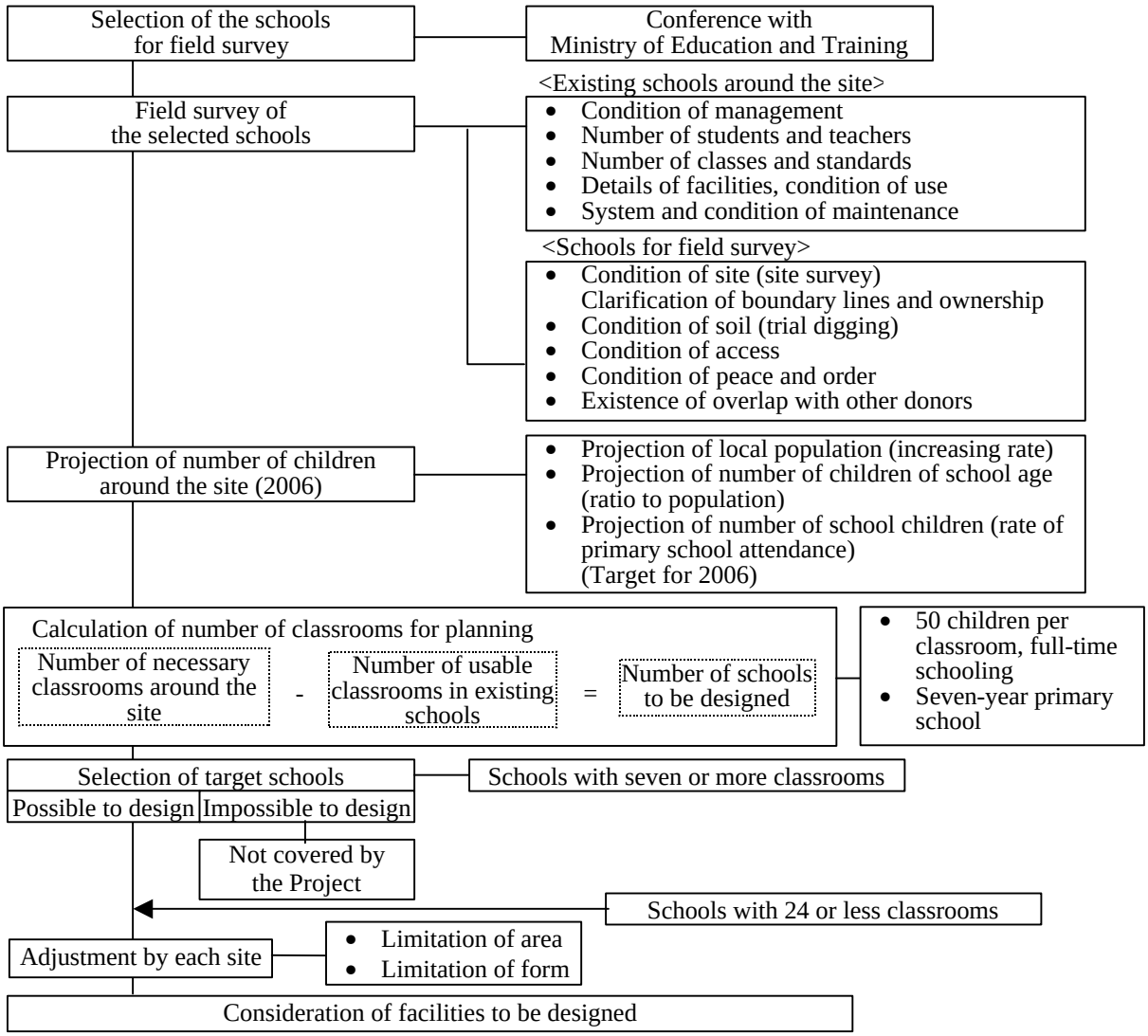



Fig. 2-1 Flowchart to Calculate Numbers of Target Schools and Classrooms to be Designed

### e. Discussion on the scale of the Project

(a) Projection of number of children

1) Indicators for the calculation of the required number of classrooms

To calculate the required number of classrooms, the following three indicators were considered: 1) the rate of population increase; 2) the ratio of school age population; and 3) the primary school enrollment ratio. These three indicators were estimated for year 2006, when the Project will be completed. This is based on the following circumstance:

i) Rate of population increase

Although the number of migrant workers to South Africa has been decreasing since the peak year of 1990, the number of people who flow into urban areas is still high because of the industrial development of Maseru and Berea Districts and the influence of drought and poor harvest. The total population in Maseru District increased by 24.21% from about 380,000 in 1996 to about 480,000 in 2001. Similarly, the total population in Berea District increased by 23.47% from about 240,000 in 1996 to about 300,000 in 2001.[3]

Table 2-3 Population Increase from 1996 to 2001 in Maseru / Berea

| | 1996 | 2001 | Rate of Increase |
|---|---|---|---|
| Maseru | 384,497 | 477,599 | 24.21% |
| Berea | 243,424 | 300,556 | 23.47% |

Source: 1996 Lesotho Population census Village List and 2001 Lesotho Demographic Survey

The growth rate of population aged 6-20 in Maseru and Berea from 1996 to 2006, when the Project will be completed, was estimated based on the population of each district in 1996, the ratio of population by age, and the population growth rate projected by the MOET. (See Table 2-4).

Although, the enrollment ratio and the ratio of children of school age enumerated in the following sectors 2) and 3) were estimated by dividing age groups into 6-12 and 13-20, the population growth rate were estimated constantly on the basis of the growth rate of the population aged 6-20 (in Maseru and Berea respectively).

[3] 1996 Lesotho Population census Village List, Bureau of Statistics, Ministry of Economic Planning.

Table 2-4 Population Increase from 1996 to 2006 in Maseru / Berea (Age 6-20)

| | 1996 to 2006 Rate of Increase (estimate) |
|---|---|
| Maseru | 23.00% |
| Berea | 32.15% |

Estimated from 1996 Lesotho Population census Village List, 2001 Lesotho Demographic Survey, and MOET Projection of School Age from 1996 to 2006.

There are urban development areas, where workers and their families tend to settle down to work in mines in South Africa or to find jobs in Maseru City, in Maseru and Berea Districts. Out of the 20 sites, six sites (Nos. 4, 7, 8, 13, 17, and 18) are located in those areas. We estimated the population growth rate for each six sites taking the progress of infrastructure and housing development around the areas into consideration. We estimated them as follows:

Table 2-5 Urbanization Progress Valuation and Weight for Development Area

| Infrastructure Items | Progress | Valuation Point | Weight |
|---|---|---|---|
| Water | Water is supplied by WASA or DRWS currently | 2 | 0.15 |
| | Water will supplied by WASA or DRWS(2003-2004) | 1 | |
| | No water supply plan from WASA or DRWS | 0 | |
| Electricity | Electricity is laid to neighbor villages | 2 | 0.1 |
| | Electricity will be laid to neighbor villages | 1 | |
| | No electricity plan | 0 | |
| Roads / Transportation | Faced to main road and easy to go to Maseru city | 2 | 0.1 |
| | Close to main road (within 2Km), but not facing main road | 1 | |
| | Far from main road and inconvenient to go to Maseru city | 0 | |
| Housing | Many residential houses have been constructed already | 2 | 0.15 |
| | Some residential houses have been constructed nearby | 1 | |
| | No residential houses nearby | 0 | |

NOTES: WASA: Water and Sewerage Authority, Ministry of Natural Resources
DRWS: Department of Rural Water Supply, Ministry of Natural Resources

a) The progress of infrastructure development (water supply, electricity supply, roads/transportation, and housing) valuation is marked on a scale between 0 and 2. If all the above-mentioned infrastructure exists, the site is marked as 2. If any development plan exists, or some infrastructure or housing exists in the neighborhood, the site is marked as 1. If there is no development plan nor infrastructure nor housing in the neighborhood, the site is marked as 0. Each point is evaluated, and weight is allocated to each item so that the total would amount to 1 (100%) if all items were marked with 2. 0.15 point each is allocated to "water" and "housing", and 0.1 point each is allocated to "electricity" and "roads/transportation".[4]

[4] The weight of "water" is high because water is an important factor in settlement to urban area for people who are used to carrying water long distance. In addition, the weight of "housing" is high because more people moved to the neighboring areas where houses have been already built than the areas where no houses have been built. (this situation is shown especially in No. 17 Abia)

b) The product of the annual growth rate of urban population estimated by the GOL (78.34% in 1996-2006)[5] multiplied by the sum of weights and points is used as the population growth rate for the site. (See Table A in the margin of Table 2-9 "Planned Number of Classrooms.")

ii) Ratio of school age population (age 6-12 and age 13-20)

Because the ratio of those who repeat the same standard and drop-out from school are quite high, the proportion of children who enroll or move up to the standard suitable for their ages is quite low: 38% of age 6 in the Standard 1, 11% of age 9 in the Standard 4, and 10% of age 12 in the Standard 7.[6] In 1999, the population of age 6 was 60,000. However, only about 50,000 children entered primary schools in the same year. In 2000, when the FPE programme began, although the population of age 6 was about 60,000, about 100,000 children entered primary schools. This means that the ratio of new students aged more than six has increased.[7] Therefore, as for the latest statistical data from 2002 being prepared by MOET, it is quite possible to predict that the ratio of students over school age will increase. Thus, when calculating the number of students from the school age population, we included the ratio of school age population aged 13-20 into the indicators for the projection, in addition to the ratio of children aged 6-12.[8]

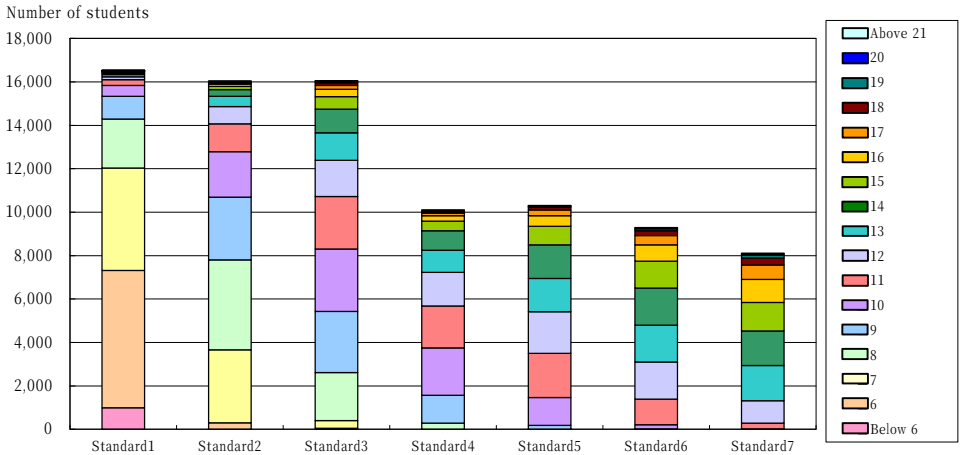



Fig. 2—2 Primary Students by Age and Standard in Maseru

5 Calculated from the Lesotho average annual percentage growth of urban population (5.4%) (according to the World Bank, African Development Indicators 2003 "Urbanization")

6 Education Statistics 2002, M101: Primary Students by Age, Gender and Standard, Location.

7 Education Statistics 2002, Table 1, Apparent Intake Rates in Primary Schools 1992-2001.

8 The age limit is 20 because the oldest age in the data from the MOET is "20 or older" and because it is necessary to fix an age limit when calculating the ratio of children of school age.

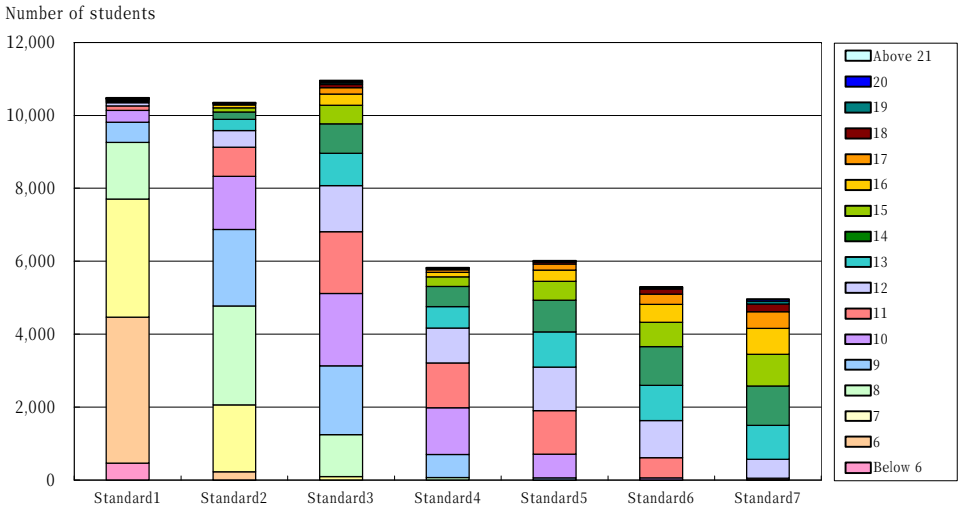



Fig. 2－3　Primary Students by Age and Standard in Berea

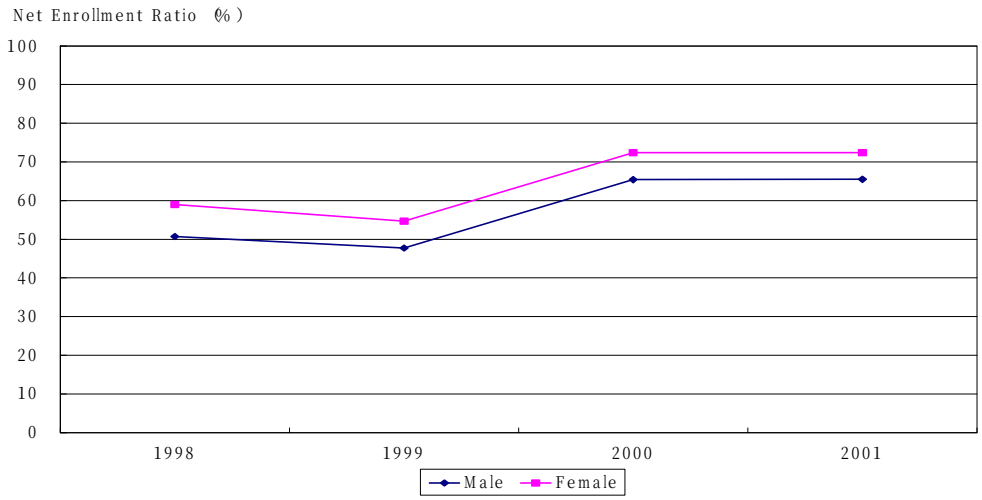
Table 2-6　Share of School Age Population (Age 6-12 and 13-20) in Maseru and Berea

| | Age 6-12 | Age 13-20 |
|---|---|---|
| Maseru | 16.30% | 20.60% |
| Berea | 17.30% | 21.00% |

Source: 2001 Lesotho Demographic Survey

iii) Enrollment ratio

As shown in Fig. 2-4, the net primary school enrollment ratio sharply rose from 51.2% in 1999 to 69% in 2001 because of the FPE programme introduced in 2000. However, the ratio remained almost the same at about 70% after the introduction of the FPE. Therefore, when projecting the number of students in 2006, we used the enrollment ratio data from 2002 (for those aged 6-20) in Maseru and in Berea (see Table 2-7).




Source: Ministry of Education and Training. Education Statistics 2002. p4. Figure 3. Evolution of NER.

Fig. 2-4　Net Enrollment Ratio in Primary School

Table 2-7 Enrollment Ratio in Maseru and Berea (Age 6-12 and 13-20)

| | Age 6-12(NER) | Age 13-20(Enrollment Ratio) |
|---|---|---|
| Maseru | 75.90% | 25.93% |
| Berea | 69.69% | 25.13% |

Source: Education Statistics 2002. M101: Primary Students by Age, Gender and Standard, Location.

2) Projection of the number of children

Based on the indicators above, the number of children was estimated as follows:

i) Accessible area was defined as within 3 km from the school in rural areas and as within 2 km in urban areas. Then the Projection of School Age Population living in Accessible Villages (age 6-12 and 13-20) was estimated from the Total Population within Accessible Villages[9] (See Table 2-9, B and E).

ii) Projection of School Age Population living in Accessible Villages in 2006 was estimated from the population growth rate up to 2006 (See Table 2-9, C and F).

iii) Projection of Number of Children living in Accessible Villages in 2006 from the enrollment ratio of children aged 6-12 and those aged 13-20 (See Table 2-9, D and G).

(b) Calculation of the required number of classrooms

The required number of classrooms was estimated by the following criteria:

(i) Students / classroom ratio = 50
(ii) Full-time schooling
(iii) Seven-year primary school

1) Students per classroom

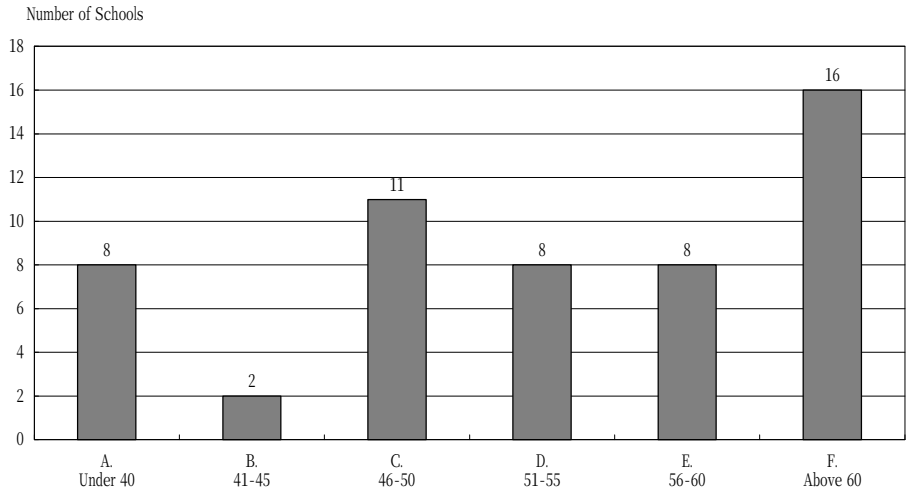
In the Application form for this Project, the MOET calculated the required number of classrooms on the basis of about 40 students per classroom in order to solve a shortage of classrooms and improve the quality of

[9] The reason why Accessible area was defined as within 2 km in urban areas and 3 km in rural areas is (i) the MOET's guideline for establishment of school (in rural area), which prescribes that an accessible area should be within 3 km from the school; (ii) examples of the "accessibility" standard at the school mapping seminar held by UNESCO-IIEP; and (iii) Japan's school design standard. According to (ii), a distance of 1-3 km is reasonable, a distance of 3-6 km is hard to commute, and a distance of 6 km or longer is impossible to commute (Caillod, F., School Mapping and Micro-Planning in Education, UNESCO-IIEP). Therefore, the Team considered it difficult for students to go to school at a distance of 3 km or longer on foot. According to (iii), in urban areas, the appropriate distance (and time) is 400 m (10 min) for the students in the lower standard and 500 m (10 min) for those in the upper standard; in rural areas, it is 750 m (15 min) for those in the lower standard and 1,000 m (15 min) for those in the upper standard (New Compendium of Architecture 29, School Design, p. 42). Therefore, in Lesotho also, we judged it reasonable to divide the accessible area into those in urban areas, where it is comparatively easy to commute to school, and those in rural areas, where geographical conditions may be difficult.

education. The Education Sector Strategic Plan also states that 40 students per classroom should be the basis for the calculation so that accessibility to school can be secured for all the children by 2015.[10] (Reference under ESDP: the World Bank's basis for the calculation of the number of classrooms for the construction of primary schools under ESDP is 40 students per classroom.)

However, when the MOET's districts inspectorates submit applications for additional classrooms in existing schools (especially church schools), the MOET calculates the required number of classrooms on the basis of 60 students per classroom, against their objective "40 per classroom". Moreover, according to the "Teacher Re-allocation Plan" shown in the field survey 2, the Teacher Service Department (TSD) plans reallocation on the basis of 60 students per teacher.

On the other hand, according to the results of the field survey, out of the 53 existing schools around the sites, the number of schools that have 60 or more students per classroom was 16 schools, 51-55 was 11 schools, and 46-50 was 9 schools. Thus, the average number of students per classroom was 51.98. (See Fig. 2-5.) (The average number of students per teacher was 49.11 in 53 schools.)




Source: Questionnaire from Field Survey 2

Fig. 2-5 Number of Students/Classroom

Therefore, the number of students per classroom was considered as 50 to support Lesotho to accomplish the increase in number of classrooms and to improve the quality of education, while trying to harmonize with the existing schools. (Reference: the Africa Development Bank's basis for

[10] Ministry of Education and Training, Education Sector Strategic Plan, Final Draft, October 2002.

the calculation of the number of classrooms for the construction of primary schools is 50 students per classroom.)

2) Full-time schooling

All the schools covered by the field survey had the full-time schooling system, except some of them giving supplementary tutor classes. Lesotho doesn't have double shift system for primary schools. Therefore, the number of students and classrooms was calculated on the basis that all schools have the full-time schooling system.

3) Seven-year primary school

Because Lesotho's primary schools have seven standards, seven-year primary schools with seven or more classrooms are constructed under this Project.

On these assumptions, the projection of number of children estimated from the three indicators ( i) Rate of population increase, ii) Ratio of school age population, and iii) Enrollment ratio) described in (a) 1)) above was divided by 50, then the necessary classrooms in the entire accessible area from each school site was calculated (See Table 2-9, Row K.)

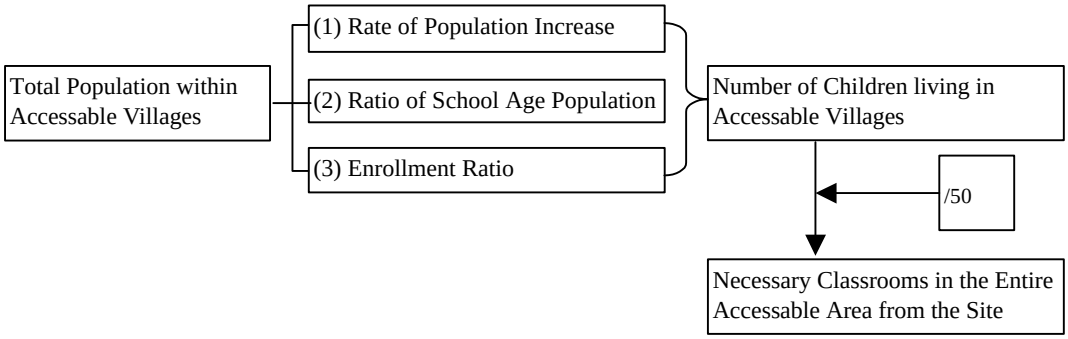



Fig. 2-6 Flowchart of Projection of Enrollment and Necessary Classrooms

(c) Calculation of the number of classrooms to be designed

1) The number of classrooms to be designed was calculated by the following procedures:

i) "The Number of Classrooms used by Students from Accessible Villages" was estimated from "the Current Number of Students in Existing Nearby Schools", and "the Number of Students from Accessible Villages in Existing Nearby Schools and the Existing Number of Classrooms". In the process, it was assumed that the existing classrooms in good condition could be used as they are.

However, church halls, tents, henhouses, kitchens, and other facilities used as classrooms were excluded (See Table 2-9, Rows H, I, J, L, and M).

ii) "The Number of Classroom Shortages" subtracted from "Necessary Classrooms in the Entire Accessible Area from the Site" was the difference between the "Number of Necessary Classrooms in the Entire Accessible Area from the Site" and "The Number of Classrooms used by Students from Accessible Villages". (See Table 2-9, Row N.)

iii) If the school site has any physical constraints or limitations in its area and shape, the maximum possible number of classrooms to be constructed is altered (limited) (Final Number of Classrooms to be designed: See Table 2-9, Row O.)

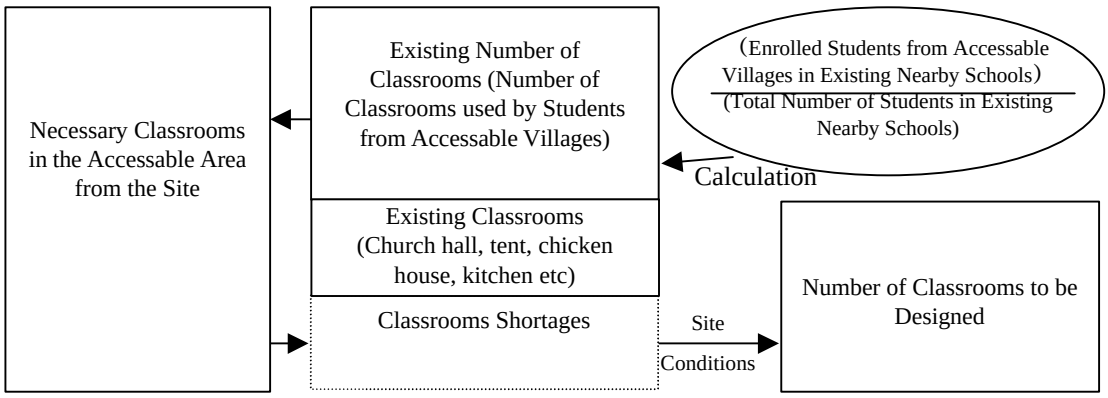



Fig. 2-7 Flowchart of Calculation of Number of Classrooms to be Designed

2) The planned number of classrooms were calculated on the following assumptions:

| | |
|---|---|
| (i) | The number of classrooms shall be 24 or less per school; but should be altered according to the physical condition of the site or the surroundings. |
| (ii) | The number of classes shall be calculated not by standard but according to the total number of children (number of classrooms = total number of children/50). |
| (iii) | The number of classrooms shall be rounded off. |

The followings are the grounds for the above-mentioned three conditions:

i) The number of classrooms shall be 24 or less per school

The MOET has no guideline for the maximum number of classroom per school, and there is no restriction on the extension of classrooms for a church school.

Therefore, the basis for the calculation of the number of classrooms for this Project was defined by (1) the standards established by Japan's Ministry of Education and Training, Culture, Sports, Science and Technology and the analysis of the proper scale of schools; and (2) the analysis of each site where the required number of classrooms exceeds 21. The results of the analysis are as follows:

a) The standards established by Japan's Ministry of Education and Training, Culture, Sports, Science and Technology and Analysis of the proper scale of schools

The Regulations for the Enforcement of the School Education Law revised by the Japan's Ministry of Education and Training, Culture, Sports, Science and Technology in March 2002 define that the standard number of classes shall be between 12 and 18, unless there is any special situation in the area.[11] Because the number is only a standard, there are various scales of schools in reality.

In addition, according to the survey on the proper scale of schools conducted by Tokyo in 1988, medium-sized schools (12-24 classes) and large ones (26 classes or more) are generally better than smaller numbers (11 classes or less). However, as the said survey was conducted for classes of 40 students in Japan, excessive-scale schools may emerge in the case of 50 students per class which is used for this Project. Based on this, it was considered appropriate to set the maximum number of classrooms at 24, which is the upper limit of medium-sized schools.

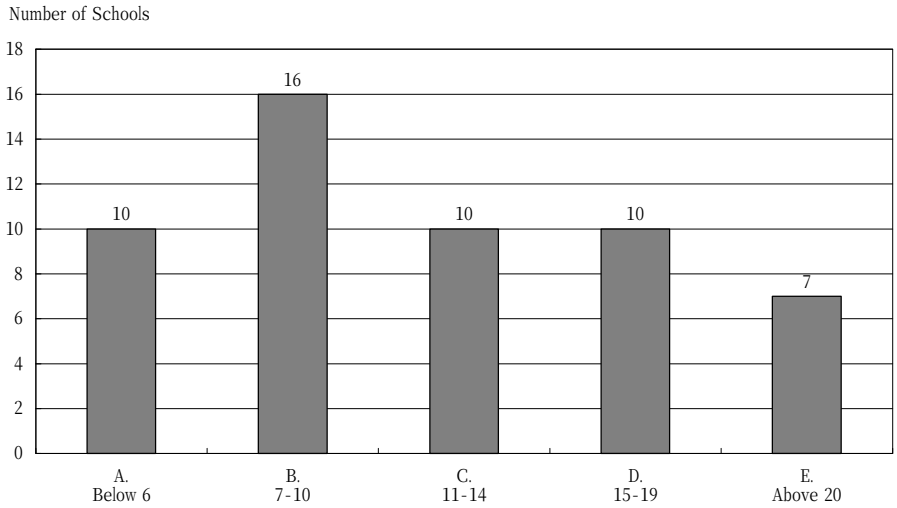
b) Analysis of each site where the required number of classrooms exceeds 21

Because characteristics vary among schools according to scale, it is necessary to analyze the efficiency and effectiveness of education from different angles, taking the situation of each country, area, or school into consideration. One of the neighboring schools we visited has 30 classrooms,[12] the largest number in our survey.[13] According

[11] The Revised Regulations for the Enforcement of the School Education Law, Chapter II, Article 17 (Standards for the Establishment of Primary Schools), which can be read on the Ministry's website.

[12] Including eight unused classrooms.

to our classification of schools by the number of classes, the number of schools with 7-10 classes is 16, the largest, and the number of schools with 20 classes or more is only seven, as shown in Fig. 2-8.




Source: Questionnaire from Field Survey 2

Fig. 2-8 Number of Classrooms in a School

The followings are the results of the analyses of the school sites where the required number of classrooms exceeds 21 (Sites Nos. 6, 12, & 20).

**Site No. 6 Maseru East**

This school site is located at the center of the Maseru city. Out of the 14 neighboring schools (located within 2 km from the site), six are large schools with 20 classrooms or more. The largest number of classrooms in Maseru is 35, and four schools have the capacity of more than 1,200 students. The number of students per classroom is 60 or more in three schools: a shortage of classrooms is evident in this area. Although the calculated number of classrooms for this site was 42, it was considered to be appropriate to set the number of classrooms at 24. However, because this site has physical constraints in site conditions, the number of classrooms to be designed for this Project should be 15 classrooms with two buildings.

A shortage of classrooms in this area would remain. However, as this area is an overpopulated area, it is not easy to secure large enough sites to construct large schools, and it seems to be difficult to solve a shortage of classrooms by construction of one large school. Therefore, in order to solve a shortage of classrooms of this area gradually, it is necessary for MOET to select and secure some sites for school construction in this area.

[13] Neighboring Schools No. 50, Tsosane LEC, Maseru.

**Site No. 12 Mabote**

Out of the seven neighboring schools around this school site, three have 20 classrooms or more. The largest number of classrooms is 35, and two schools have the capacity of more than 1,200 students. The number of students per classrooms is 60 or more in four schools: a shortage of classrooms is also evident in this site. The calculated number of classrooms for this site was 24 (See Table 2-9). Because of the reason described in 2) i) , the number of classrooms of this school site was set at 24.

**Site No. 20 Lancers Gap**

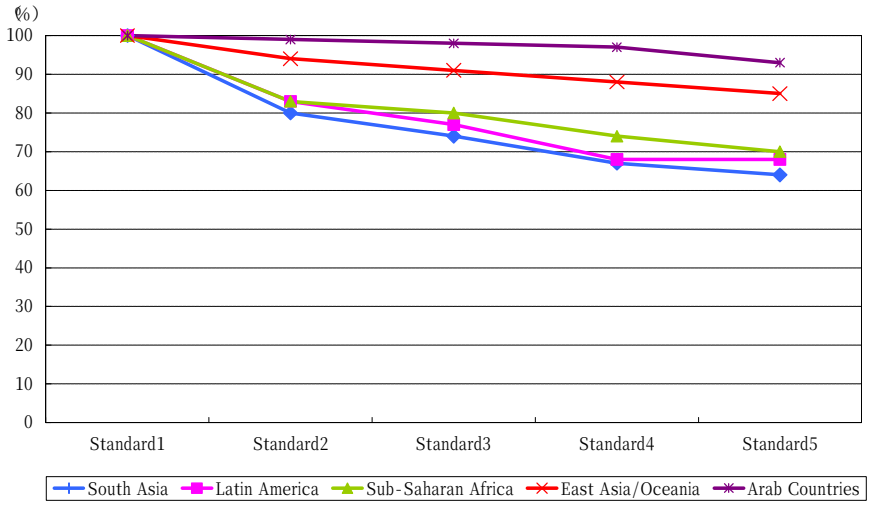
This school site is located at the top of a small mountain (with a slope like a cliff) to the west of the Maseru city. There is a community school, which has two classrooms with multi-grade classes. Although there are several villages on the top of the mountain, there is no primary school, except for the community school and a church school at a distance of 3 km (Thuathe LEC: eight classes with 354 students). Children in the villages go to primary schools at distances of 6-9 km from the site. Because the number of existing classrooms are small, compared with the number of children in the villages, the calculated number of classrooms was 22 (23 classrooms minus one existing classroom[14]). For this school site, however, a school cannot have more than three two-story classroom buildings and more than 20 classrooms due to the site condition (19 classrooms in reality, because one classroom is used as the staff room). Therefore, the number of classrooms of this school site was set at 19.

ii) The number of classes is calculated not by standard but according to the number of children (number of classrooms = total number of children/50)

As described above, the number of children who enter into the standard suitable for their ages has remarkably increased since the FPE programme started in 2000. According to the result of the field survey, the number of students in the Standard 1-4 in neighboring schools remained the same, while the number of those in the fifth standard or higher gradually decreased because they did not receive the benefits of the programme. The number of the students now in the Standard 1-4, who receives the benefits, is estimated to remain almost the same when they move up to the upper standard of primary school.

[14] Although the existing school has two classrooms, we regarded them as one classroom because the classrooms are narrow and each has the capacity of far less than 50 students, the student/classroom basis in this Project.

There are too many uncertain elements to calculate the number of classrooms, a multiple of the number of standard – for example, problems in the quality of education, the existence of children who cannot go to school due to reasons other than economic ones, and a high ratio of those who repeat the same standard. Out of the 49 countries in Sub-Sahara Africa, primary education is compulsory in 39 countries. The ratio of those who move up to the Standard 3 from standard 1 is 80% and up to standard 5 is down to 70%, and there are many students who drop out before reaching the upper standard of primary school (See Fig. 2-9)[15]. These trends are likely to continue even after the completion of the FPE programme.




Source: UNESCO World Education Report 1998

Fig. 2-9 The Ratio of Students who Move up to the Standard 5 in Developing Countries

Moreover, as shown in Table 2-8, although the number of classrooms per school is more or less seven in Maseru and Berea, the number varies widely among schools, and differences in scale of school are growing due to urbanization (It cannot be said that the total number of classrooms is mostly a multiple of seven, the number of standard).

[15] UNESCO, World Education Report 1998, p. 59, Figure 3.2.

Table 2-8 Numbers of Schools by Number of Classrooms in Maseru and Berea

| Number of Classrooms | Number of Schools by Number of Classrooms | | Total Classrooms | |
|---|---|---|---|---|
| | Maseru | Berea | Maseru | Berea |
| 0 | 8 | 2 | 0 | 0 |
| 1 | 36 | 4 | 36 | 4 |
| 2 | 13 | 2 | 26 | 4 |
| 3 | 18 | 2 | 54 | 6 |
| 4 | 13 | 5 | 52 | 20 |
| 5 | 20 | 8 | 100 | 40 |
| 6 | 21 | 9 | 126 | 54 |
| 7 | 53 | 27 | 371 | 189 |
| 8 | 11 | 8 | 88 | 64 |
| 9 | 8 | 5 | 72 | 45 |
| 10 | 6 | 5 | 60 | 50 |
| 11 | 3 | 4 | 33 | 44 |
| 12 | 1 | 4 | 12 | 48 |
| 13 | 4 | 3 | 52 | 39 |
| 14 | 8 | 3 | 112 | 42 |
| 15 | 1 | 2 | 15 | 30 |
| 16 | 2 | 4 | 32 | 64 |
| 17 | 3 | 1 | 51 | 17 |
| 18 | 1 | - | 18 | - |
| 19 | 1 | - | 19 | - |
| 20 | 2 | 1 | 40 | 20 |
| 21 | 2 | - | 42 | - |
| 22 | 5 | - | 110 | - |
| 23 | 1 | - | 23 | - |
| 24 | 0 | - | 0 | - |
| 25 | 1 | - | 25 | - |
| 28 | 1 | - | 28 | - |
| 33 | 1 | - | 33 | - |
| 35 | 1 | - | 35 | - |
| Total | 245 | 99 | 1665 | 780 |
| Avereage Number of Classrooms/School | 6.80 | 7.88 | | |

Source: EMIS Data2002

In this Project, therefore, it is reasonable to calculate the maximum number of classrooms and the planned number of classrooms from the total number of children living in accessible area instead of the limiting number of standard (a multiple of seven).

iii) The number of classrooms is to be rounded off

Decimals in the required number of classrooms as a result of calculation are rounded off to the nearest whole number. In case that the number of children in one classroom may exceed the estimated number of school children (50 x the number of classrooms), the maximum number of children per classroom would be 53 instead of 50. It will be possible for the classroom to have such a number of children.

The Number of Classrooms to be Designed by Site is shown in Table 2-9 on the following page, and the Final Number of Classrooms to be Designed is shown on the Row “P” of the table.

Out of the 20 school sites listed in the Request Application Form, 17 sites are to be covered by this Project. The total number of classrooms to be designed is 229 instead of 221 as specified in the Application. The MOET’s request is not based on reliable statistics such as the population growth rate, the school

enrollment rate, the ratio of school population, etc. Therefore, it was concluded that the basic design (components and details) should be considered based on our original calculation of the study, rather than based on those specified in the Application.

# Table 2-9 Number of Classrooms to be Designed by Site

| | | Calculation | 1. Mahlabatheng Maseru | 2. Lihaseng Maseru | 3. Ha Tlhakanelo Maseru | 4. Sowe Maseru | 5. Senyotong Berea | 6. Maseru east Maseru | 7. Khubelu Maseru | 8. Thetsane Maseru | 9. Likotsi Maseru | 10. Moseqobela Berea | 11. Leqele Maseru | 12. Mabote Berea | 13. Ha Ntjabane Berea | 14. Ha Mpiti Maseru | 15. Ramaqhanyane Maseru | 16. Semphetenyane Maseru | 17. Abia Maseru | 18. Tsolo Maseru | 19. Lenono Maseru | 20. Lancers Gap Berea | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | Total Population within Accessable Villages*a | Existing Figures | 5,499 | 7,384 | 4,214 | 3,530 | 5,447 | 22,073 | 3,348 | 4,960 | 948 | 4,600 | 20,211 | 29,149 | 9,128 | 5,908 | 4,685 | 12,214 | 3,863 | 3,815 | 6,767 | 6,266 | |
| B | Projection of School Age Population living in Accessable Villages (Age 6-12) *a | <A>x Share of School Age Population (Age 6-12) (Maseru:0.1630, Berea:0.1730)*b | 939 | 1,311 | 687 | 575 | 942 | 3,602 | 546 | 808 | 155 | 902 | 3,294 | 5,025 | 1,579 | 963 | 764 | 1,991 | 631 | 622 | 1,103 | 1,074 | |
| C | Projection of School Age Population living in Accessable Villages(Age 6-12) (in 2006) | <B>x Rate of Population Increase to 2006 (Maseru 1.23, Berea 1.3215)*b In Development Area, (#4,7,8,13,17,18) rate was calculated individually*c | 1,155 | 1,612 | 845 | 778 | 1,188 | 4,438 | 759 | 1,062 | 190 | 1,192 | 4,052 | 6,613 | 2,012 | 1,184 | 939 | 2,449 | 1,124 | 963 | 1,357 | 1,403 | |
| D | Projection of Number of Children living in Accessable Villages (in 2006)(Age 6-12) | <C>xNet Enrollment Ratio (Age 6-12) (Maseru:0.7590, Berea:0.6969)*d | 877 | 1,224 | 641 | 591 | 868 | 3,362 | 576 | 806 | 144 | 831 | 3,076 | 4,631 | 1,402 | 899 | 713 | 1,859 | 853 | 731 | 1,030 | 991 | |
| E | Projection of Age 13-20 Population living in Accessable Villages*a | <A> x Share of Population Age 13-20 (Maseru:0.2060, Berea:0.2100)*b | 1,196 | 1,665 | 868 | 727 | 1,580 | 4,549 | 690 | 1,022 | 195 | 1,101 | 4,163 | 6,141 | 1,926 | 1,217 | 965 | 2,516 | 796 | 786 | 1,394 | 1,317 | |
| F | Projection of Age 13-20 Population living in Accessable Villages | <E>x Rate of Population Increase to 2006 (Maseru : 1.23, Berea : 1.3215)*b Inm Development Area, (#4,7,8,13,17,18)rate was calculated individually.*c | 1,470 | 2,048 | 1,068 | 984 | 2,149 | 5,604 | 960 | 1,342 | 240 | 1,454 | 5,121 | 8,081 | 2,454 | 1,586 | 1,187 | 3,095 | 1,419 | 1,217 | 1,715 | 1,721 | |
| G | Projection of Number of Children living in Accessable Villages (in 2006)(Age 13-20) | <F>x Primary School Enrollment Ratio (Age 13-20) (Maseru:0.2593, Berea:0.2513)*d | 381 | 531 | 277 | 255 | 382 | 1,452 | 249 | 348 | 62 | 365 | 1,328 | 2,035 | 617 | 388 | 308 | 802 | 368 | 316 | 445 | 434 | |
| H | Current Number of Students in Existing Nearby Schools(Age 6-20) *e | Existing Figures | 1,752 | 908 | 2,021 | 5,580 | 1,677 | 15,536 | 3,673 | 6,670 | 1,727 | 1,630 | 15,334 | 5,806 | 2,937 | 2,830 | 732 | 13,210 | 4,672 | 5,665 | 2,600 | 1,711 | |
| I | Number of Students from Accessable Villages in Existing Nearby Schools*e | Existing Figures | 582 | 589 | 607 | 817 | 706 | 2,565 | 610 | 668 | 221 | 680 | 4,031 | 11,913 | 1,425 | 1,262 | 484 | 1,677 | 483 | 653 | 1,156 | 271 | |
| J | Percentage of Students from Accessable Villages in Existing Nearby Schools(Age 6-20) | <I>/<H> | 0.33 | 0.65 | 0.30 | 0.15 | 0.42 | 0.17 | 0.17 | 0.10 | 0.13 | 0.42 | 0.26 | 0.49 | 0.49 | 0.45 | 0.66 | 0.13 | 0.10 | 0.12 | 0.44 | 0.16 | |
| K | Necessary Classrooms in the Entire Accessable Area from the Site | (<D>+<G>)/50 | 25.16 | 35.10 | 18.36 | 16.91 | 24.99 | 96.28 | 16.51 | 23.08 | 4.13 | 23.93 | 88.07 | 133.31 | 40.38 | 25.74 | 20.41 | 53.22 | 24.43 | 20.93 | 29.49 | 28.51 | |
| L | Existing Number of Classrooms (Including Classrooms not used currently. Excluding Church hall, Tent, Chicken houses, etc) *e | Existing Figures | 38 | 21 | 39 | 81 | 32 | 298 | 61 | 139 | 26 | 29 | 278 | 238 | 61 | 45 | 12 | 242 | 89 | 101 | 47 | 36 | |
| M | Number of Classrooms used by Students from Accessable Villages | <Sum of L in each School>x<Sum of J> | 11.61 | 14.24 | 11.47 | 11.87 | 14.60 | 54.63 | 11.47 | 12.64 | 3.50 | 12.07 | 68.98 | 108.93 | 29.12 | 19.15 | 7.87 | 31.98 | 9.28 | 9.88 | 22.57 | 5.88 | |
| N | Number of Classroom Shortages subtracted from Necessary Classrooms in the Entire Accessable Area from the Site | <K>-<M> | 14 | 21 | 7 | 5→0 | 10 | 42→24 | 5→0 | 10 | 1→0 | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 23 | 249 |
| O | Number of Classrooms Limited by Physical Condition of Land | Adjusted Figure | -1 | -6 | | | | -9 | | | | | | | | | | | | | | -4 | -20 |
| **P** | **Final Number of Classrooms to be Designed** | **<N>+<O>** | **13** | **15** | **7** | **0** | **10** | **15** | **0** | **10** | **0** | **12** | **19** | **24** | **11** | **7** | **13** | **21** | **15** | **11** | **7** | **19** | **229** |
| Q | Projection of Enrollment in Schools to be Designed(50 Students / Classroom) | <P>x50 | 650 | 750 | 350 | 0 | 500 | 750 | 0 | 500 | 0 | 600 | 950 | 1,200 | 550 | 350 | 650 | 1,050 | 750 | 550 | 350 | 950 | 11,450 |
| R | Requested Classrooms | Submitted Numbers | 7 | 7 | 7 | 16 | 7 | 7 | 16 | 24 | 7 | 7 | 16 | 16 | 16 | 7 | 7 | 7 | 16 | 8 | 16 | 7 | 221 |

*a) 1996 Lesotho Population Census Village List, Bureau of Statistics
*b) 2001 Lesotho Demographic Survey, Bureau of Statistics
*c) As for Individual Rate of Population Increase in the Development Area, Please Refer the Table Shown in Right
*d) EMIS Data 2002, Ministry of Education
*e) Source: Questionnaire Answers from Field Survey 2

*g) World Bank. African Development Indicators
Shaded Colum: Would not be Included in the Design.

Table A Rate of Population Increase in Each Development Site

| Infrastructure Items | Weight | #4 Masowe | #7 Khubelu | #8 Thetsane | #13 Ha Ntjaba | #17 Abia | #18 Tsolo |
|---|---|---|---|---|---|---|---|
| Water | 0.15 | 1 | 1 | 1 | 1 | 2 | 1 |
| Electricity | 0.1 | 1 | 0 | 0 | 0 | 2 | 2 |
| Roads/Transportation | 0.1 | 2 | 2 | 1 | 2 | 2 | 2 |
| Housing | 0.15 | 0 | 1 | 1 | 0 | 2 | 1 |
| Valuation Indicators | Weight x Valuation Point | 0.45 | 0.5 | 0.4 | 0.35 | 1 | 0.7 |
| Rate of Population Increase in Each Site | | 1.3525 | 1.3917 | 1.3134 | 1.2742 | 1.7834 | 1.5484 |

Rate of Population Increase in Each Site=Valuation Indicatorsx Average Annual Percentage Growth of Urban Population (1996-2006) 78.34%*g

**f. Study for the Size of Each Room**

MOET has its own "MOET Standards (drawings and technical specifications)" for school construction. Accordingly, other donors, including World Bank ("WB") and African Development Bank ("AfDB"), implement their school construction projects based on the MOET Standards. Outlines of the MOET Standard are as shown herein below.

Outlines of MOET Standard

| | | |
|---|---|---|
| Classroom Block | : | Floor area per classroom = 64.0 $m^2$. Standard type for 7 classrooms per school is with single-storied 3 classrooms block + 4 classrooms block. 2-storied classroom block will be planned for the school having limited site area and large-scale school. |
| Administration Block | : | Consists of Headmaster's Room (16.8 $m^2$), Staff Room (64.0 $m^2$) and Book Store (23.0 $m^2$). |
| Kitchen Block | : | Consists of Kitchen (15.4 $m^2$), Food Store (16.8 $m^2$) and Equipment Store (15.4 $m^2$). Facility for school lunch feeding by cooking in school. |
| Students' Toilet Block | : | Floor area per block = 15.9 $m^2$. Although toilet block shall be planned separately for male and female, specification shall be same for both male and female toilet block. Pit latrine with western-style toilet pan. 5 booths without doors per toilet block. |
| Staff Toilet Block | : | Pit latrine with western-style toilet pan same as students' toilet block and 2 booths per toilet block. |
| Furniture / Equipment | : | Furniture for classrooms and various rooms at administration block. Science Kit. |

In this Project, facility planning should also consider on the MOET Standard with some improvements to adapt facilities to each site within the budget and set minimum necessary floor area for each room (unit) of which the total floor area and cost planning for the Project is based.

In addition, the planning of this Project should be based squarely on aforementioned review of the number of classrooms with consideration to the conditions of existing school facilities, and similar facilities constructed by the Lesotho Government, other donors in Lesotho and by Japan's Grass Roots Assistance. In consideration of the implementation of such similar facilities, comparisons are shown in Table 3-10 below.

Table 2-10 Implementation Situation of School Construction Projects

| | This Project | FPE (Lesotho Government) | World Bank | African Development Bank (AfDB) | Ireland Aid | Japan's Grass Roots Assistance |
|---|---|---|---|---|---|---|
| Target Area | Maseru<br>Berea | 10 District<br>nation-wide | 2003.9 –<br>(252 classroom)<br>3 (Berea, Leribe, Batha-Buthe)<br>2002 – 03<br>(59 schools<br>413 classrooms)<br>Mohale's Hoek, Mokhotlong, Mafeteng, Butha-Buthe, Qacha's Nek | 2002 – 03<br>(40 schools'<br>280 classrooms)<br>Thaba-Tseka, Quthing, Qacha's Nek | Since 2002,<br>Maseru<br>1998 – 2001<br>(37 schools)<br>Mohale's Hoke, Mokotlowg | Mainly farming villages and mountainous areas (there are no specified target area) |
| Form of Assistance | Bilateral Aid Grant Aid | | Multilateral Aid (Loan) | Multilateral Aid (Loan) | Bilateral Aid Grant Aid | Grass Roots Grant Aid |
| Specifications | MOET Standard (improved) | MOET Standard | MOET Standard | MOET Standard | MOET Standard (since 2002 original specification up to 2001) | original specifications project by project |
| Contents of Assistance | - Classroom Block (incl. various rooms for administration)<br>- Toilet Block (students and staff)<br>- School Furniture | - Classroom Block<br>- Administration Block<br>- Toilet Block (students and staff)<br>- Kitchen Block<br>- School Furniture<br>- Science Kit | - Classroom Block<br>- Administration Block<br>- Toilet Block (students and staff)<br>- Kitchen Block<br>- School Furniture<br>- Science Kit | - Classroom Block<br>- Administration Block<br>- Toilet Block (students and staff)<br>- Kitchen Block<br>- School Furniture<br>- Science Kit | - Classroom Block<br>- Administration Block<br>- Toilet Block (students and staff)<br>- Kitchen Block<br>- School Furniture | varies by project |
| Unit Rate for Construction (Direct Cost) | Classroom Block JPY 20,882/$m^2$ | Classroom Block JPY 24,814/$m^2$ | Classroom Block JPY 21,456/$m^2$ | Classroom Block JPY 22,336/$m^2$ | Classroom Block Unknown | Classroom Block JPY 15,817/$m^2$ (incl. labour costs) |

*1 : Exchange Rate 1US$ = JPY 120.37 (6 month average between 1 December 2002 and 31 May 2003).
1 Maloti = 1 Rand = JPY 16.15 (6 month average between 1 December 2002 and 31 May 2003).
However, as for the Japan's Grass Roots Assistance, it is calculated based on the ceiling amount for each project.

*2 : As for the projects funded by the World Bank, African Development Bank and Ireland Aid, the tender is implemented by Lesotho Government. Although the project funded by the World Bank and African Development Bank is supposed to be international tender, in fact, there is almost no participation by foreign contractors and contract has been awarded to the contractor in Lesotho. Tender is usually implemented based on a site plan and drawings and specifications compiled with MOET Standards for each facility and "Bills of Quantities" are not handed over to the participating contractors. However, MOET usually have reference cost estimates being calculated based on the Bills of Quantities compiled by themselves and tender evaluation is made based on the said reference cost estimates.

Based on the above-mentioned policies, floor area of each room for this Project was set as follows:

(a) Classroom

As mentioned in the foregoing section, the number of students per classroom is set to be 50. According to the MOET Standard, a module of classroom should be 8m x 8m = 64$m^2$, 1.28$m^2$ floor area per student. According to the field survey, an average number of students per classroom in neighboring schools of the project site (53 schools) was 51.98, and average floor area per student was

1.23m$^2$. Therefore, the size of classroom in this Project is appropriate and will comply with the MOET Standards.

Desks and chairs are also to be based on the MOET Standard. Desks suitable for group learning in combination with benches (for two students) should be procured for standard 1 and 2, and combination school desks (for two students) should be procured for standard 3 thru 7.

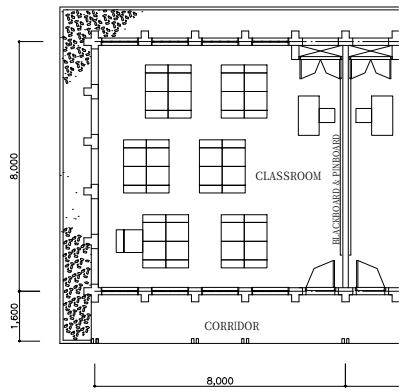
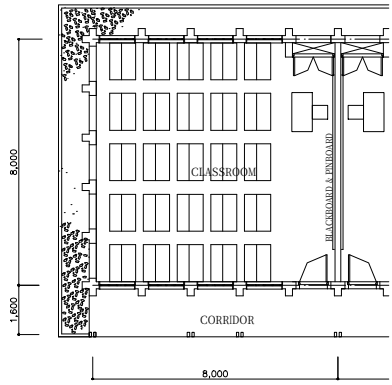
| Standard 1 and 2 | Standard 3 thru 7 |
|---|---|
|  |  |
| • Student's Tables (size : 730mm x 600mm) x 25No.<br>• Student's Benches (2 Students) x 25No. | • Student's Desk with Chair x 25No.<br>(2 Students, size : 1,200mm x 460mm) |

Fig. 2－10 Classroom

(b) Administration offices

It was confirmed in the field survey that the existing schools generally have administration offices in addition to classrooms, such as a headmaster's room, a staff room and a store. The MOET Standard also includes the standard type of administration block containing these rooms. In this Project, in view of a reduction in construction costs, as well as multi-purpose use of the staff room, administration offices should be incorporated into a classroom building.

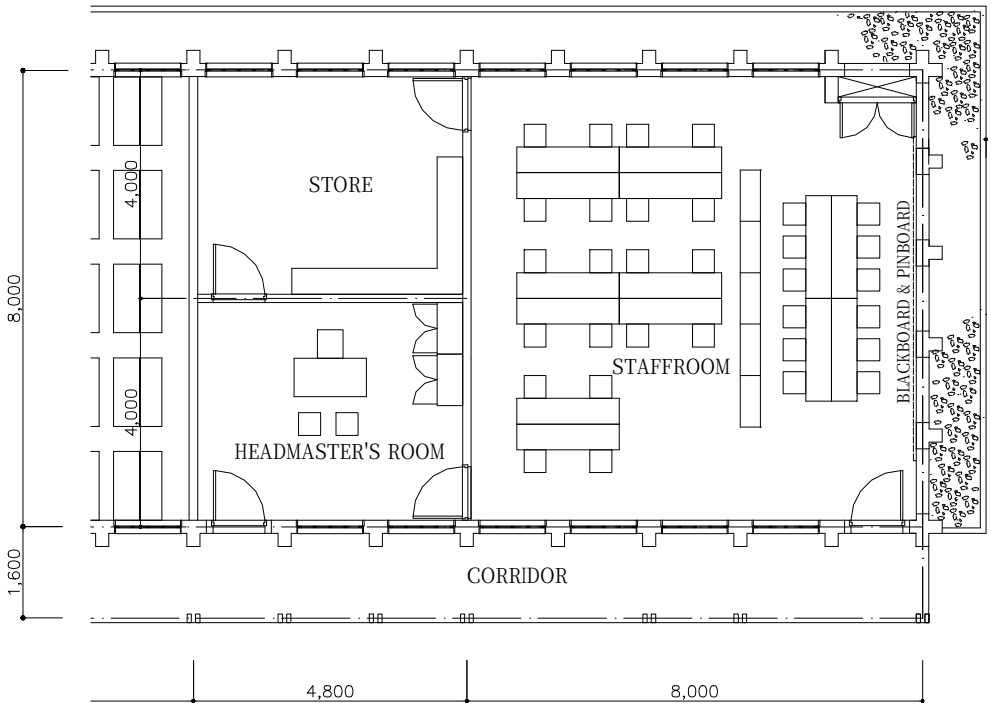


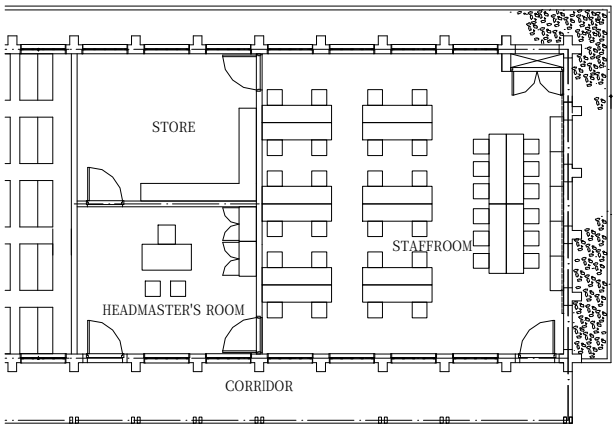

Fig. 2－11 Administration Rooms

1) Headmaster's Room

It was confirmed in the field survey that there was a Headmaster's Room in almost all of the existing schools. In the MOET Standard, the area of Headmaster's Room is approximately 20m$^2$ used as an independent room including space for visitors. The Headmaster's Room for the Project should be about 19m$^2$, which will be adequate space for placement of standard furniture (a desk, a chair and a cabinet) together with chairs for visitors which are usually placed in the existing schools.

2) Staff Room

A Staff Room specified in the MOET Standard is independent, and its size is 64m$^2$. Practically, required area of Staff Room depends on the size of and the number of staffs of each school. However, the size of Staff Room for the Project should be same as classrooms (8m x 8m = 64 m$^2$), specified in the MOET Standard with consideration to multi-purpose use of the Staff Room and possibility for use as a Classroom in the case the number of students increases and the number of classroom becomes insufficient in the future.




＜Case - A＞ 24 Classrooms

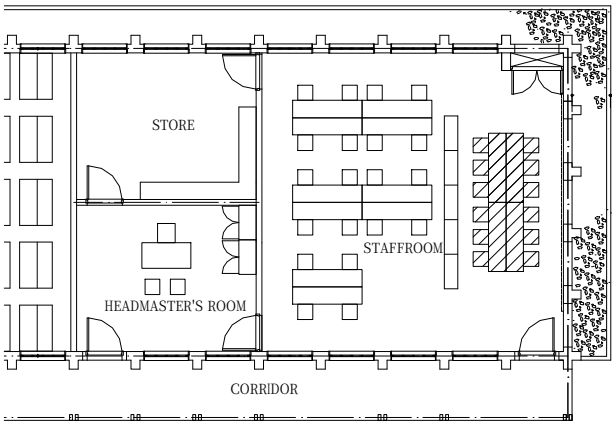
The Number of Teachers

- Official Teachers :24
- Expected Volunteer Teachers etc.:12

Total* :36

The Number of Furniture

- Meeting Tables :16
- Standard Chairs :36
- Book Shelves : 5




Space for both Teachers and Students

＜Case - B＞ 13 Classrooms

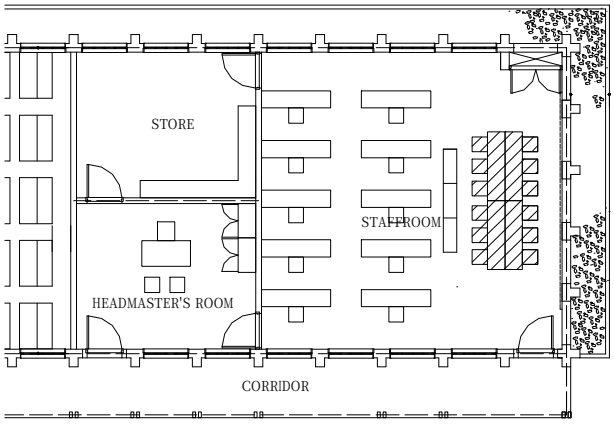
The Number of Teachers

- Official Teachers :13
- Expected Volunteer Teachers etc.: 7

Total* :20

The Number of Furniture

- Meeting Tables :14
- Standard Chairs :32
- Book Shelves : 5




Space for both Teachers and Students

＜Case - C＞ 7 Classrooms

The Number of Teachers

- Official Teachers : 7
- Expected Volunteer Teachers etc.: 3

Total* :10

The Number of Furniture

- Meeting Tables :14
- Standard Chairs :22
- Book Shelves : 3

*) Total number of teachers includes the number of official teachers and expected volunteer teachers.

Fig. 2-12 Multi-purpose Use of Staff Room

i) As shown in Fig. 2-12, the Staff Room can be used in various ways. Regardless of the size of school, a Staff Room should have a working and meeting space for staff as well as a space for multi-purpose use (e.g. reading space for staff and students). The flowchart for determining of the number of furniture in the Staff Room is described later in section, "2-1-1 h. Furniture".

ii) In the future, when the number of classrooms become insufficient due to an increase in the number of students, a Staff Room may be used as an alternative Classroom.

3) Store

Lesotho side made a request for " Book Store" in the administration block, not used for " Store". It was confirmed in the field survey that there were some schools without storage space, therefore, a part of Headmaster's Room, Staff Room, and Administration Office, or even Classrooms, are being used to store educational materials and data files, thereby causing hindrance to school affairs. Therefore, in this Project, a Store, not a Book Store, is planned as a necessary component but with minimum floor area (about 19$m^2$) thereof, which should provide multi-purpose use.

(c) Pit Latrine

At the all-existing schools visited in the field survey, Latrines are used, but with a slight difference in type and grade. As the school enrollment rate improves, it becomes increasingly necessary to provide public health education. Thus, the provision of a Latrine is one of the essentials in primary school planning. Therefore, in this Project, Latrines should be constructed for each school.

Latrines are also mentioned in the MOET Standards. The other donors construct Latrines based on the MOET Standard. According to the MOET Standard, staff latrine is separate from latrines for students which is the same design and specification are used for both girls and boys. This is not because of simplifying each latrine but because of Lesotho's cultural background; children will not approach the latrine if adults are around. In fact, in the survey of the existing schools, it was confirmed that the children will not enter the latrine if the teacher approach the latrine where children are around. It is not a healthy situation especially for younger students and it would exert a harmful effects in regard to sanitary and hygienic conditions. In the past, there were a few cases where detached latrine built for students and teachers became "teachers only" latrine. This is the reason why MOET Standard prescribes that latrine for students and teachers be constructed separately. Therefore, it is

planned that latrines for this Project shall be in accordance with MOET Standard i.e. latrines to be constructed separately.

The MOET Standard indicates that, in principle, one booth should be provided per 30 students. However, there is no description regarding the number of booths and urinals for boys in the MOET Standard. Therefore, in this Project, it is planned to install one booth with a toilet bowl for 50 boy students and one urinal for 25 boys (according to the Japanese Standard).

The reasons why the MOET Standard and Japanese Standard are being referred to in this section is that MOET Standard prescribes the same latrine design and specification for boys and girls. However, it is judged reasonable that the latrines for boy students should be installed a urinal besides booths with toilet bowls, in consideration of frequency of boy's use.

The Staff Latrine is planned to provide one booth each for male and female at each school site based on the relevant Japanese Standard, as there are no regulations regarding the number of booths for teachers and staff in the MOET Standard.

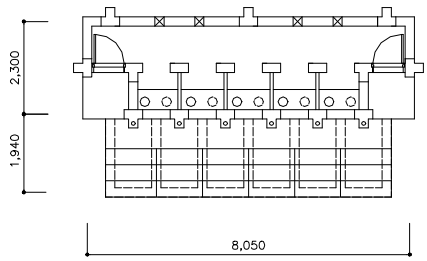
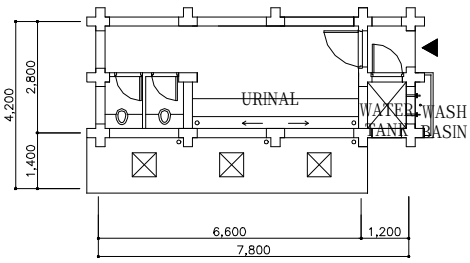
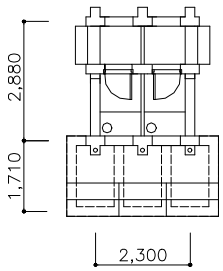
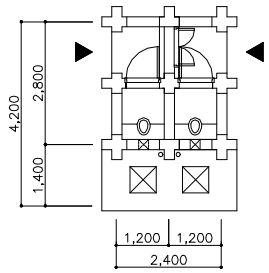
| MOET Standard | The Project Plan |
|---|---|
| Latrine for Students | Latrine for Male Students |
|  |  |
| Latrine for Staff | Latrine for Staff |
|  |  |

Fig. 2-13 Pit Latrine

Table 2－11　Number of Facilities

| Schools | | Classroom building | | | | Pit Latrine | | | | | Water Supply Facilities | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Classroom | Staff Room | Head master's Room | Store | Male Students' Booth | Female Student's Booth | Urinal (for 5 Students) | Male Staff | Female Staff | Water Resource | Reservoir Tank | | |
| | | | | | | | | | | | | Type -A | Type -B | Type -C |
| 1 | Mahlabatheng | 13 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | Well | 1 | 0 | 0 |
| 2 | Lihaseng | 15 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | Well | 0 | 0 | 1 |
| 3 | Ha Tlhakanelo | 7 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | Well | 0 | 1 | 0 |
| 5 | Senyotong | 10 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | Well | 0 | 1 | 0 |
| 6 | Maseru East | 15 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | WASA | 0 | 0 | 0 |
| 8 | Thetsane | 10 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | WASA | 0 | 0 | 0 |
| 10 | Maseqobela | 12 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | Well | 1 | 0 | 0 |
| 11 | Leqele | 19 | 1 | 1 | 1 | 6 | 18 | 3 | 1 | 1 | WASA | 0 | 0 | 0 |
| 12 | Mabote | 24 | 1 | 1 | 1 | 6 | 18 | 3 | 1 | 1 | WASA | 0 | 0 | 0 |
| 13 | Ha Ntjabane | 11 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | WASA | 0 | 0 | 0 |
| 14 | Ha Mpiti | 7 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | Well | 0 | 1 | 0 |
| 15 | Ramaqhanyane | 13 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | Well | 1 | 0 | 0 |
| 16 | Semphetenyane | 21 | 1 | 1 | 1 | 6 | 18 | 3 | 1 | 1 | WASA | 0 | 0 | 0 |
| 17 | Abia | 15 | 1 | 1 | 1 | 4 | 12 | 2 | 1 | 1 | WASA | 0 | 0 | 0 |
| 18 | Tsolo | 11 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | WASA | 0 | 0 | 0 |
| 19 | Lenono | 7 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 1 | Well | 0 | 1 | 0 |
| 20 | Lancers Gap | 19 | 1 | 1 | 1 | 6 | 18 | 3 | 1 | 1 | Well | 0 | 0 | 1 |
| Total | | 229 | 17 | 17 | 17 | 62 | 186 | 31 | 17 | 17 | | 3 | 4 | 2 |

NOTES: Water Supply Facilities is described in "2-2-2 c.　Water Supply Planning".
WASA: Water and Sewerage Authority, Ministry of Natural Resources

## g. Concepts of Facilities

(a) Classroom building (Consideration on a prototype)

This project aims to construct a large number of Classrooms uniformly at various sites within a short time period. Therefore, prototypes for Classroom buildings will be planned for the required number of Classrooms. In Lesotho, the MOET Standard has been established for the school construction, and other donors, such as the WB and the Ireland Aid, comply with it when they implement school construction project. The results of analysis on the MOET Standard plans as well as the policy of this Project are described here in below. Each prototype of the Project is shown in Appendix 8.

Classroom plan of the MOET Standard, in principle, adopts the local construction method, maximizes the utilization of construction materials which can be procured locally, and takes into account the facilitation of construction works, the cost reduction, and the maintainability. In this Project, the conventional method is adopted as it matches the local conditions in terms of costs and construction methods, with considerations to improvements to adapt facilities to each school site by paying attentions to avoid any over-design.

1) Construction method

A local conventional method, consisting of reinforced concrete blocks and bricks, will be adopted. Concrete blocks are used for columns and beams, whereas bricks are used for walls. In order to reduce the costs of transporting construction materials and secure the uniform quality of materials, cast-on-site concrete blocks should also be considered. For the enhancement of structural strength and durability, reinforced concrete construction should be adopted for the foundation.

2) Finishing work

According to the MOET Standard, both interior and exterior walls should be the original finish surface of materials, such as concrete blocks and bricks, thereby reducing costs of finishing work and facilitating maintenance work. Therefore, this project will adopt the finished surface materials.

Steel sashes and wooden doors are standardized for school facilities. This Project also complies with the same specifications with some improvements by adding hardware which has durability and maintainability to provide maximum use.

3) Roofing

According to MOET Standard, a gable roof with wooden truss structure is adopted. This Project also adopts a wooden truss structure, however, it is necessary to consider the joint details of members and the anchoring method to the beams.

In the MOET Standard, corrugated galvanized steel sheets are used as roof materials. As for roof light, polycarbonate corrugated roofing sheets are sometimes used. However, in order to improve durability, costs, and maintainability of these roof materials, this Project plans to adopt factory colored folded metal roofing sheets (anticorrosive type).

4) Ceiling

The ceiling has not been included in the MOET Standard. By installing insulation sheets directly below the roof materials, a rise in the room temperature caused by the direct sunrays to the metal roof can be prevented, to facilitate improving the learning environment during the daytime. However, the specifications for insulation materials are not described sufficiently, and materials do not seem to work effectively, therefore, insulation boards will be considered in this Project.

Furthermore, there was confirmation that a quite few existing neighboring schools have ceiling for the classrooms which are quite effective for the thermal insulation. Therefore, the ceiling materials having thermal insulation factor will be used in this Project.

(b) Pit Latrine

The construction method and finishing materials are basically the same as those applied to a Classroom building.

According to the MOET Standard, a Latrine for students should be equipped with western-style toilet bowls with two holes per booth. A booths have no door, and the height of a partition between each booth is at waist level. Therefore, when sitting on the toilet seat, one cannot see others using neighboring booths. However, as the results of hearing conducted during the field survey indicate that many students (especially girls in the higher standards) want the a door to each booth having the same height as the partition.

A urinal for boys are not included in the MOET Standards. One of the reasons for unclean conditions around a toilet bowl is that boys are using the same toilet bowl. Once a toilet bowl becomes filthy, it will not be used properly, thereby inviting further unkept conditions. It was confirmed in the field survey that some existing schools around the school have installed urinals.

In order to improve the above-mentioned situation, western-style toilet bowls with one hole per booth and urinals for boys' latrine will be installed in this Project. Moreover, a door will be installed for each booth. In consideration of public health and hygiene education, a wash hand basin with a water tank and taps will be installed outside the latrine for some schools having water supply system either through WASA or well. And, as to the rest of schools without water supply system, students and teachers will wash their hands with water taps installed near the water reservoir tank to facilitate hygiene requirements after each time they use latrine.

(c) Staff Latrine

The specifications for a Staff Latrine is also to be improved, and western-style toilet bowls with one hole per booth will be installed. A Latrine for male staff will be equipped with a movable toilet seat so that it can be used for urinating as well.

As for washing of hands, a water tap without wash basin shall be installed instead.

On the basis of the above mentioned basic design policies, construction materials for the Project were planned as shown below.

Table 2－12　Material Schedule

| Category | | | Proposed materials for the Project | Materials for MOET Standard |
|---|---|---|---|---|
| Structure | | | Reinforced Concrete Block＋Brick Masonry | Reinforced Concrete Block＋Brick Masonry |
| Story Height | | | （1F）3,000mm、（2F）2,760mm | （1F）2,830mm、（2F）2,630mm |
| Exterior Finishing | Roof | | Colored, Anti-Rust Painted Metal Roof Sheet | Waveform Zinc Plating Steel Roof Sheet |
| | Plancier | | - | - |
| | Column | | Concrete Block (Original Surface)<br>＋Brick (Original Surface) | Concrete Block (Original Surface)<br>＋Brick (Original Surface) |
| | Wall | | Brick (Original Surface) | Brick(Foundation) |
| | Window | | Steel Window＋Paint | Steel Window＋Paint |
| | Door | | Wooden Ledged and Braced Door + Paint,<br>Steel Flush Door＋Paint (Administration offices) | Wooden Ledged and Braced Door＋Paint |
| | External Floor | | Concrete Trowel Finish | Concrete Trowel Finish |
| Interior Finishing | Class Room Build. | Floor | Concrete Trowel Finish | Vinyl Floor Sheet（t=2mm） |
| | | Wall | Brick (Original Surface)<br>＋Concrete Block (Original Surface) | Brick (Original Surface)<br>＋Concrete Block (Original Surface) |
| | | Ceiling | The Highest Floor : Insulation Board<br>＋Wooden Truss＋Paint<br>Other Floor : Concrete Slab Patching +Paint | The Highest Floor : Insulation Board<br>＋Wooden Truss＋Paint<br>Other Floor : Concrete Slab Patching +Paint |
| | Pit Latrine | Floor | Concrete Trowel Finish | Concrete Trowel Finish |
| | | Wall | Brick (Original Surface)<br>＋Concrete Block (Original Surface)<br>Ceramic Tile (Urinal) | Brick (Original Surface)<br>＋Concrete Block (Original Surface) |
| | | Partition Wall | Wooden Panel＋Paint | Wooden Panel＋Paint |
| | | Ceiling | - | - |

Layout plans for each site are shown in Appendix-9.

### h. Furniture

The requests from the Lesotho side include basic school furniture for Classrooms, such as desks and chairs for students and teachers, and furniture for a Headmaster's Room and a Staff Room.

In compliance with the MOET Standard, a table combined with a bench for group learning (for two students) is to be procured for Standard 1-2, whereas a school double desk unit (a desk with a chair for two students) is to be procured in reference to Standard 3-7.

## (2) Considerations to sanitary education

After installation of water supply facilities, the schools shall train students in hygiene and sanitary education by the effective use of water supply facilities. Specifically, washing hands after using the toilet and before eating and washing mouth after eating shall be instructed. Furthermore, students shall be trained to become accustomed to cleaning classrooms and pit latrines in order to keep the school life in good hygienic condition.

Particularly, washing hands after using toilet is very important for prevention of infectious disease. For this reason, in this Project, wash hand basins with a water tank and taps will be installed outside the latrine for some schools having water supply system either through WASA or by well system. For the rest of schools without water supply system, the site layout plans were considered for locations of Pit Latrines and Wells to facilitate students and teachers to wash their hands with water taps installed at water reservoir tank after each use of the latrine. The school shall train students in hygiene education in a suitable way for use of its own water supply system.

**(3) Considerations to natural conditions**

a. Natural Ventilation

According to the statistics, the maximum temperature in Maseru and Berea in 2002 was between 16.5°C and 28.4°C. In the summer season (from November to February), it is hot in the daytime. In order to improve a learning environment, windows with window stays will be installed in order to adjust window openings for ventilation.

b. Natural Lighting

In Lesotho, only few existing schools have installed lighting fixtures in their classrooms, because all classes are scheduled during the daytime. There are no evening classes are scheduled. Therefore, in this Project, lighting fixtures will not be installed.

The openings for a window should be large enough (30% larger than the MOET Standard) to secure light in a classroom, and windows should face the north as much as possible to maintain a comfortable learning environment.

c. Rain

The rainy season in Lesotho is from January to April with the maximum rainfall about 100mm. The annual rainfall in Maseru and Berea is approximately 700mm. However, eaves gutters and down pipes to collect rain will be installed at the corridor side of Classroom building because students will use it frequently. In addition, insulation board under the roofing will be installed to facilitate the problem of noise from rainfall and more importantly thermal rise.

d. Heat (Rays of the sun)

As heating facilities are out of scope of this Project, it is necessary to make layout planning and facility planning suitable for taking advantage of heat (rays of the sun) during winter. In order to control heat transfer from a roof during summer and to

prevent cold air temperature from entering during winter, ceiling (insulation board) will be installed.

**(4) Considerations to social conditions**

In Maseru and Berea, as preventive measures from entering, security grilles and steel doors have been installed to Administration Blocks. In addition, the outside water tap has a lock to prevent people using water at night. In this Project, the following crime prevention measures are taken into account in designing.

(1) Steel security grilles will be installed at the windows of Administration Offices (a Headmaster's room, Staff Rooms, and Store) facing the outside.
(2) A hand pump and a water taps can be locked.

**(5) Considerations to procurement**

As for construction materials, those that can be procured locally or from neighboring third country should be selected as practically possible to facilitate maintenance in the future. Although most construction materials are specified in MOET Standards some natural materials, such as sand, gravel and sandstone, and secondary products such as concrete blocks and bricks are actually imported from neighboring South Africa. There seems to be no particular problems in terms of the quality and performance/efficiency therefrom.

**(6) Considerations to the employment of local contractors**

At present, only the local contractors are in charge of construction for the schools complying with the MOET Standards. Among the principal contractors there are approximately 10 companies such as SIGMA Construction, N. M. KHOJANE, etc., who were awarded with the contract which include not only the construction of primary schools but also the construction of other large-scale projects. Construction supervision of such projects are implemented mainly by foreman of each company and the technical level which are generally expected locally.

In the field survey, construction ability and technical skills of the local contractors was monitored and confirmed by conducting fixed point observation of on-going construction of two (2) primary schools; namely, Thamae LEC Primary School in Maseru and Ramaphiri Primary School situated approximately 40km away from downtown Maseru, which include the construction of two-story, 8 classroom primary school including the extension of toilet blocks and the single-story 4 classroom primary school including the extension of toilet blocks respectively. Contractors for both schools have dealt with the construction of many primary schools and complied with MOET Standards and MOET have high trust in both contractors. One contractor's foreman have been conducting construction supervision on site and, at each critical stage

of the construction of on-going work which was inspected by Construction Supervisor of MOET who was informed in advance. More over, the Construction Supervisor of MOET will monitor the sites at a pace of twice a month in order to observe the work progress and construction quality (workmanship), etc. MOET adopts the construction methods in view of the level of construction ability and skills of the local contractors and generally there seems to be no problem for the local contractors to construct within the construction period using technological know-how and with acceptable quality. However, the following risks may be assumed during the progress of the work if local contractors execute the entire construction works by themselves.

1. Shortage of the construction materials and equipment and poor arrangement of the procurement would become an element to hinder progress of the construction schedule caused by limited quantities of the construction materials and equipment which are being distributed and available in Lesotho.

2. As to the quantity and quality of workers engaged in building construction in Lesotho, workers for internal finishing works are in short supply and level of workmanship is also quite low. Therefore, once the Project progresses to the internal finishing works stage, the progress of work will be slowed down, which may affect the completion of the Project as scheduled.

Therefore, it is necessary for the Japanese construction company to take the following countermeasures in order to avoid such risks.

1. By managing construction work and scheduling thereof by the Japanese construction company, procurement of building materials and equipment shall be planned and arranged well in advance. It is also necessary to prepare various corrective and/or emergency measures for unforeseen happenings.

2. As to the continuous procurement of necessary numbers of skilled workers, procurement from neighboring countries such as South Africa should be considered in addition to procurement in Lesotho. And, in order to facilitate procurement of workers, it is necessary to prepare for their entry into Lesotho without any problems.

In this Project, for the reasons being mentioned above, local construction method shall be adopted as much as possible and the facilities shall be planned in order that local engineers and workers are able for construction. And, considering of the above-mentioned risks, the construction plan shall be made so that the local sub-contractors under the supervision of the Japanese contractor are able to implement the project by securing necessary skilled workers and also by effectively procuring the construction materials and equipment smoothly and promptly during the progress of each construction work

List of the local contractors having performance records of the construction of primary schools is included in the Appendix at the back of this report.

**(7) Considerations to administrative and maintenance competency of the Implementing Organization**

In order to reduce burdens on maintenance, structures and finishes showing high durability and weather resistance should be adopted. Moreover, the design of facilities should aim to facilitate maintenance and reduce costs.

**(8) Considerations to the grade of facilities**

The contents of this Project are construction of the primary schools and procurement of school furniture. Specifications and grades of facilities should be planned to facilitate the construction and the maintenance of facilities. In planning, the MOET Standard can be used as reference, with some improvements in specifications and grades.

**(9) Considerations to the construction period**

In order to complete the Project within the implementation period of Japan's Grant Aid scheme, it is important to make an appropriate construction schedule by taking into account factors that may affect the construction period. To implement efficient construction in this Project, it is necessary to organize construction teams appropriately, and 17 school sites should be divided into groups based on the construction process and geographical distribution.

This project requires 12 months of construction period due to the following reasons:

(1) The target sites (17 school sites) are scattered in Maseru and Berea.
(2) The number of classrooms per school is about 13 on average (7 classrooms at the minimum and 24 classrooms at the maximum).
(3) Due to cost-reduction purposes and local working conditions, construction work will be carried out step-by-step. Therefore, a longer construction period is required compared to the case where construction starts at all the sites simultaneously.

### 2-2-2 Basic Plan

#### (1) Facility planning

##### a. Site layout

As the 17 school sites of this Project have various configurations, uniform site layout planning cannot be applied. Taking characteristics and conditions of each site into account, site layout planning should be carried out properly according to the following basic principles:

1) Based on substantial understanding of the characteristics of each site, a layout of Classroom buildings and Pit Latrines should be determined respectively.

2) In order to secure satisfactory natural ventilation, natural lighting, and noise prevention throughout the year, distance between adjacent buildings and the orientation of buildings should be determined. In particular, in order to secure natural lighting during winter, windows should face to the north as practically possible.

3) Based on the water supply plan at each site, layout of water supply facilities should be planned in relation to each Pit Latrine. Especially at a school site where water supply from a well is planned, it is necessary to consider a difference of level at the site as well as the distance from other facilities in site layout planning.

4) At a school site having a steep slope, facilities should be placed on leveled ground as practically possible using least excavation.

5) Taking the surroundings and neighboring facilities into account, a comfortable educational environment and interior environment should be secured.

6) In a site layout plan, a space for a playground should be secured as large as possible.

7) When a site has enough extra spaces, a layout plan should allow for an extension of buildings in the future.

8) Pit Latrines should be placed based on a plan that takes environmental aspects (e.g. odor) and hygienic aspects into account. A layout of Pit Latrines for girls and boys should be planned in order to avoid facing each other at the entrance. And for the girls, especially, the entrance should be positioned so that they are

not to be hidden from teachers in classroom buildings. This allows teachers to keep an eye on all students.

9) In site layout planning, a flow line of students coming to school should be considered.

10) In site layout planning, it is necessary to consider an extra space for construction work and stockyard with a view of improving work efficiency.

11) It is necessary in site layout planning to lessen the burden on the Lesotho side, such as leveling work and demolition work of existing buildings and structures.

Layout plans for each site are shown in Appendix 9.

**b. Architectural plan**

(a) Floor plan

The floor planning should be based on the above-mentioned site layout plan, calculated floor area of each room, and functions of each room, together with consideration of the MOET Standard that have been applied to the local school construction. Moreover, the following points should be taken into account when planning:

(i) In order to improve flexibility in floor planning, reduce costs, and streamline construction works, standardization of space is essential. Therefore, it is necessary to fully consider a module to be used as a base (standard unit size) as well as how to combine these modules. Based on the MOET Standard, a module of each room and a standard size of economical span will be discussed, in order to make a module in floor planning. For Classrooms building, a standard span should be 1.6m x 1.6m; while for Pit Latrines, it should be 1.1m x 1.4m.

(ii) In floor planning of Classroom building, a balcony access type will be adopted. Corridors will be an opening type, thus securing ventilation and natural lighting in a classroom.

(iii) Each classroom has one entrance to which a usual swing-in type door will be installed, so that students can take lessons leaving the door open all the time except winter.

(iv) Administrative offices, which are located in another building in the MOET Standard, will be combined with the Classroom building in this Project so

as to enable reduction in overall construction costs, as the number of buildings will be less.

(v) Materials procured locally or from a neighboring third country should mainly be used. Moreover, the planning should take local climate and culture into account so as to facilitate maintenance, and effectively reduce maintenance and operation costs as practically possible.

Prototype drawings and site layout plans are shown in Appendix 8 and 9.

(b) Sectional planning

(i) One Classroom building style is one-story building and another one is two-story building. A basic section will be a pitched roof with timber truss construction.

(ii) Considering the rainfall in the said region and the ground condition with many rocks, the first floor level should be GL+200mm, which is very close to the surrounding ground level.

(iii) The height of ceiling should not be less than 2.88m considering natural ventilation and lighting.

(iv) In order to prevent the direct sunrays and the sound of raindrops from the roof, an insulation board will be installed under roof purlines.

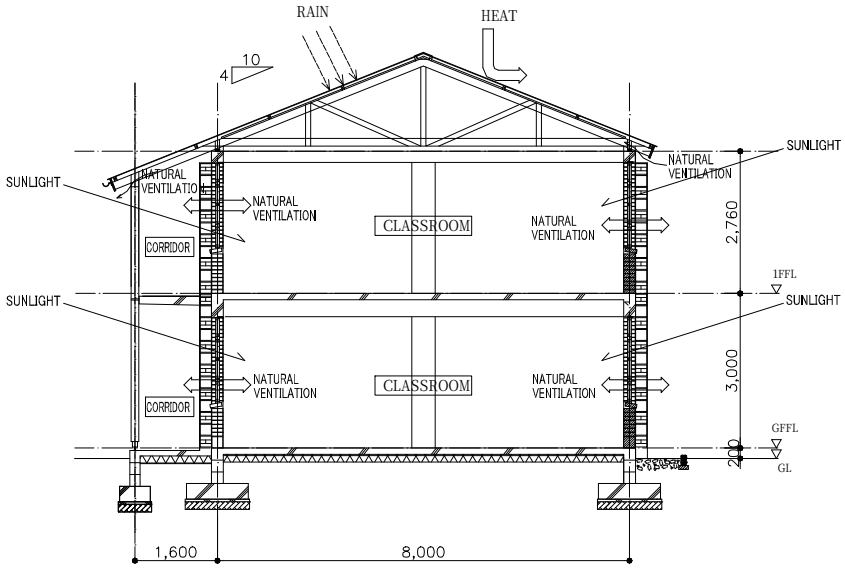



Fig. 2-14 Cross-Section

(c) Structural planning

As for the structural design for this Project, the MOET standard should be studied and reviewed, and the economical and durable structure, including roof structure should be adopted, while considering the local circumstances. Major conditions for designing are shown herein below:

1) Standards for structural design

In Lesotho, "Building Control (Building Operations and Building Design and Construction) Regulations 1999" was established in 1999, which was based on the Building Control Act established in 1995. Application for construction should be made based on the said Regulations. The Regulations are relatively soft and loose and not strictly adhered to, though.

As standards for materials and tests, the South African Standard issued by SABS (the South African Bureau of Standard) has been applied.

These standards in Lesotho and South Africa will be basically used for the Project, with reference to the standards of the Architectural Institute of Japan if necessary.

2) Geological condition and Foundation

The 17 target school sites are scattered around in Maseru and Berea, with a slight difference in the ground condition. According to the results of re-entrusted test pit digging at the site, the ground has sufficient bearing capacity (9 to 65t/$m^2$ or more when rocks exist) to support buildings (mainly two-story buildings) in this Project. Therefore, this Project shall adopt reinforced concrete spread foundation (continuous footing). The results of Trial Digging and Soil Penetration Test for each school site are included at the back of this report as APPENDIX.

3) Design load

Dead load is applied as long-term load, whereas wind pressure is applied as short-term load, without considerations to seismic load as there is no record of earthquakes in Lesotho.

4) Methods and Materials

In this Project, one-story or two-stories buildings will be constructed in accordance with a conventional construction method, that is, reinforced

concrete block work (partly brick work), which is a common and economical structural method. The following materials will be used:

| | |
|---|---|
| Concrete | 25N/mm$^2$ |
| Reinforcing bar | 420N/mm$^2$: $\phi$10 to $\phi$20 |
| | 400N/mm$^2$: $\phi$25 |
| Timber | Pinewoods grown in South Africa |

**c. Water supply planning**

(a) Adequacy of water supply facility

Currently, most of the schools in Lesotho have no water supply system. Nothing is mentioned in the MOET Standard as to such facility other than rainwater collection facility. The medium term plan of FPE programme, which started in 2000, advocates supply of safe water, although its concrete steps have never been clarified.

The results on sanitary conditions survey in the existing schools in the surrounding area points out the following outcomes:

(i) In a school without water supply facility, children bring water from their home or springs for drinking.
→ This means that they need water in school.

(ii) There were two schools that had an incidence of waterborne diseases. Both had no water supply facility, and used water from children's home or springs.
→ When there is no water supply facility, a school's sanitary condition is not appropriate.

(iii) The schools which do not make efforts to educate the children to practice washing hands, which is the basics of sanitary education, do not have water supply facility.
→ If water supply facilities exists, it would facilitate the children to make it a habit of washing their hands.

Considering the above factors, it is judged quite important to include the establishment of the water supply facility in schools in order to secure safe water and to improve sanitary and hygienic conditions.

(b) Unit water consumption

The unit water consumption for schools has not been set because the standard specification of school facilities do not include water supply facility. Water And Sewerage Authority (WASA) has not set the unit water consumption for schools, either. The Department of Rural Water Supply (DRWS) describes in their design criteria that the unit water consumption for the schools shall be 2 L/student/day. The value has been set based on the data, which is obtained through monitoring the actual consumption of the existing schools. The results in existing project of "The Water Supply and Sanitation Project for Primary Schools" also indicate similar value. Therefore, the value of 2L/student/day will be adopted in this Project.

(c) Water demand

The water demand in each target school is calculated by multiplying the unit water consumption by the number of children. The number of children of each school was calculated in the Section 2-1-1 "Basic policy" of this report. The water demand in each target school is listed in the Table 2-13.

Table 2–13 Water Demand of Each Target School

| No | Name of School | Number of Students | Demand (L/day) | No | Name of School | Number of Students | Demand (L/day) |
|---|---|---|---|---|---|---|---|
| 1 | Mahlabatheng | 650 | 1300 | 11 | Leqele | 950 | 1900 |
| 2 | Lihaseng | 750 | 1500 | 12 | Mabote | 1200 | 2400 |
| 3 | Ha Tlhakanelo | 350 | 700 | 13 | Ntjabane | 550 | 1100 |
| 4 | Sowe | -- | -- | 14 | Ha Mpiti | 350 | 700 |
| 5 | Senyotong | 500 | 1000 | 15 | Ramaqhanyane | 650 | 1300 |
| 6 | Maseru East | 750 | 1500 | 16 | Semphatenyane | 1050 | 2100 |
| 7 | Khubelu | -- | -- | 17 | Abia | 750 | 1500 |
| 8 | Thetsane | 500 | 1000 | 18 | Tsolo | 550 | 1100 |
| 9 | Likotsi | -- | -- | 19 | Lenono | 350 | 700 |
| 10 | Maseqobela | 600 | 1200 | 20 | Lancers Gap | 1000 | 2000 |

(d) Discussion of the water sources

As the flow chart illustrates in Fig. 2-15, in the school sites where city water by WASA is not available, well drilling was conducted during the field survey 2. When the well drilling is unsuccessful, DRWS's water supply facilities or other alternative water sources shall be used.

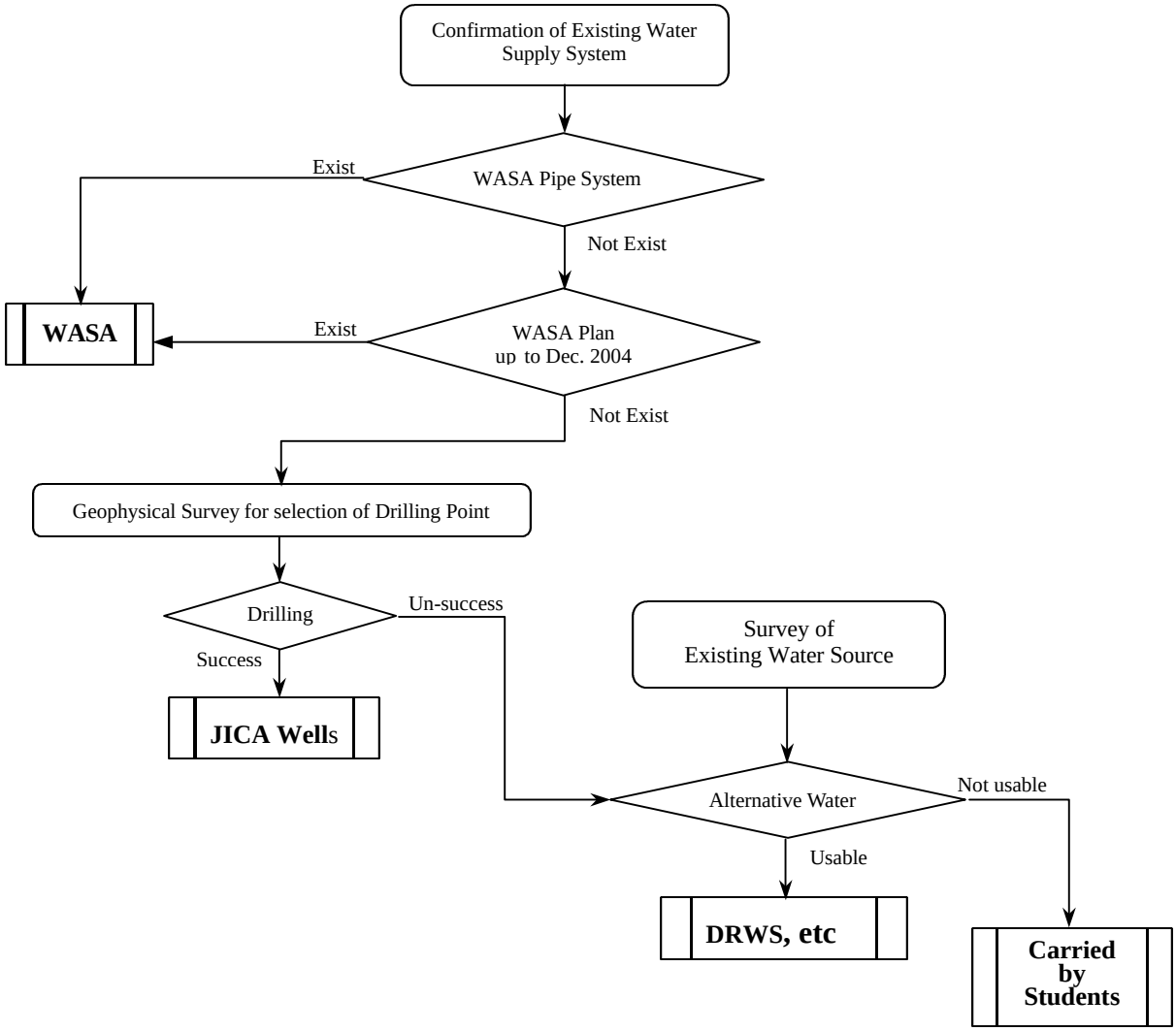



Fig. 2-15 Flowchart of the Water Source Selection

1) The sites where water supply systems are available

The following 10 sites will be covered by WASA's water supply systems according to the future plan until the end of 2004.

| | |
|---|---|
| Covered as of May 2003: | No.6 Maseru East, No.12 Mabote, No.16 Senpeteyane, No.17 Abia |
| Covered by the end of 2003: | No.4 Sowe, No.7 Khuberu, No.11 Leqele |
| Covered by the end of 2004: | No.8 Thetsane, No.13 Ha Ntjabane, No.18 Tsolo. |

2) Test well drilling

i) Selection of well drilling points

In the ten sites where WASA's water supply system was not available, test well drilling was carried out. Groundwater in Lesotho occurs at fissures or

fault fracture zones. In the target areas, sandstone and siltstone without cracks that were formed in Jurassic are distributed horizontally. Because of low permeability of these rocks, finding cracks that retain ground water is very difficult. On the other hand, many amount of intrusive dolerite is found in the target areas. Many cracks tend to be formed around the intrusive dolerite when the intrusion occurs. Such crack fissures become the aquifer. Three features of dolerite are as the follows;

- Dolerite is stronger than the surrounding sedimentary rocks.
- It is magnetic.
- In many cases, it intrudes almost vertically in the shape of a sheet.

As a result of the above features, it is easy to find dolerite from land features. Also, the location of dolerite can be identified accurately by using a magnetometer. Taking these into consideration, well drilling points were decided by the results of aerial photograph analysis and geophysical exploration. The numbers of geophysical exploration stations are shown in Table 2-14.

Table 2-14 Stations of the Geophysical Survey

| | Method of Survey | Stations (line/site) | Number of Sites | Total |
|---|---|---|---|---|
| 1 | Magnetic Horizontal Survey (Magnetometer) | 3 | 10 | 30 |
| 2 | Electric Horizontal Survey (Wenner Method) | 3 | 10 | 30 |
| 3 | Electric Vertical Survey (Schlumberger Method) | 6 | 10 | 60 |

ii) Test well drilling

Test well was drilled at the points decided through geophysical exploration. The locations of test well were shown in the planning chart of well location in the end of this report. The Table 2-15 describes the specification of the test well.

Table 2-15 Specification of the Test Well

| Items | Description | |
|---|---|---|
| Drilling Site | 10 Sites (results are described in Table 2－16) | |
| Criteria for Successful Borehole | The well capable to supply more than the amount of demand by the 4 hours pumping. In case, the first well has no capacity, the second well shall be drilled. | Demand= N * U / T (l/hour)<br>where N : Number of Students<br>U: Unit Water Consumption (2 liter/student/day)<br>T: Operation time per day (4 hours) |
| Drilling Depth | Approximately less than 100m | |
| Final Drilling Diameter | 8-1/2 inches | |
| Casing Diameter | 6 inches | |
| Borehole Test | Geophysical Logging | Spontaneous・Resistivity (Long & Short Normal)・Gamma ray |
| | Pumping Test | Step Draw down, Constant・Recovery |

As the result of drilling according to the above specification, drilling failed in 5 sites at the first location, but was successful in the second location in those sites. At the end, successful wells were obtained in all 10 sites. The results of test well drilling were shown in Table 2-16 and Appendix 12. The column diagram is at the end of this report.

Table 2-16 Results of the Test Well Drilling

| No. | Name of School | Number | Drilling Depth (m) | Static Water Level (m) | Water Yield (l/sec) | Max. Number of students using well | Estimated Number of Students | Judgment |
|---|---|---|---|---|---|---|---|---|
| 1 | Mahlabatheng | 1-1 | 110 | 55.00 | --- | --- | --- | Un-successful |
| | | 1-2 | 51 | 7.65 | **0.40** | 2880 | 650 | Successful |
| 2 | Lihaseng | 2-1 | 101 | 31.15 | **0.18** | 1296 | 750 | Successful |
| | | 2-2 | 91 | 27.17 | --- | --- | --- | Un-successful |
| 3 | Tlhakanelo | 3-1 | 100 | 95.30 | --- | --- | --- | Un-successful |
| | | 3-2 | 91 | 46.14 | **0.67** | 4824 | 350 | Successful |
| 5 | Senyotong | 5-1 | 101 | 23.23 | **0.40** | 2880 | 500 | Successful |
| 9 | Likotsi | 9-1 | 90 | --- | --- | --- | --- | Un-successful |
| | | 9-2 | 61 | 30.29 | **0.60** | 4320 | 0 | Successful |
| 10 | Maseqobela | 10-1 | 61 | 11.31 | **0.25** | 1800 | 600 | Successful |
| 14 | Ha Mpiti | 14-1 | 101 | --- | --- | --- | --- | Un-successful |
| | | 14-2 | 96 | 19.30 | **0.15** | 1080 | 350 | Successful |
| 15 | Ramaqhanyane | 15-1 | 61 | 32.00 | **0.40** | 2880 | 650 | Successful |
| 19 | Lenono | 19-1 | 81 | 18.57 | **0.40** | 2880 | 350 | Successful |
| 20 | Lancers Gap | 20-1 | 61 | 27.14 | **3.50** | 25200 | 1000 | Successful |

* "Max. Number of students using well" is calculated by the unit water consumption of 2 (l/day/student)

iii) Pumping tests

The yield of each test well is decided through conducting pumping tests. Pumping tests were conducted as to the four items shown in the Table 2-17.

Table 2-17 Outline of the Pumping Test

| Test Items | Contents of Test | Objectives |
|---|---|---|
| Provisional Test | Provisional pumping by the different rates. Draw down of the water level shall also be measured. | to decide the pumping rates of step draw-down test |
| Step Draw-down Test | The test shall be run by different pumping rate. | to determine the yield. |
| Constant Discharge Test | Continues 12 hours pumping by the rate determined by the step draw down test. | to estimate the aquifer constants |
| Recovery Test | The test starts immediately on completion of constant discharge test until the water level return to its static water level. | to estimate the aquifer constants |

Table 2-18 shows a list of the yield and specific capacity calculated from the result of pumping tests, and the groundwater level when pumping by a hand pump (pump discharge: 0.17 L /sec=10.2 L /min), which is roughly estimated from the specific capacity.

Table 2-18 Results of Pumping Tests

| No. | Name of School | Drilling Depth (m) | Static Water Level (m) | Yield (l/sec) | Specific Capacity (l/min/m) | Draw-down by hand pump operation (m) | Draw-down water level (m) |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | D=10.2/C | A+D |
| 1 | Mahlabatheng | 51 | 7.65 | **0.4** | 5.50 | 1.80 | 9.45 |
| 2 | Lihaseng | 101 | 31.15 | **0.18** | 0.64 | 15.9 | 47.05 |
| 3 | Tlhakanelo | 91 | 46.14 | **0.67** | 2.12 | 4.80 | 50.94 |
| 5 | Senyotong | 101 | 23.23 | **0.4** | 2.01 | 5.07 | 28.30 |
| 9 | Likotsi | 61 | 30.29 | **0.6** | 2.45 | 4.16 | 34.45 |
| 10 | Maseqobela | 61 | 11.31 | **0.25** | 1.23 | 8.29 | 19.60 |
| 14 | Ha Mpiti | 96 | 19.30 | **0.15** | 1.04 | 9.80 | 29.10 |
| 15 | Ramaqhanyane | 61 | 32.00 | **0.4** | 4.45 | 2.24 | 34.24 |
| 19 | Lenono | 81 | 18.57 | **0.4** | 1.16 | 8.80 | 27.37 |
| 20 | Lancers Gap | 61 | 27.14 | **3.5** | 18.5 | 0.55 | 27.69 |

3) Existing water sources

Existing water sources were surveyed in order to determine alternative water source in case the yield of test well is not enough, and to grasp the ground water conditions around the target sites. The results are shown in the Table 2-19.

Table 2-19 Results of Existing Water Source Survey

| № | Name of School | Sample Number | Type of Water Source | Type of System | Distance to the Site (m) | Quantity of water (l/sec) | Developer | Temp. (℃) | pH | EC ( /㎝) | Taste | Color |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mahlabatheng | S1-1 | Spring | Water Point | 400 | 0.035 | DRWS | 19.0 | 7.2 | 165 | Slightly Soure | Shallow White |
| 2 | Lihaseng | S2-1 | Spring | Gravity | 600 | 0.34 | DRWS | 17.9 | 7.0 | 50 | Good | Non |
| | | S2-2 | Well | Hand Pump | 600 | 0.1 - 0.2 | DRWS | 25.0 | 7.7 | 465 | Good | Non |
| 3 | Ha Tlhakanelo | S3-1 | Well | Motor Pump | 300 | >0.3 | DRWS | 17.5 | 7.8 | 320 | Good | Non |
| 5 | Senyotong | S5-1 | Spring | Gravity | 0 | 0.13 | DRWS | 20.4 | 8.2 | 55 | Very good | Non |
| 9 | Likotsi | S9-2 | Well | Hand Pump | 1200 | >0.2 | DRWS | 22.4 | 7.4 | 460 | Good | Non |
| 10 | Maseqobela | S10-1 | Well | Motor Pump | 200 | 1.0 | DRWS | 19.5 | 8.1 | 475 | Good | Non |
| 14 | Ha Mpiti | S14-1 | Spring | No facility | 0 | 0.02 | ---- | 19.6 | 7.7 | 245 | Fair | Shallow White |
| | | S14-2 | Spring | Wind Meal (Broken) | 800 | 0.34 | DRWS | 17.0 | 7.9 | 90 | Very good | Non |
| 15 | Ramaqhanyane | S15-1 | Well | Hand Pump | 300 | Seasonal | DRWS | 20.3 | 8.0 | 295 | Iron | Non |
| | | S15-3 | River | No Facility | 150 | Seasonal | ---- | 20.0 | 9.1 | 260 | Fair | Non |
| 19 | Lenono | S19-1 | Well | Hand Pump | 200 | >0.2 | DRWS | 21.2 | 6.6 | 80 | Good | Non |

Most of the existing water resource facilities were constructed by DRWS, but many of them are unsuitable as alternative water sources in terms of the amount of water. However, since well drilling was successful in the all ten target sites during the field survey 2 in this research, it is not necessary to use the alternative water sources. There were no serious problems suspected in terms of water quality, either.

4) Results of water quality test

Water quality test was conducted on the water from the existing water sources and the test wells. The results are shown in Attached Document 8. Regarding the test wells, water quality test was conducted by two testing organizations for the purpose of accuracy. Big differences between the values in some test items are probably due to contamination caused by insufficient cleansing of sample bottle or that caused during the analyzing process. If the cause of contamination is not found in the sites, those values are excluded from the results, regarded as abnormal.

The results generally satisfy the WHO standard. Although analytical values of Cadmium, turbidity, and fluorine is exceeding those of the WHO standard, water which have such results are also regarded as suitable as drinking water in terms of the following reasons:

- Cadmium:
  The WHO standard value is 0.003mg/L. Although values of water from five sites exceed over that of the WHO standard, those are lower than those of the Japanese standard, which is 0.01 mg/L. In this way, such water is determined as suitable for drinking.

- Turbidity:
  The values that exceed the standard were found because the water was collected during the pumping test. Turbidity will be lowered after the wells are used. Thus, there should be no problem to use the water for drinking.

- Fluorine:
  The WHO standard value is 1.5 mg/L. The value of water from Lihaseng exceeds the WHO standard, but not the maximum threshold limit value of 4.0 mg/L in the Drinking Water Standards under the Safe Drinking Water Act by United States Environmental Protection Agency (USEPA). Thus, the water is determined as suitable for drinking.

  The water from the seven wells had positive results for fecal coliform group. Regarding those wells, a system in which ground waters to be pumped up from those wells should be pooled in the reservoir tank, where the water is sterilized using chlorine, should be established. However, the positive values were obtained probably due to the contamination during the period from collection of the water to the analyzing process considering the following two factors. One is that

the fecal coliform group is rarely found in deep wells. The other is that although one testing organization did not find any such bacteria but the other did. Accordingly, test for the fecal coliform group will be conducted again when the well is designed in detail, and hygienic management system is re-discussed based on the results.

The necessary amount of chlorine for sterilization is calculated in the following manners.

- The fecal coliform group is annihilated when the density of free residual chlorine is 0.3 – 0.4 ppm.

- The amount of available chlorine in calcium hypochlorite that is used usually for chlorine sterilization is about 70%.

From these factors, the amount of calcium hypochlorite necessary in 1 ton of water is as follows: 0.4 x 10/7 = 0.57 g.

(e) Discussion on water supply facility

1) Design policy

Standard components of a water supply facility are designed according to the following policies. Detailed facilities are decided considering the water source in each site and allocation of school facilities.

- Twice as much water as the necessary daily amount should be reserved.
- Well should be used at the sites where water cannot be supplied by WASA.
- Hand pumps should be used for the well.
- Pumped water should directly be supplied to a reservoir tank for the purpose of hygienic management.
- Facility should be designed so as to protect it against illegal water connection.

The types of water supply are categorized into three types in terms of conditions of each target site: WASA, gravity system from the well, and wells. The Table 2-20 outlines the water supply facilities, and Fig. 2-16 illustrates the basic design of the facilities.

Table 2-20 Outline of the Water Supply System

| Facility \ Water Supply System | | WASA water supply system | The gravity system from the well | Well |
|---|---|---|---|---|
| Type | | I | II | III |
| Pit latrine | For Student | Connection to the every pit latrine<br>・provide the valve before the tanks at each building, and deliver the water by manual<br>・provide key to the taps and valves | | Without pipe connection<br>・tank is not provided and hand is washed at tap of reservoir tank |
| | For Staff | Connection to the every pit latrine<br>・provide the valve before the tap<br>・provide key to the taps and valves | | Without pipe connection<br>・hand is washed at tap of reservoir tank |

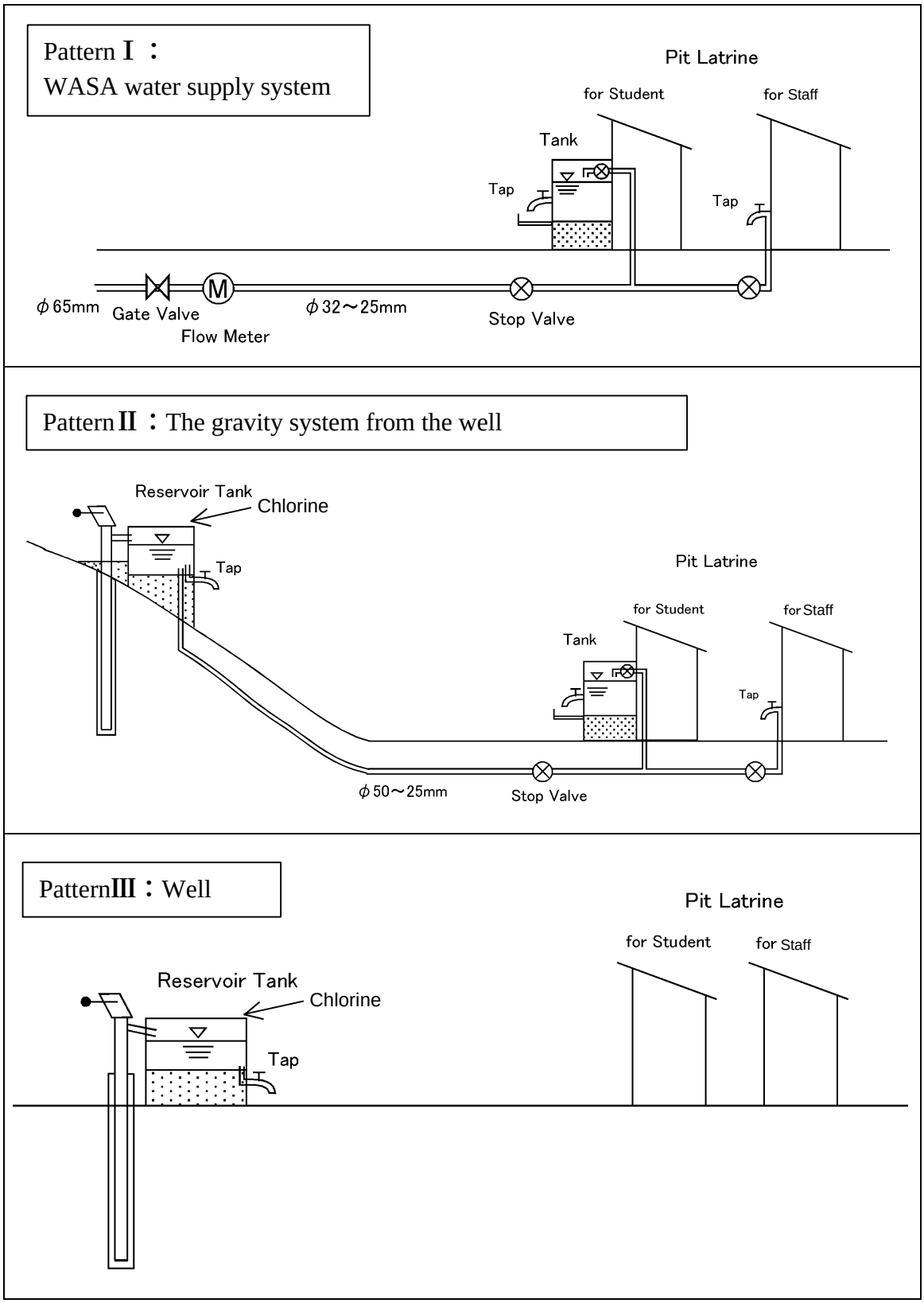



Fig. 2－16　Pattern of Water Supply System

2) Selection of pump

The most common pumps in the region are rotary method HOP and MONO pump, which require experts for maintenance. Available pumps among those designated, as Village Level Operation and Maintenance (VLOM) are Wozamanzi, AFRIDEV and Indian Mk III. Each pump is compared in the Table 2-21. Pumps used in the past project for water supply and sanitation improvement in primary schools were India Mk III, which have already been under the control of the MOE. Five years has past since those pumps were taken over to the MOE in 1997, and 95% of them are still in operation currently. The pumps that are out of order are also able to be repaired. Also in this Project, Indian Mk III will be adopted. This is because using several different types of pumps will lead to a difficulty in consistent maintenance of them, in the point of technical guidance and others.

Table 2-21 Comparison of Hand Pumps

| Type of Hand Pump | Performance | | | Product Country | Authorized VLOM |
|---|---|---|---|---|---|
| | Head (m) | Discharge (L/s) | Max. Head (m) | | |
| HOP4 | 60 | 0.16 | 120 | South Africa | No |
| HOP5 | 60 | 0.21 | 80 | | |
| HOP10 | 45 | 0.28 | 45 | | |
| Wozamanzi | 60 | 0.28 | 80 | South Africa | Yes |
| MONO HP12L | 60 | 0.13 | 60 | South Africa | No |
| MONO HP9M | 60 | 0.12 | 120 | | |
| AFRIDEV | 45 | 0.25 | 45 (80) | South Africa | Yes |
| Indian MkIII VLOM50 | 50 | 0.17 | 60 | South Africa | Yes |

The length of the column pipe will be determined in consideration of the groundwater level, capacity of the well, and performance of the pump. The groundwater level may lower due to pumping, or seasonal changes. Taking these factors into consideration, cylinder of the pump should be placed at the depth where water pumping is possible at all times of the year. The estimated groundwater levels from the results of the pumping test are shown in the Table 2-17. These values are calculated on the assumption that the water is pumped at 0.17 L/sec using Indian Mk III. Using these water levels, the corresponding depth of the cylinder was determined. The Table 2-22 shows the determined length of the column pipe.

Table 2-22 Length of Column Pipe of Hand Pump

| School № | №1 | №2 | №3 | №5 | №9 | №10 | №14 | №15 | №19 | №20 |
|---|---|---|---|---|---|---|---|---|---|---|
| Water Level (m) | 7.65 | 31.15 | 46.14 | 23.23 | 30.29 | 11.31 | 19.30 | 32.00 | 18.57 | 27.14 |
| Draw-Down at Pumping (m) | 9.45 | 47.05 | 50.94 | 28.30 | 34.45 | 19.60 | 29.10 | 34.24 | 27.37 | 27.69 |
| Length of Column Pipe (m) | 40 | 60 | 60 | 50 | 50 | 40 | 50 | 50 | 40 | 50 |

3) Capacity of the tanks

In this Project, in order to use water efficiently, the water will be reserved in the water tanks attached to the Pit latrine. When the water source is a drilled test well, the reservoir tank is constructed next to the hand pump, so that the pumped water is temporarily reserved in it. The capacity of each water tank is determined in the following manners.

i) Capacity of water tank for Pit Latrine

The capacity of the water tank for pit latrine is set in the following way.

Precondition 1: The amount of water used for washing hands per students should be 1 L.

Precondition 2: The amount of water reserved should be more than that of water used in two days.

The amount of water required for a Pit Latrine (Qt):
Qt = 1(L/person/ day) × 6(booth/building) × 30(person/booth)
× 2 =360(L/day/building)

Accordingly, the capacity of the water tank attached to the pit latrine should be determined as 360 L or more. In No.2 Lihaseng, No.5 Senyotong, No.14 Ha Mpiti and No.20 Lancers Gap, no water tank will be attached to the pit latrine because the gravity system will not be available, thus the pit latrine shall be located in the position where the water tap of reservoir tank is convenient to wash their hands. Hands will be washed at the tap of reservoir tank.

ii) Capacity of the reservoir tank

In this Project, the amount of water twice as much as that required per day is determined as the amount of reservoir water for the whole school. Because water tanks attached to the pit latrines retain the amount of water for more than two days' use, the volume of water for more than one day's use is always secured in the tank of pit latrine. Thus, the amount of water for reservoir tank shall be sufficient to keep two days' water demand for miscellaneous use and one day's water demand for washing hands. Therefore the amount of water for reservoir tank shall be determined to be one and a half (1.5) times of the daily water demand as follows.

The capacity of the reservoir tank (Qm):

Qm = (the unit water consumption) × (number of children) × 1.5
=2× (350 to 650) × 1.5 = 1050 to 1950 L

As mentioned in i) in the preceding page, the school sites No.2 Lihaseng, No.5 Senyotong, No.14 Ha Mpiti and No.20 Lancers Gap will have only the reservoir tank, but not the water tank attached to the pit latrine. Therefore the capacity of the reservoir tank shall be determined so as to hold the amount of water demand for two days as follows.

The capacity of the reservoir tank for the site No.2, 5, 14, 20 ($Q_{2,5,14,20}$):

$Q_{2,5,14,20}$ = (the unit water consumption) × (number of the children) × 2
= 2.0× (350 to 1000) × 2
= 1400 to 4000 L

The calculated capacity of the reservoir tank for each school is shown in the Table 2-23. Based on the calculated values, the tanks with the capacity of either 2.0 $m^3$ or 4.0 $m^3$ will be adopted as the reservoir tank. When the well is constructed in the higher elevation than the school facilities, the reservoir tank will be connected to the water supply facilities with the gravity flow. Taps are placed on the reservoir tank in order for several children to use water at the same time. The following three types of tanks are adopted as the reservoir tank. (See 2-2-3Basic Design Drawings)

Type A: This is suitable for gravity flow water supply system, and has the capacity of 2.0 $m^3$.
Type B: This reservoir tank is independent, and has the capacity of 2.0 $m^3$.
Type C: This reservoir tank is independent, and has the capacity of 4.0$m^3$.

Table 2-23 Estimated Volume of Reservoir Tank in Each School ($m^3$)

| № | 1 | 2 | 3 | 5 | 10 | 14 | 15 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|
| Name of School | Mahlabatheng | Lihaseng | Ha Tlhakanelo | Senyotong | Maseqobela | Ha Mpiti | Ramaqhanyane | Lenono | Lancers Gap |
| Number of Students | 650 | 750 | 350 | 500 | 600 | 350 | 650 | 350 | 1000 |
| Estimated Volume | 1.95 | 3.00 | 1.05 | 2.00 | 1.80 | 1.40 | 1.95 | 1.05 | 4.00 |
| Type of Reservoir Tank | Type A (2.0$m^3$) | Type C (4.0$m^3$) | Type A (2.0$m^3$) | Type B (2.0$m^3$) | Type A (2.0$m^3$) | Type B (2.0$m^3$) | Type A (2.0$m^3$) | Type A (2.0$m^3$) | Type C (4.0$m^3$) |

(f) Discussion on water supply pipes

Construction of water supply pipes is designed for the school sites where the water supply by WASA will be available and those where the water supply system can be established by using gravity flow of water from the test well. Condition for the construction is that 0.3 L/sec of water is available at the water tap, considering the time to supply the amount of water for one day's use into each water tank attached to pit latrine. Because water will be supplied to the water tank one by one, not to the several water tanks at the same time, the flow rate is calculated with only one stopcock opening for a water tank. As a result, the diameter of the end of the column pipe should be 25mm either when using WASA's water supply system, or using natural gravity flow system. When it is necessary, distributing pipe to each pit latrine shall be the diameter of 32 mm or larger. The outline of a water supply system for each site is shown in the Table 2-24.

Table 2-24 Outline of Water Supply System

| No | Name of School | Water Sources | Type of Reservoir Tank *1 | Pattern of Water Supply System *2 | Pit Latrine |
|---|---|---|---|---|---|
| 1 | Mahlabathen | Well | Type-A | II | 360l×4 |
| 2 | Lihaseng | Well | Type-C | III | -- |
| 3 | Ha Tlhakanelo | Well | Type-A | II | 360l×2 |
| 5 | Senyotong | Well | Type-B | III | -- |
| 6 | Maseru East | WASA | — | I | 360l×4 |
| 8 | Thetsane | WASA | — | I | 360l×2 |
| 10 | Maseqobela | Well | Type-A | II | 360l×4 |
| 11 | Leqele | WASA | — | I | 360l×6 |
| 12 | Mabote | WASA | — | I | 360l×6 |
| 13 | Ha Ntjabane | WASA | — | I | 360l×2 |
| 14 | Ha Mpiti | Well | Type-B | III | -- |
| 15 | Ramaqhanyane | Well | Type-A | II | 360l×4 |
| 16 | Semphetenyane | WASA | — | I | 360l×6 |
| 17 | Abia | WASA | — | I | 360l×4 |
| 18 | Tsolo | WASA | — | I | 360l×2 |
| 19 | Lenono | Well | Type-A | II | 360l×2 |
| 20 | Lancers Gap | Well | Type-C | III | -- |

*1) Type of Reservoir Tank；Type-A: 2.0$m^3$(Gravity System)、Type-B: 2.0$m^3$(Flat land)、Type-C: 4.0$m^3$ (Flat land)

*2) Pattern of Water Supply System; I : WASA Water Supply System
(refer to Fig. 2-16) II: The Gravity System from theWell
III : Well

## d. Sanitary and sewerage system

In order to plan sanitary and sewerage system in conformity to the local situation, a survey on sanitary conditions was conducted to the surrounding schools of the target schools as well as the surrounding residents of the target school. Based on the

results of this survey, with further discussion on the MOET Standard, sanitary and sewerage system was planned while taking the following matters into account.

1) Pit Latrine

The type of lavatory to be adopted is the one recommended by the Urban Sanitation Improved Team in Lesotho. Many existing schools have adopted this type, namely; VIP (Ventilated Improved Pit Latrine) Type. Therefore, it is planned to use a vacuum car owned by WASA for pumping out soil wastes.

2) Toilet bowl

Western style toilet bowls are most common in local schools, though some schools have installed squatting pans. It was confirmed from a hearing survey that some residents felt uncomfortable about squatting style. Therefore, in this Project, western style toilet bowls are adopted. On the other hand, it is difficult for students in lower standards to sit on a toilet seat properly as it is made to the specifications for adults. This is one of the causes for making a toilet bowl dirty, so it is necessary to plan an easy-cleaning toilet bowl with some consideration of the height of a toilet seat.

In Lesotho, paper has been used for wiping. A piece of newspaper brought by children instead of toilet papers provided at a lavatory/school is usually used in many existing schools. Therefore, it seems too much to include a toilet paper holder in this project. Thus, according to the MOET Standard, a bench-type counter will be installed at the rear of a toilet seat.

3) Rainwater drainage

Most existing schools have installed a rainwater storage tank that has been included in the MOET Standard. Rainwater is mainly used in a farm or for washing hands; however, at some schools with no water supply facilities, it is used for drinking.

In this Project, a rainwater tank will not be installed although eaves gutters to collect raindrops and down pipes to discharge rainwater will be installed at corridor side of the roof for each Classroom building, as the water supply facilities are provided for each school site. As for the rainwater drain for other facilities including the other side of the Classroom buildings where no gutters are installed, crushed stones will be laid to a place where raindrops fall (directly below the eaves around facilities)

4) Waste drainage

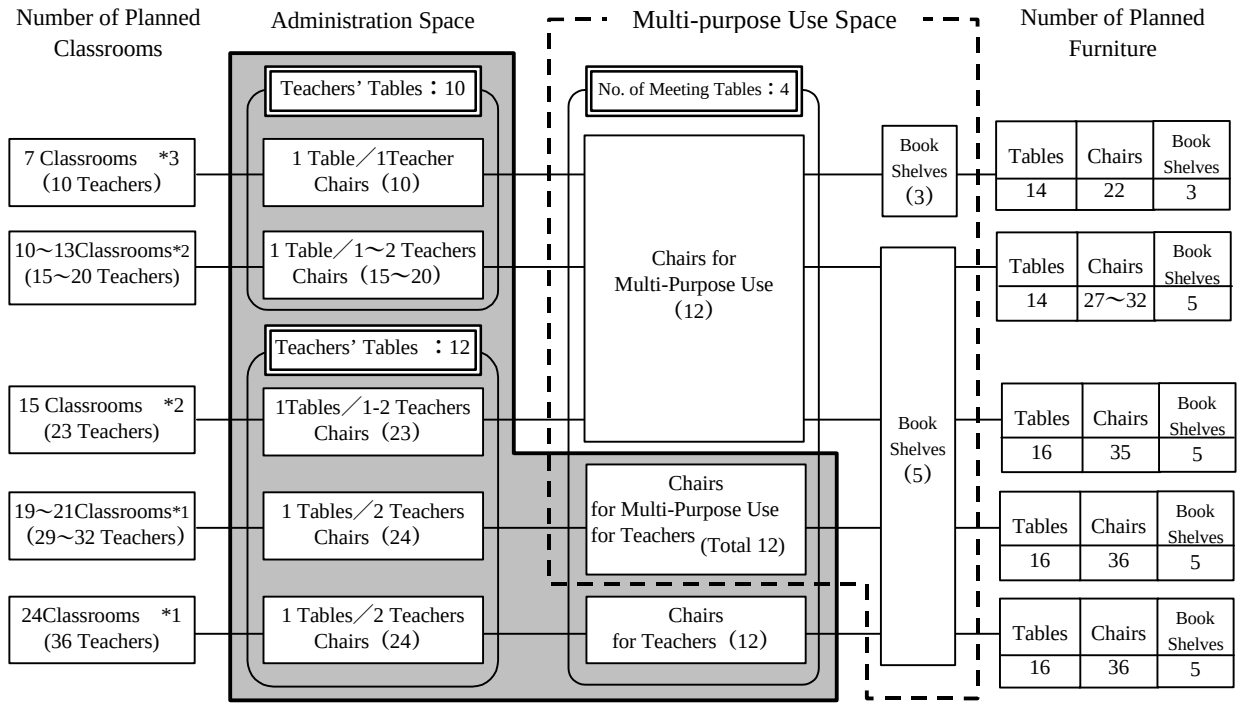
Except in urban areas, untreated wastewater has been discharged from houses in the surrounding areas. In order to maintain a good sanitary environment at school, the waste drainage system with appropriate soak pit is planned in this Project.

**e. Furniture**

Requests described in the M/D (27 February 2003) include desks and chairs (both for students and teachers) for classrooms, as well as desks, chairs, and cabinets for a staff room and a headmaster's room. These furniture are indispensable for school education; however, it is difficult to secure a national budget for these items as the quantity is too large. Therefore, it seems appropriate that these furniture should be provided in this Project. The specifications for these furniture should comply with the MOET Standard that has also been applied to the existing schools.

As for desks and chairs for students, a table for group learning combined with a bench will be procured for lower standard students (first and second standards), and an integral unit (a desk with a chair for two children) will be procured for upper standards students (third thru seventh students).

A staff room can be used for multi-purpose, and it may be changed into a classroom in the future when the number of students increases. Taking this into account, meeting tables, chairs, and bookshelves will be procured for a staff room. The number of furnishings for a staff room will be decided according to the number of teachers. A flow chart of the calculation is shown he in below. The bookshelves shall be used mainly as lockers for teachers, and 3 to 8 teachers shall share one bookshelf. The number of teachers is calculated as 'the number of classrooms × 1.5 teachers' (1.5 = the number of official teacher (1) + the expected number of volunteer teacher, etc. (0.5 = half of the number of a official teacher: average number of those in existing schools)).




(*1) Fig. 2－12 The Multi-Purpose Use Layout of a Staff Room＜Case A＞ref.
(*2) Fig. 2－12 The Multi-Purpose Use Layout of a Staff Room＜Case B＞ref.
(*3) Fig. 2－12 The Multi-Purpose Use Layout of a Staff Room＜Case C＞ref.

Fig. 2－17 The Number Calculation Flowchart of Staff Room Furniture

Table 2－25 Furniture List

| Room (Total) | Equipment | Quantity / Room | Total | Size(mm) (W×D×H) | Specification |
|---|---|---|---|---|---|
| Classroom (229) | Students Tables & Benches (2students.) | 25sets | 1,875 Sets | Table:730×600×570 Bench:350mmH | Steel Tube＋MDF (Surfaces Coated by Clear Lacquer) |
| | Students Tables & Benches (2students) | 25sets | 3,850 Sets | 1,200×800×720 (Table Chair One Apparatus) | Steel Tube＋MDF (Surfaces Coated by Clear Lacquer) |
| | Teachers Tables & Chairs | 1set | 229 Sets | Table:1,200×600×720 Bench:500mm (H) | Table: Steel Tube＋MDF Chair: Steel Tube＋Plastic Laminate (Seat & Back Panel with Armrest) |
| Staff Room (17) | Meeting Tables | 14-16No. | 252 No. | 1,800×450×700 | Hard Board＋Steel Tube |
| | Staff Chairs | 22-36No. | 521 No. | Seat:500mm (H) | Steel Tube＋Plastic Laminate (Seat & Back Panel with Armrest) |
| | Meeting Shelves | 3-5No. | 79 No. | 900×400×900 | Wooden/MDF |
| Head Master's Room (17) | Head Masters Tables & Chairs | 1set | 17 Sets | 1,200×600×720 | Table : Steel Tube＋MDF Chair : Steel Tube＋Chipboard, Fabric (Seat & Back Panel with Armrest) |
| | Standard Chairs | 2No. | 34 No. | Seat: 430mm (H) | Steel Tube＋Plastic Laminate (Seat & back Panel) |
| | Filing Cabinets | 2No. | 34 No. | 470×625×1,320 | Metal with Lock |

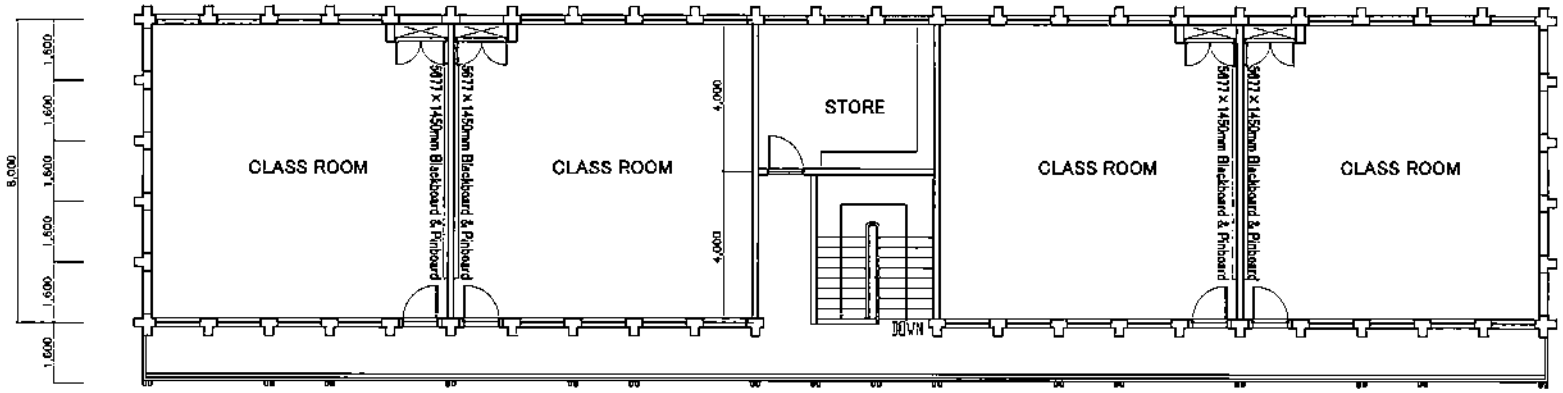
## Table 2—26 Facilites List by site

| | Prototype | Stories | Floor Area (m²) | 1. Mahlabatheng | 2. Lihaseng | 3. Ha Tlhakanelo | 4. Sowe | 5. Senyotong | 6. Maseru East | 7. Khubelu | 8. Thetsane | 9. Likotsi | 10. Maseqobela | 11. Leqele | 12. Mabote | 13. Ha Ntjabane | 14. Ha Mpiti | 15. Ramaqhanyane | 16. Semphetenyane | 17. Abia | 18. Tsolo | 19. Lenono | 20. Lancers Gap | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASSROOM | 3-C | 2 | 514.56 | | | | - | | | - | | - | | 1 | | | | | | | 1 | | 1 | 3 |
| | 3-D | 2 | 552.96 | 1 | | | - | | | - | | - | | 1 | | | | 1 | 1 | | 1 | | 1 | 6 |
| | 4-A | 1 | 307.20 | | | 1 | - | | | - | | - | | | 1 | 2 | 1 | | | | | 1 | | 6 |
| | 4-B | 1 | 353.28 | | | 1 | - | | | - | | - | | | | 1 | 1 | | | | | 1 | | 4 |
| | 4-C | 2 | 668.16 | 1 | 1 | | - | | 1 | - | | - | | 1 | 1 | | | 1 | 2 | 1 | | | 1 | 10 |
| | 4-D | 2 | 706.56 | | 1 | | - | | 1 | - | | - | 1 | | 1 | | | | | 1 | | | | 5 |
| | 5-A | 1 | 384.00 | | | | - | | | - | | - | 1 | | 1 | | | | | | | | | 2 |
| | 5-B | 1 | 430.08 | | | | - | 1 | | - | 1 | - | | | | | | | | | | | | 2 |
| | 6-A | 1 | 460.80 | | | | - | 1 | | - | 1 | - | | | | | | | | | | | | 2 |
| | Number of Classrooms | | | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| | Head Master's Room | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Staff Room | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Store | | | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| | Total Floor Area (m²) | | | 1,221.12 | 1,374.72 | 660.48 | - | 890.88 | 1,374.72 | - | 890.88 | - | 1,090.56 | 1,735.68 | 2,065.92 | 967.68 | 660.48 | 1,221.12 | 1,889.28 | 1,374.72 | 1,067.52 | 660.48 | 1,735.68 | 20,881.92 |
| Projection of Enrollment (A) | (50 Students per Class Room) | | | 650 | 750 | 350 | - | 500 | 750 | - | 500 | - | 600 | 950 | 1200 | 550 | 350 | 650 | 1050 | 750 | 550 | 350 | 950 | 11,450 |
| Type of Latrine | L- I | M (Sd + B) | 21.84 | 2 | 0 | 1 | - | 0 | 2 | - | 1 | - | 2 | 3 | 3 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 0 | 24 |
| Legend | L- II | F (Sd + B) | 21.84 | 2 | 0 | 1 | - | 0 | 2 | - | 1 | - | 2 | 3 | 3 | 1 | 0 | 2 | 3 | 2 | 1 | 1 | 0 | 24 |
| M (Male) | L-III | M (Sd) | 21.84 | 0 | 2 | 0 | - | 1 | 0 | - | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 7 |
| F (Female) | L-IV | F (Sd) | 21.84 | 0 | 2 | 0 | - | 1 | 0 | - | 0 | - | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 7 |
| Sd (Students) | L-S | Sf | 6.72 | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| Sf (Staff) | Total Floor Area (m²) | | | 94.08 | 94.08 | 50.40 | - | 50.40 | 94.08 | - | 50.40 | - | 94.08 | 137.76 | 137.76 | 50.40 | 50.40 | 94.08 | 137.76 | 94.08 | 50.40 | 50.40 | 137.76 | 1,468.32 |
| B (Basin) | | | | | | | | | | | | | | | | | | | | | | | | |
| Latrine Facilites Required | Female : (6/Building) | | | 12 | 12 | 6 | - | 6 | 12 | - | 6 | - | 12 | 18 | 18 | 6 | 6 | 12 | 18 | 12 | 6 | 6 | 18 | 186 |
| | Male Booth : (2/Building) | | | 4 | 4 | 2 | - | 2 | 4 | - | 2 | - | 4 | 6 | 6 | 2 | 2 | 4 | 6 | 4 | 2 | 2 | 6 | 62 |
| | Urinal : (5/Building) | | | 10 | 10 | 5 | - | 5 | 10 | - | 5 | - | 10 | 15 | 15 | 5 | 5 | 10 | 15 | 10 | 5 | 5 | 15 | 155 |
| | Staff : (Male-1, Female-1) | | | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |
| Grand Total Floor Area / per site (m²) | | | | 1,315.20 | 1,468.80 | 710.88 | - | 941.28 | 1,468.80 | - | 941.28 | - | 1,184.64 | 1,873.44 | 2,203.68 | 1,018.08 | 710.88 | 1,315.20 | 2,027.04 | 1,468.80 | 1,117.92 | 710.88 | 1,873.44 | 22,350.24 |
| Water Tank | Type A | 2.0m³ | | 1 | | 1 | - | | | - | | - | 1 | | | | | 1 | | | | 1 | | 5 |
| | Type B | 2.0m³ | | | | | - | 1 | | - | | - | | | | | 1 | | | | | | | 2 |
| | Type C | 4.0m³ | | | 1 | | - | | | - | | - | | | | | | | | | | | 1 | 2 |

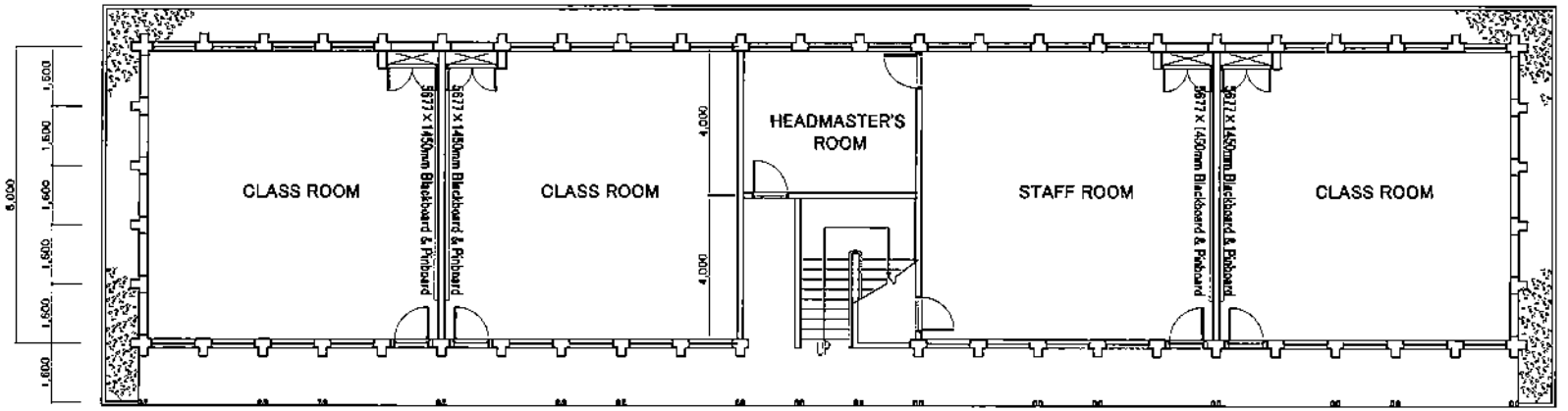
Table 2－27 Furniture List by Site

| | 1. Mahlabatheng | 2. Lihaseng | 3. Ha Tlhakanelo | 4. Sowe | 5. Senyotong | 6. Maseru east | 7. Khubelu | 8. Thetsane | 9. Likotsi | 10. Moseqobela | 11. Leqele | 12. Mabote | 13. Ha Ntjabane | 14. Ha Mpiti | 15. Ramaqhanyane | 16. Semphetenyane | 17. Abia | 18. Tsolo | 19. Lenono | 20. Lancers Gap | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Students' Tables and Benches | 100 | 125 | 50 | - | 100 | 125 | - | 100 | - | 100 | 150 | 200 | 100 | 50 | 100 | 150 | 125 | 100 | 50 | 150 | 1,875 |
| Students' Desks | 225 | 250 | 125 | - | 150 | 250 | - | 150 | - | 200 | 325 | 400 | 175 | 125 | 225 | 375 | 250 | 175 | 125 | 325 | 3,850 |
| Teachers' Tables | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| Teachers' Chairs | 13 | 15 | 7 | - | 10 | 15 | - | 10 | - | 12 | 19 | 24 | 11 | 7 | 13 | 21 | 15 | 11 | 7 | 19 | 229 |
| Meeting Tables | 14 | 16 | 14 | - | 14 | 16 | - | 14 | - | 14 | 16 | 16 | 14 | 14 | 14 | 16 | 16 | 14 | 14 | 16 | 252 |
| Standard Chairs | 32 | 35 | 22 | - | 27 | 35 | - | 27 | - | 30 | 36 | 36 | 29 | 22 | 32 | 36 | 35 | 29 | 22 | 36 | 521 |
| Book Shelves | 5 | 5 | 3 | - | 5 | 5 | - | 5 | - | 5 | 5 | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 3 | 5 | 79 |
| Head Masters Tables | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| Head Masters Chair | 1 | 1 | 1 | - | 1 | 1 | - | 1 | - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 17 |
| Standard Chairs | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |
| Filing Cabinets | 2 | 2 | 2 | - | 2 | 2 | - | 2 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 34 |

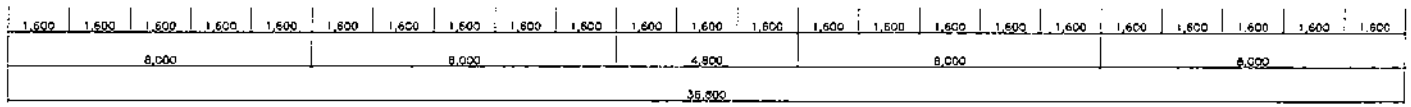
### 2-2-3 Basic Design Drawings



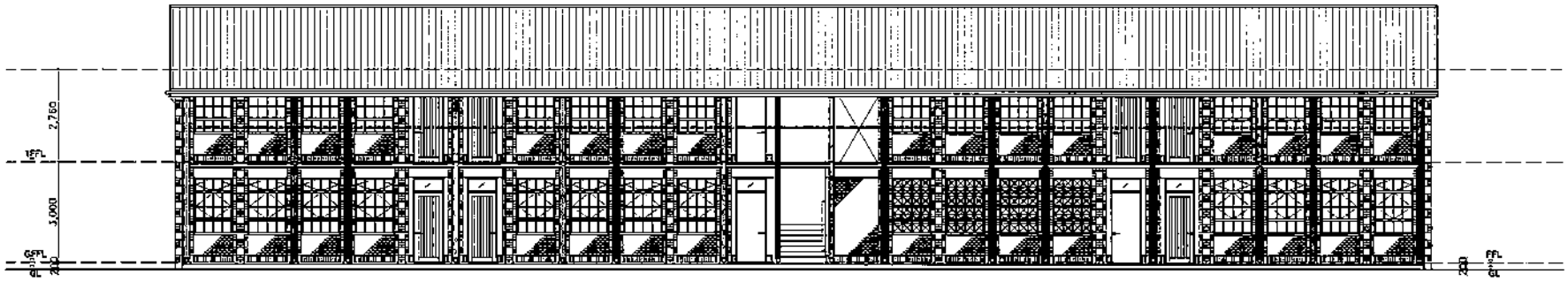

FIRST FLOOR PLAN



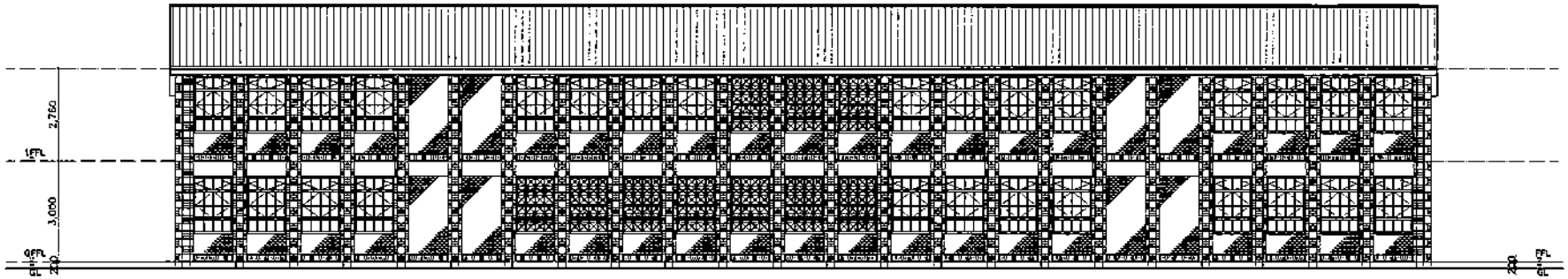

GROUND FLOOR PLAN



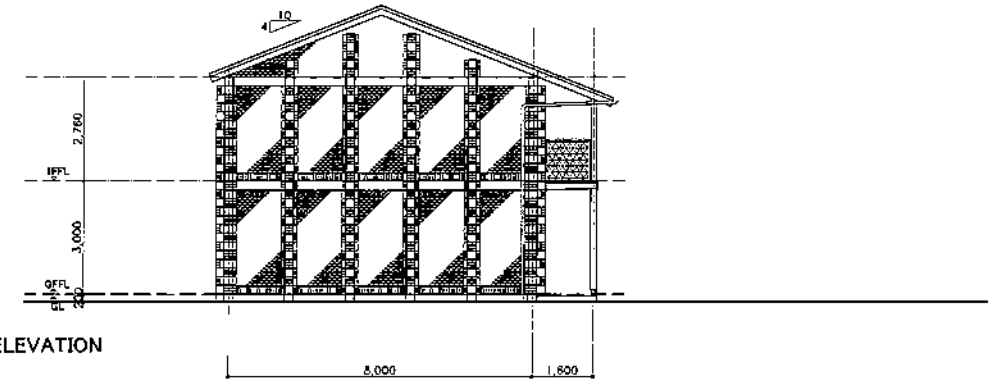

| | DATE | SCALE | DRAWING TITLE. |
|---|---|---|---|
| | JULY ,2003 | 1/200 | PLAN (PROTOTYPE 4-D) |



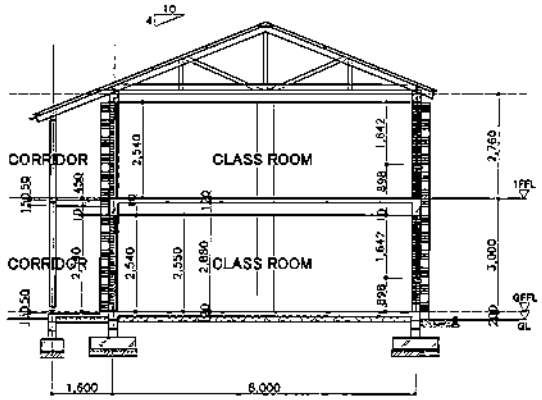

FRONT ELEVATION




REAR ELEVATION

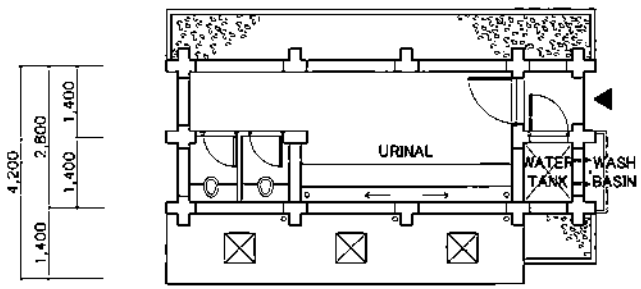



SIDE ELEVATION

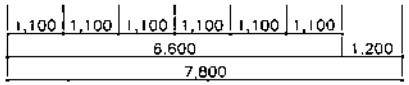



SECTION

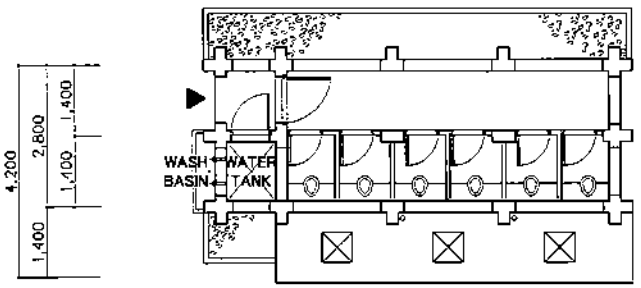
| | DATE | SCALE | DRAWING TITLE. |
|---|---|---|---|
| | JULY ,2003 | 1/200 | ELEVATION & SECTION (PROTOTYPE 4-D) |



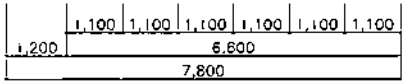

GROUND FLOOR PLAN



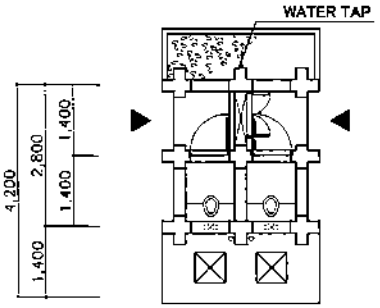

L- I <MALE LATRINE>



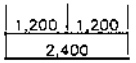

GROUND FLOOR PLAN



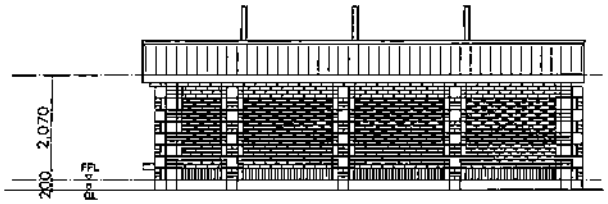

L- II <FEMALE LATRINE>



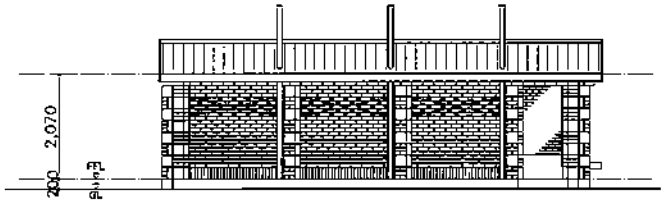

GROUND FLOOR PLAN



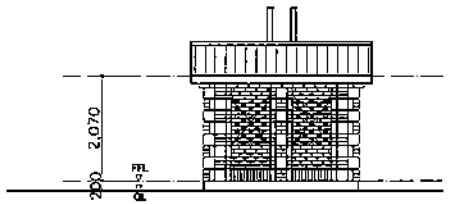

L-S <STAFF LATRINE>



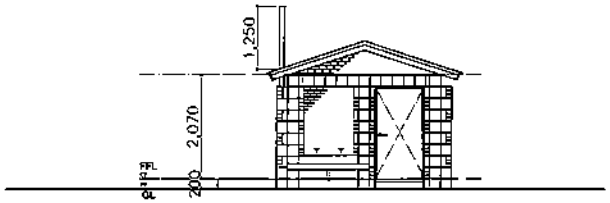

FRONT ELEVATION L- I <MALE LATRINE>



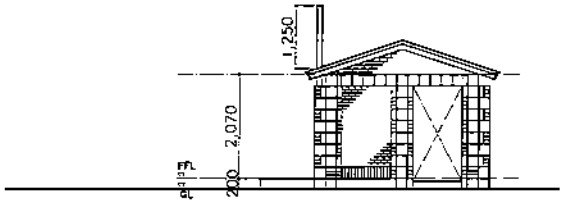

REAR ELEVATION L- I <MALE LATRINE>



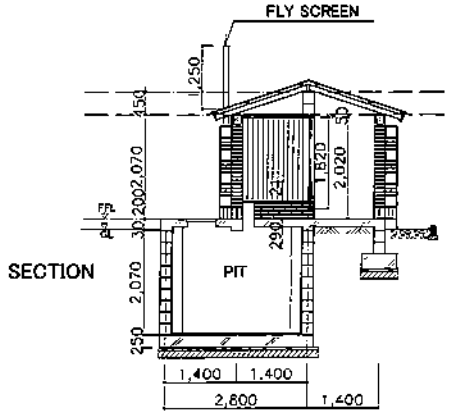

FRONT ELEVATION L-S <STAFF LATRINE>




SIDE ELEVATION L- I <MALE LATRINE>

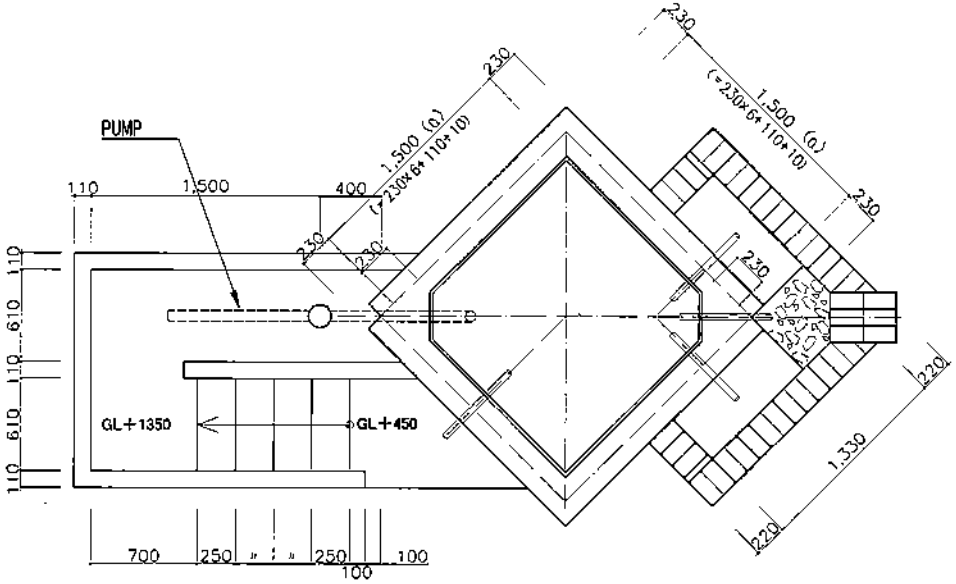



SIDE ELEVATION L-S <STAFF LATRINE>

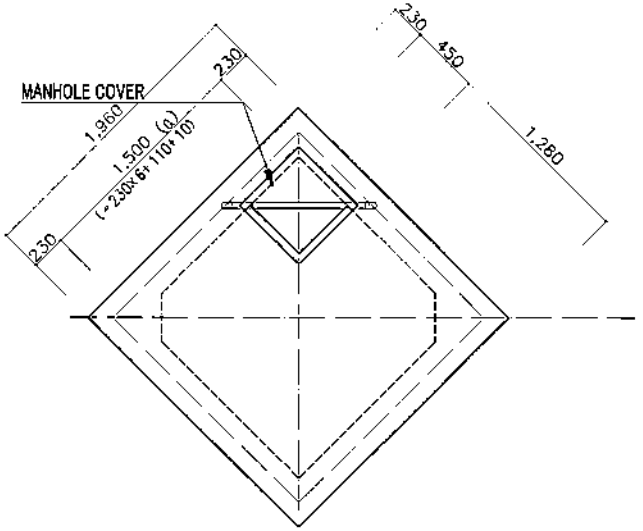



SECTION

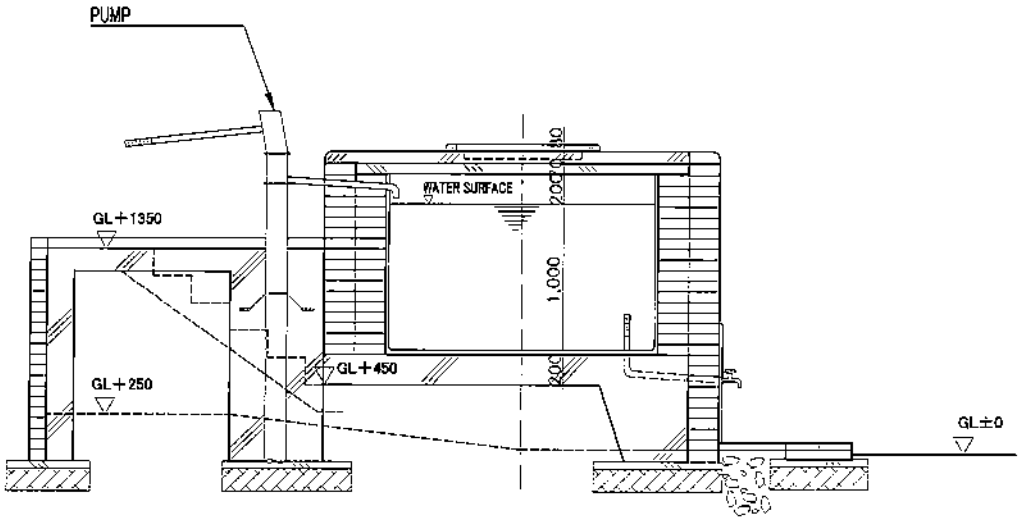
| DATE | SCALE | DRAWING TITLE. |
|---|---|---|
| JULY ,2003 | 1/150 | LATRINE PLAN, ELEVATION & SECTION (PROTOTYPE L-I,L-II,L-S) |




2m³ RESERVOIR TANK GROUND PLAN




2m³ RESERVOIR TANK FLOOR PLAN




2m³ RESERVOIR TANK SECTION

| TYPE | DIMENSION / TANK VOLUME | (a) DIMENSION (mm) | NOTE |
|---|---|---|---|
| A | 2m³ | 1,500 | NATURAL STREAM SYSTEM |
| B | 2m³ | 1,500 | |
| C | 4m³ | 1,960 | |

| DATE | SCALE | DRAWING TITLE |
|---|---|---|
| JULY ,2003 | 1/50 | PLAN & SECTION (RESERVOIR TANK) |

## 2-2-4 Implementation Plan

### 2-2-4-1 Implementation Policy

#### (1) Basic matters concerning the implementation of the Project

This Project would not be implemented until the Japanese competent Organizations examines the Project based on this report and unless the Japanese Cabinet approves it thereafter. Then, after the approval of the Cabinet, the Japanese Government and the Lesotho Government conclude Exchange of Notes (E/N) to implement the Project.

The Project shall be implemented according to the Agreement between Lesotho's Implementing Organization and a Japanese consulting firm and the Contract between the said Organization and a Japanese contractor concluded under the Japan's Grant Aid Scheme. The Japanese Government should verify both Agreement and Contract.

#### (2) System of implementing the Project

Lesotho's Implementing Organization who is responsible for the implementation of this Project is the MOET. Its Planning Unit should be responsible for the actual management of the Project.

The MOET concludes Consulting Services Agreement with a Japanese consulting firm and a Construction Contract with a Japanese contractor. Its Planning Unit and Education Facilities Unit ("EFU") should be responsible for the general supervision of the construction works and the coordination with the consultant and the contractor for the technical maters.

#### (3) Consultant

After the conclusion of E/N between both Governments, the MOET concludes Consulting Services Agreement with a Japanese consulting firm concerning the detailed design and construction supervision of the Project according to the guidelines for Japan's Grant Aid Scheme.

Then, after the Japanese Government verified the Agreement, the consultant should proceed with the preparation of the detailed design drawings and tender documents for the facilities and furniture for the Project based on this Basic Design Study Report prepared through several meetings with the Planning Unit.

And, after receiving approval from the MOET for the detailed design drawings and tender documents, the consultant invites tenders to select a Japanese contractor who will supervise the construction works until the completion of the construction for the Project.

### (4) Contractor

This Project consists of the construction of school facilities (including furniture). The contractor should be selected from among Japanese general contractors being pre-qualified for the Project through open competitive tender. In principle, the right to conclude the construction contract with the MOET would be given to the lowest tender.

After receiving verification for the Construction Contract from the Japanese Government, the contractor should complete the construction works within the term specified in the Contract and hand over the school facilities and furniture to the MOET after completing final inspection.

### (5) Use of local consultants and contractors

Local contractors would participate in the construction works as sub-contractors. Construction works shall be carried out at 17 sites scattered around in Maseru and Berea Districts. Each site will have school facilities of 7 to 24 classrooms with floor area ranging from 710.88$m^2$ to 2,203.68$m^2$. The total floor area including other facilities will exceed 22,350$m^2$. Therefore, it is desirable to divide the construction works among several groups of sub-contractors. In addition, completion of the construction works at the 17 school sites within a specified period requires strict implementation of unified overall construction schedule being prepared for each site and the Project as a whole. Therefore, it is quite important to introduce Japanese construction management skills in addition to recruiting sufficient local skilled workers and analysing effective procurement of building materials.

### (6) Others

The Project in all aspects including construction method should be discussed further between the Lesotho's Implementing Organization and the consultant during the detail design period. And, the scope of works for the Government of Lesotho and the Government of Japan should be clarified through the meetings so as to complete the Project successfully. And, works to be carried out by Lesotho should be implemented as scheduled. In particular, site clearance for all the sites including demolition and removal of existing buildings and structures for some sites should be completed before the commencement of the Project.

## 2-2-4-2 Implementation Conditions

### (1) Local contractors

In Lesotho, there are approximately 25 local contractors that have enough experience in building primary schools according to the MOET standard. Although the size of the local contractors varies from small-scale to large-scale companies, it is not expected to

encounter with any technical problem since this Project adopts standardized specification for the primary schools by use of local materials and ready available imported materials.

### (2) Characteristics of the construction

The characteristic of this Project is to construct primary schools at 17 school sites; including extension at one site. The scale of construction works varies from site to site, ranging from 710.88 $m^2$ to 2,203.68 $m^2$ in floor area. The construction period is estimated to be approx. six (6) months for one-story building and approx. seven (7) months for two-story building. Because local standard construction methods i.e. MOET Standards are adopted, it is not expected to encounter any technical problems. The sites are scattered around in Maseru and Berea Districts; therefore, it is necessary to give consideration to the maintenance of peace and the prevention of theft at each site during the construction period.

1) Draw up a construction schedule where contractor and sub-contractors can efficiently carry out the construction works without any delays at each site located in Maseru or Berea District while maintaining the construction standards and quality at a certain level.
2) Examine the construction methodology and carry out the construction works accordingly at each site while having close coordination with the Planning Unit and EFU of the MOET as well as the local communities.
3) In order to attain equal quality at all sites, the one progressing ahead of the others should be used as the model school as to the general finishing work and various construction details.
4) Investigate the quality and the supply capacity fully beforehand and draw up procurement plan so that various materials could steadily be procured in due-course along with the progress of the construction works at each site.
5) Prior to the commencement of the construction works, the contractor should clarify critical-path on overall construction schedule for the project as a whole as well as on construction schedule for each site and implement the construction works accordingly. For this purpose, the contractor and sub-contractors should hold regular coordination meetings as much as practically possible, thereby, all the persons in charge of the construction management would understand the expected standards for quality and work progress and would raise their consciousness of participation in the Project.

### (3) Construction method

Contractor shall be selected from among Japanese general contractor according to the guidelines for Japan's Grant Aid Scheme. The implementation plan of the Project has been prepared based on the assumption that the selected Japanese contractor would carry

out the whole construction works from the start to the completion. And, the local subcontractors would be selected by taking each contractor's past work records into consideration, especially results of the construction of school buildings being constructed in accordance with MOET Standard.

**(4) Condition of transportation**

The construction sites are located at 17 places in Maseru and Berea Districts. All the sites are approachable by main roads from the center of Maseru City. The road condition is good and seems to cause no problem in regard to transportation. However, because some sites are located quite far from main roads, it is necessary to pay full attention when transporting building materials and construction equipment to such sites.

**(5) Procurement of construction materials**

Although most of the construction materials used for this Project are from neighbouring South Africa except sand and aggregate, and secondary products such as concrete blocks and bricks, many items including cement are on the market in Lesotho. However, because the available quantities of each item may be limited, it shall also be considered possible to import construction materials directly from South Africa considering the deadline for delivery.

As for the procurement of concrete blocks as secondary products, there would not be any problems for procurement as quite a few factories are scattered in and around Maseru and the quality etc thereof are quite similar. And also, the procurement of the bricks would not be problem and there would be no doubt about the production and quality, although only one factory was in operation at the time of survey, the factory is large-scale and well managed.

In addition, it is necessary to reduce the number of items to the minimum so as to procure construction materials of uniform quality efficiently, and at the same time, the consideration shall be given to smooth implementation of the construction works and easy maintenance.

### 2-2-4-3 Scope of Works

The Japanese and Lesotho Governments shall share the construction works as follows:

**(1) Japanese Government**

1) Construction of facilities
   - Construction of school facilities that consist of Classroom Buildings (including Classrooms, Headmaster's room, Staff room, and Store) and Pit Latrines.
   - Water supply facilities including a Reservoir Tanks.

- Desks and chairs for students, teachers and headmasters, bookshelves, meeting tables and filing cabinets.

**(2) Lesotho Government**

1) Demolition and removal of the existing buildings, structures and other obstacles to the commencement of construction works; and site clearance and leveling.

2) Construction of auxiliary facilities, such as landscaping, entrance gates and boundary fences.

3) Preparation of the access road to the construction sites.

4) Installation of city water intake pipes to the construction sites without well.

### 2-2-4-4 Consultant Supervision

**(1) Basic polices and cautions concerning detailed design and supervision**

The consultant that designs facilities and furniture under this Project shall be selected by Lesotho's MOET from among Japanese consulting firms with rich experience in design planning of educational facilities and projects implemented by Grant Aid Scheme. The consultant holds conferences with the Lesotho Government, closely designs facilities and furniture, and prepares tender documents, according to the main purpose of the Basic Design. At the stage of supervision of the construction works, the consultant should assign a resident supervisor who directs the construction companies and liaise with the MOET, its Planning Unit and EFU, schools and other concerned Government Organizations. The details of the consulting services works are as follows:

1) Detailed design

Prepare the tender documents including specifications and detailed drawings for the construction works of the Project.

2) Promotion of construction contract

Decide on the policy for Construction Contract, draft a contract, and evaluate summary and breakdowns of bills of quantities for the construction works and select a contractor through announcement of tender, pre-qualification, evaluation of tenders and contract attendance.

3) Inspection and approval of construction drawings

Check and approve the submittals from contractor for approval, including construction drawings, construction methodologies, materials, samples of finishing and furniture.

4) Direction on construction

Examine the construction methodologies and the construction schedule then direct the contractor accordingly.

5) Report on progress of construction works

Report the progress of construction works to the Lesotho's Implementing Organization and other concerned organizations and hold monthly coordination meetings among parties concerned.

6) Cooperation in procedure for approval of payment

Examine the details of payment request for claims to be paid during and after the construction period and cooperate in carrying out the procedures for approval of the payments.

7) Attendance at inspection

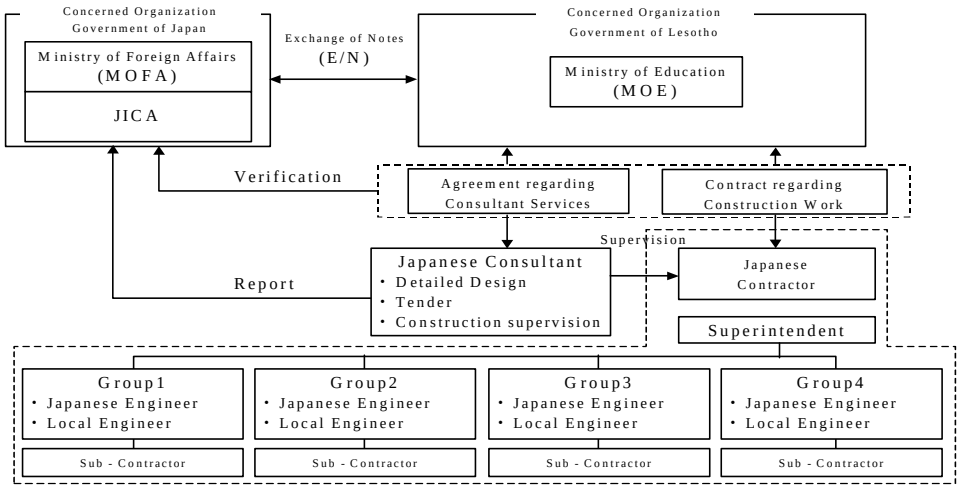
Inspect the on-going works and quality thereof from the commencement and completion of the construction works.

**(2) Supervision system**

It is necessary for the Consultant to give proper directions about the supervision of the workmanship i.e. quality of the work, work progress, safety and so on at each and all construction sites scattered around in Maseru and Berea Districts and to coordinate with local school authorities and concerned municipal and national agencies. In addition, the consultant needs to complete the supervision of construction of the facilities smoothly according to the design documents within the specified period. For these purposes, the Consultant shall assign one Japanese staff member and two (2) local staff members and, when necessary, dispatch the following experts:

| | |
|---|---|
| Expert in building work: | Inspection of the ground conditions; consultation about color scheme, material samples, shop drawings and construction schedule for building work and approval thereof; and final inspection of completed buildings. |

Expert in mechanical work: Consultation about material samples, construction schedule and shop drawings for mechanical work and approval thereof; and final inspection of completed facilities.




## 2-2-4-5 Quality Control Plan

### (1) Detailed design

The detailed design drawings shall be developed based on the studies of actual construction circumstances in Lesotho, maintenance cost, use of local construction materials and local construction methods. In addition, the specification for this Project should comply with Lesotho's Building Control Regulations, and supplemented by SABS and Japanese standard (JIS, JASS, and so on) if necessary.

### (2) Supervision

The consultant should examine the overall implementation plan and construction methodologies for selected major works to be submitted by the contractor prior to the commencement of each stage of the work, and approve them if the construction materials and the execution methods conform to the Specification. The consultant should inspect the works as necessary based on the said implementation plan and construction methodologies.

1) Earth work

According to the soil investigation report, which was made during the Basic Design Study, the grounds of each and all Project sites are in good condition for construction. However, with a consideration of rainy season, temporary storm water drainage plan, curing plan and construction schedule shall be planned carefully.

2) Reinforcing bar work

The consultant should confirm the mill-sheet prepared by the manufacturer and submitted by the contractor. Also bar strength should be inspected to match yield strength in the Specification.

3) Concrete work

Concrete shall be mixed at the construction sites by using concrete mixers. The methods of concrete quality control (inspection items and methods) shall be as follows;

a. Materials for concrete

| Material | Item | Methods |
|---|---|---|
| Sand, Aggregate, | Grading | Sieving |
| Crashed stone | Absolute dry specific gravity | Specific gravity and water absorption test |
| | Alkali-reactivity | Alkali- reactivity test |
| Water | Organic impurity etc. | Water quality test |

b. Trial mix for site-mix concrete

| Item | Method |
|---|---|
| Assumption of compressive strength | Cube/ cylinder test |
| Slump | Slump corn |
| Concrete temperature | Thermometer |
| Air contents | Air pressure gauge |
| Chloride contents | Chloride test paper |

c. Inspection before casting concrete

| Item | Method |
|---|---|
| Time take for mixing and casting | Review log book/ stop watch |
| Slump | Slump corn |
| Concrete Temperature | Thermometer |
| Air contents | Air pressure gauge |

d. Inspection of completed concrete work

| Item | Method |
|---|---|
| Compressive strength for structural concrete | Schmidt hammer |
| Accuracy/ precision (plumb) | Plum bob, measuring tape |
| Accuracy/ precision (floor slab levelness) | Auto level, measuring tape |
| Finish | Visual inspection |

### 2-2-4-6 Procurement Plan

#### (1) Plan for procurement of construction materials

Construction materials shall be procured as shown in Table 2-28 herein below. It is planned that most of the construction materials shall be imported from the neighboring third country (e.g. South Africa) except natural materials, such as sand, gravel and sandstone, and secondary products such as concrete blocks and bricks. This is because products made in South Africa are available at reasonably low price in Lesotho; there are extremely few products made in Lesotho; and the quantity of South Africa products on the market in Lesotho would not be enough for this Project. However, as for cement, because an adequate quantities of cement made in South Africa, are always available on the market in Lesotho and it can be procured locally.

Almost all the construction materials and equipment procured from the third countries including South Africa would be transported from South Africa by truck then imported into Lesotho by passing through the South Africa/Lesotho border. Although the exemption of import duties and taxes would be applicable to the Project which will be funded by Japan's Grant Aid, it is necessary to acquire various approvals of the import documents from the authorities concerned in advance, after completing registration with the International Donor's Association through the Client; MOET in order to be exempt from the due import duties and taxes which require necessary procedures for customs clearance at the border. Detailed procedures are as described hereinafter.

1. Fill out and complete the import documents (Import Entry) then submit it to the Client; MOET together with invoice(s) and packing list(s) for their approval of importing the construction materials and/or equipment for the Project and obtain their stamp and signature thereon. The custom agent on behalf of the Contractor would usually do filling out and completing the said import documents.

2. Then, submit the import documents being approved by the Client to the Bureau of Customs for their approval of the exemption of import duties for the building materials and/or equipment to be imported. It is sometime required to submit Truck Load Certificate in lieu of Bill of Lading prior to obtaining their approval.

3. Finally, submit the said import documents to Tax Office of MOFDP for their approval of the exemption of import duties.

Table 2－28　Procurement of Construction Materials

| Materials | | From Lesotho | From Japan | From Third Country | Remarks |
|---|---|---|---|---|---|
| Construction Materials | Sand, Gravel | ○ | | | |
| | Cement | ○ | | | |
| | Concrete block | ○ | | | |
| | Brick | ○ | | | |
| | Structural Timber (for Roof Truss, etc) | | | ○ | Assumed to be procured from South Africa |
| | Timber (for Finish) | | | ○ | - ditto - |
| | Re-bar | | | ○ | - ditto - |
| | Glass Pane | | | ○ | - ditto - |
| | Steel Window, Door and Frame | | | ○ | - ditto - |
| | Wood Door | | | ○ | - ditto - |
| | Roof Sheet | | | ○ | - ditto - |
| | Ceramic Tile | | | ○ | - ditto - |
| | Water Proofing Material | | | ○ | - ditto - |
| | Ceiling | | | ○ | - ditto - |
| | Paint | | | ○ | - ditto - |
| | Miscellaneous Hardware | | | ○ | - ditto - |
| | Plumbing Material | | | ○ | - ditto - |
| | Furniture (Table, Chair, Cabinet) | ○ | | | |

### 2-2-4-7　Implementation Schedule

If this Project is implemented with the Japan's Grant Aid Scheme, the Implementing Organization of the Lesotho Government and the Consultant shall enter into Consulting Services Agreement after the conclusion of E/N between Lesotho and Japan, followed by preparation of detailed design documents, tendering and conclusion of Construction Contract; then, construction works will commence.

#### (1)　Detailed design documents

The Consultant shall prepare detailed design and tender documents based on this basic design, including detailed drawings, specifications and structural calculations.　At each of the early, intermediate, final stages of the preparation of the detailed design, the Consultant shall have intensive discussions with Lesotho's Implementing Organization and other agencies concerned for review and approval of the final design prior to proceeding with tendering.

#### (2)　Tendering

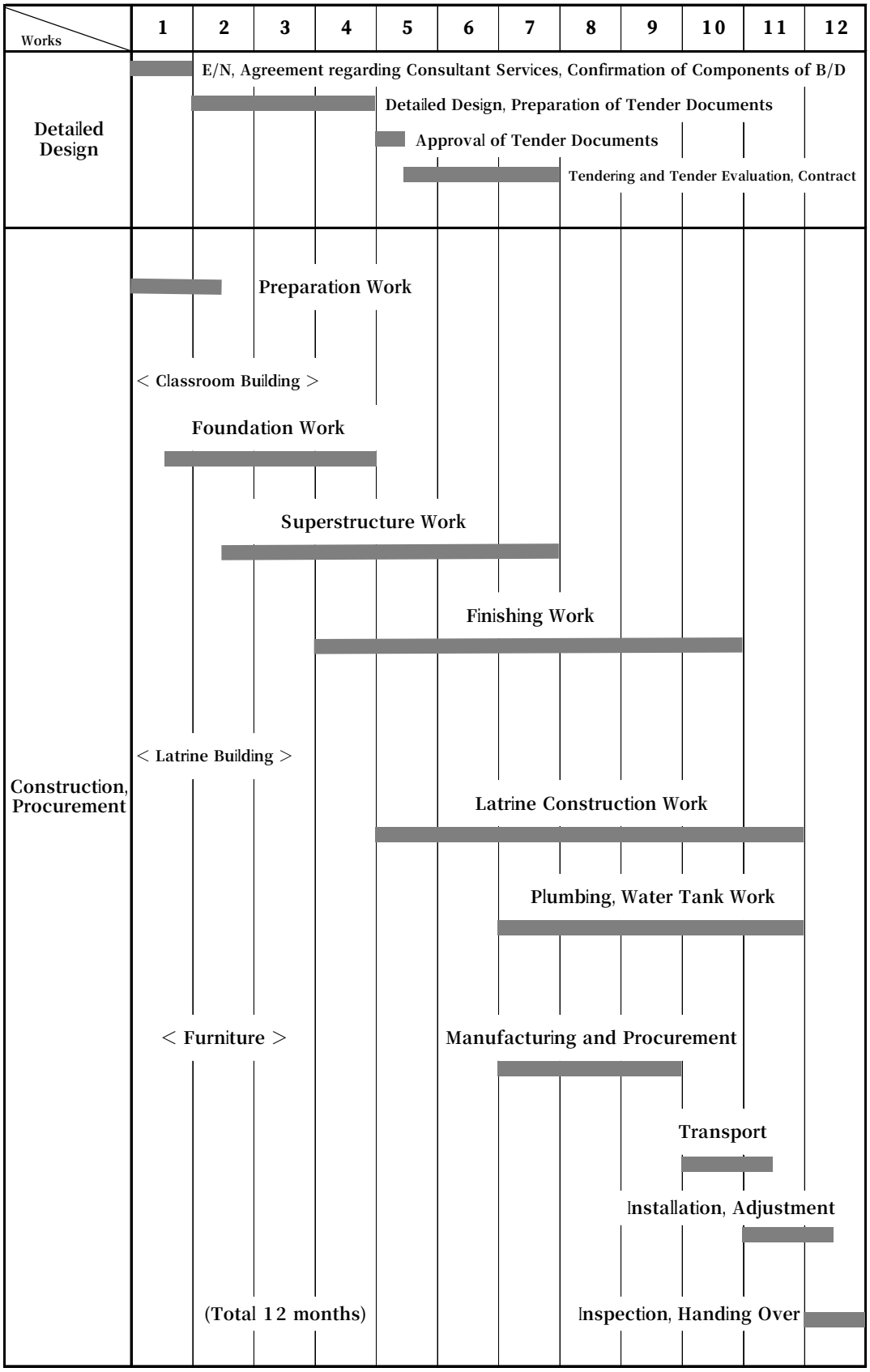
After the completion of the detailed design, the Consultant publicly invites applicants for tender in Japan and examines their qualifications (P/Q) on behalf of the MOET as the Implementing Organization of the Lesotho Government, and reports the result to the MOET for approval.　Then the consultant opens competitive tendering in Japan in the presence of the persons concerned and reports the result to the MOET for approval. Then, the Construction Contract with Lesotho's MOET will be awarded to the lowest

tender provided that the contents of the tender is appropriate. The Construction Contract comes into effect when the Japanese Government verifies the said Contract. It takes approx. six (6) months to complete the whole process i.e. completion of the detailed design, the tendering and the conclusion of the Construction Contract, after the conclusion of the Consulting Services Agreement.

**(3) Construction schedule**

After the conclusion of the construction contract, the construction works will commence after Japanese Government verifies the contract. The construction period is estimated to be about six (6) months for a one-story building and about seven (7) months for a two-story building. It is possible to complete the construction works at all the site in twelve (12) months by scheduling the overall construction schedule carefully and utilizing the staff and the temporary materials and construction equipment effectively and efficiently.

Table 2－29　General Project Schedule（Plan）



## 2-3 Obligations of the Recipient Country

In addition to the works described above, the Lesotho Government shall implement the following works:

(1) Secure all the school sites for this Project and guarantee the ownership throughout the future.

(2) Remove obstacles (rocks, trees, etc.) from the school sites and prepare the land before the commencement of the construction works.

(3) Build approach road for the construction works, if necessary.

(4) Remove or demolish the following facilities before the commencement of the construction works: Two pit latrine buildings (No.6 Maseru East); Pit latrine building, building foundation, and pond (No. 16 Semphetenyane); and Pit latrine building (No. 20 Lancers Gap).

(5) Landscaping, planting, fencing, and build any other auxiliary external facilities, if necessary.

(6) Install city water pipes to supply water to school sites, if necessary.

(7) Pay Japanese banks advice charges, payment charges, and other charges for Authorization to Pay (A/P), according to the Banking Arrangement (B/A).

(8) Conduct tax exemption procedures necessary for smooth customs clearance of the materials and equipment for the Project.

(9) Give Japanese companies and persons exemption from customs, taxes, and other financial duties on the services and equipment provided according to authorized agreements.

(10) For Japanese persons needed for the services and equipment provided according to authorized agreements, conduct measures necessary for their entry and stay in Lesotho.

(11) Issue Governmental permissions, approvals and licenses necessary for the Project without delay.

(12) The Ministry of Education and Training shall endeavor to maximize students' opportunity to benefit from the facilities and equipment provided by Grant Aid.

(13) The Ministry of Education and Training shall assign teachers and other school stuffs and allocate budgets so that the facilities provided by Grant Aid can be used proactively and efficiently.

(14) The Ministry of Education and Training shall regularly conduct monitoring and give appropriate instructions and advice so that the Ministry and parents' associations can properly operate and maintain the facilities provided by Grant Aid.

(15) The Ministry of Education and Training shall establish human and budgetary measures concerning the operation and maintenance of the facilities.

(16) Bear all costs for matters not covered by Japan's Grant Aid, within the scope of the Project.

## 2-4 Project Operation Plan

### (1) Operation and Management System of Schools

MOET is the Implementing Organization for this Project. In the MOET, the Chief Education Officer Primary ("CEO Primary") will be responsible for operation and management of the schools of the Project. Table 2-30 shows division of responsibilities in the MOET and related organizations.

Table 2-30 Roles in Management of Primary Education in Lesotho

| Responsible Organization | Role |
|---|---|
| Ministry of Education and Training | Securing of necessary number of teachers, Payments for teachers, Lunch feedings, Delivery of textbooks, stationeries and teaching materials, Management and maintenance of school facilities, and Monitoring of school management through the District Field Inspectorate |
| Field Inspectorate (Under Chief Field Inspectorate, CEO Primary) | Inspection of schools, Evaluation of education activities, Update of figures of students enrollment, number of teachers, physical conditions and lack of school facilities, and Report to the Chief Field Inspectorate |
| Schools | School management and Implementation of regular inspection (maintenance) of school facilities and water supply equipment |
| Management Committees | Monitoring and management of schools, and Assistance in maintenance activities |
| Parents and Community | A part of payment of lunch feeding, Assistance with provision of labor in school maintenance activities, and Assistance with consultation of agricultural education |
| Ministry of Natural Resources | A part of maintenance of water supply equipment (in case schools cannot repair by themselves) |

The operation and management system of the schools (1. School management, 2. Teachers' placement, 3. Delivery of textbooks, stationeries and teaching materials, 4. Operation and maintenance system for buildings, and 5. Water supply facilities) by each responsible organization within MOET after implementation of this Project are described hereinafter.

### (2) School Management

Any decision as to the management of the government schools (all schools of the Project are government schools) shall be made by and through "Management Committee[16]" of each school. Members of the Management Committee are 2 community members representing the government, 3 parents' representatives, 1 teachers' representative, 1 headmaster's representative, and 1 community chief's representative. Any matters concerning the management of the school (school activities, matters concerning teachers and students) shall be discussed between the Management Committee and Field Inspectorate Officer. Chief Inspectorate will establish the Management Committees after the Project is completed and the new schools will be registered to the MOET.

[16] School management system for government schools is different from church schools one. In case of church schools, each school has "Advisory School Committee" which consults all matters regarding school management to "Management Committee" consisted by the representatives of some Advisory School Committees, the proprietors and church officials. On the other hand, each government school has only one committee with functions and responsibility of the said two committees for church schools. In this report, the committee who belongs to each government school is called "Management Committee".

### (3) Teachers' Placement

The Teaching Service Department ("TSD") under the MOET will be the responsible section for the placement of teachers after this Project is implemented. The Director of TSD plans to employ 300 new official teachers as civil servant from 2003/04. Out of the 300, 150 teachers would be trained in the Lesotho College of Education ("LEC").

Table 2-31 TSD Plan (Commitment)

| Number of Teachers | 2003/04 | 2004/05 | 2005/06 |
|---|---|---|---|
| Current Number of Teachers | 8082[17] | 8394 | 8720 |
| New Teachers | 312 | 326 | 375 |
| Salaries Total | 218,537,240 | 231,298,660 | 243,509,010 |

Source: Teacher Supply and Recruitment Policy

Table 2-32 Numbers of Diploma Primary Education in LEC (Required for 3.5 years)

| | # of Enrollment in 2000 (newly becoming teachers in 2003/04) | # of Enrollment in 2001 (newly becoming teachers in 2004/05) | # of Enrollment in 2002 (newly becoming teachers in 2005/06) |
|---|---|---|---|
| # of Teachers | 167 | 198 | 148 |

Source: Lesotho College of Education. A Brief Profile.

Although it is said that many unqualified teachers brought low quality of education, 150 new teachers (out of planned 300) will be employed as unqualified teachers. In order to improve these situations to improve quality of education, Distance Teacher Education Programme ("DTEP")[18] was introduced in 2002. DTEP is In-service Training for existing teachers, and there will be 500 first qualified teachers in 2006, and second 250 qualified teachers in 2007 trained by DTEP. Also, it is planned to improve the quality of teachers by the deployment of nation-wide reshuffling of the qualified teachers.

On the other hand, in regard to the securing the cost for teachers, estimated total amount of the salaries shown in the Table 2-30 above is the committed budget as a priority budget for the achievement of FPE. Also, as there are many unqualified teachers (either paid by the parents or school or working as "volunteer" without payment) who are privately employed by the church schools, it does not necessarily mean that the Government pays salaries for all teachers. However, for those unqualified/volunteer teachers, honorariums are paid once a year out of "Training, Honorarium, etc." under the FPE recurrent budget. Furthermore, MOET plans to pay salaries to all teachers by training up teachers as qualified ones by DTEP.

[17] According to the EMIS information in March 2002, the current number of teachers in Lesotho is 8908. The budget for teachers salary is 226,749,000M in the budgetary document. The gap between this figure and the table, it would be the private non-certificate teachers hired in church schools (volunteer or paid by parents or schools).

[18] DTEP started in 2002 under the leadership of the World Bank

### (4) Textbooks / Teaching Materials / Stationeries

As for the delivery of textbooks, teaching materials, stationeries, and science kits for the students who would enroll at the schools of this Project, it would be implemented by the School Supply Unit ("SSU") of the MOET. They will start delivering as soon as the new schools are registered in each District Resource Centre and the applications for the delivery of textbooks, stationeries, and teaching materials were submitted to SSU[19]. In case of existing schools, those items are delivered based on the number of students in the previous year, and then the schools would submit application to SSU regarding shortage numbers of those materials.

However, there were some existing schools that say that they are short of textbooks during the field survey conducted for this Project. It is assumed that the inefficient manual operating system of SSU to manage/update their stock/delivery record would be one of the reasons. In order to improve this situation, by restructuring and improvement of the operating system and introducing an electronic database system to SSU and to correspond their operating system to EMIS in the Planning Unit, the MOET can automatically update the number of enrollment in each registered school.

### (5) Maintenance of Facilities (except for water supply facilities)

School facilities and equipment conditions of this Project are to be inspected by the field inspectorate officers and are maintained/repaired properly with necessary support services under the current inspection system of MOET. The field inspectorate officer who visits the school will submit the inspection report to the Chief Inspectorate Officer.

Schools to be repaired are decided according to the field inspections and the Chief Inspectorate Officer, based on the result of inspections of schools. The schools to be repaired send quotations estimated by assigned contractors to the MOET. The Chief Inspectorate Officer then provides a list to the Principal Technical Officer and informs them the name of schools to be repaired and the amount to be paid according to those quotations. The Principal Technical Officer prioritizes the orders of implementation, selects contractors, and implement repairs with estimated amount.

In regard to the schools to be repaired urgently, they request for repairs by themselves through decision making processes from Headmasters, Management Committees, Inspectorate Officers, the Chief Inspectorate Officer, and to the Principal Technical Officer.

FPE prescribes that MOET should cover maintenance cost for the schools at the cost of 5 Maloti per students per year for the students under FPE. However, in the actual system, enough maintenance service cost to cover all the FPE students is not provided. In 2003, 485,000M (1.6 Maloti per FPE students per year) were allocated for all the

[19] Interview record from the Manager of SSU, Ms. Neo Lekhera on 4/17/2003.

primary schools, including labor, transportation, and costs for repair. Provided that, the MOET is going to construct a system to provide a certain amount of budget for school facilities maintenance and clean-up of toilets to meet increasing number of FPE students.

All the schools of the Project are the government schools. Since The MOET has given first priority for securing necessary budget for the government schools, there is no problem for maintenance and operations of the schools of this Project (cost estimates are shown in the section 2-5).

### (6) Water Supply Facilities

#### a. Operation and Maintenance Plan

The MOET is responsible for the maintenance cost of wells installed for this Project, and regular inspection and maintenance is to be implemented by the headmasters and teachers / staffs (the schools). Considering the situation mentioned above, the VLOM (Village Level Operation and Maintenance) -type pump is selected so that school staffs can carry out regular maintenance and exchange parts. For that purpose, teachers / staffs etc. shall be instructed in operation and maintenance (O&M) of wells when the facilities are handed over to the school.

The O&M plans for water supply facilities, including wells, shall be carried out as follows:

(a) The headmaster and teachers shall be responsible for the maintenance of wells. Maintenance manuals and technical guidance shall be provided for them, when the water supply facilities are handed over to the school.

(b) The headmaster and teachers shall conduct regular maintenance for the hand pump according to the maintenance manuals. To make the maintenance system clear and to examine when to maintain the hand pump, they shall keep a maintenance log book, recording how long the hand pump operates, who operates it, who puts chlorine disinfectant into it, how much and at what time chlorine disinfectant is put into it, when and by whom regular maintenance is carried out, what spare parts are exchanged, when the tank is cleaned, etc.

(c) When the school cannot solve a problem by regular exchange of parts, the school shall request repair to the MOET. (School → Field Inspectorate Officer → CEO Primary).

(d) The MOET shall inspect the facility requested to repair with the technical cooperation from the Ministry of Natural Resources (“MONR”). The inspector (desirably, an employee of the Department of Water Affairs (DWA)

of MONR) shall assess the situation and, if necessary, order repair from the contractor.

(e) Steering committee shall be organized among MOET, MONR (DWA・WASA・DRWS) and MOFDP in order to follow-up the O&M System.

The figure below is a flowchart of the operation and maintenance system.

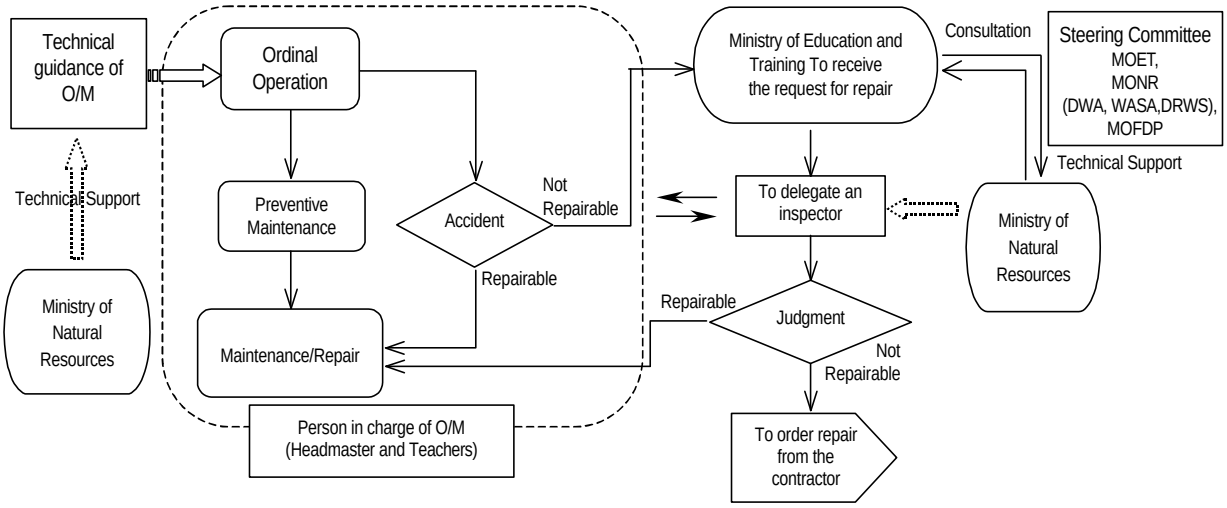



Fig. 2-18 Flowchart of Operation and Maintenance System

**b. Operation plan**

An operation plan shall be formulated, taking the scale of the facilities and the water supply system into consideration. When calculating the working hours, the time to fill the reservoir tank shall be calculated on the assumption that the hand pump INDIA Mk III pumps up 0.17 L of water every second, and the time to send water from the reservoir tank to the pit latrine water tanks is calculated on the assumption that the water pipes send 0.3 L of water per second.

Table 2-33 Required Time for Operation per Day

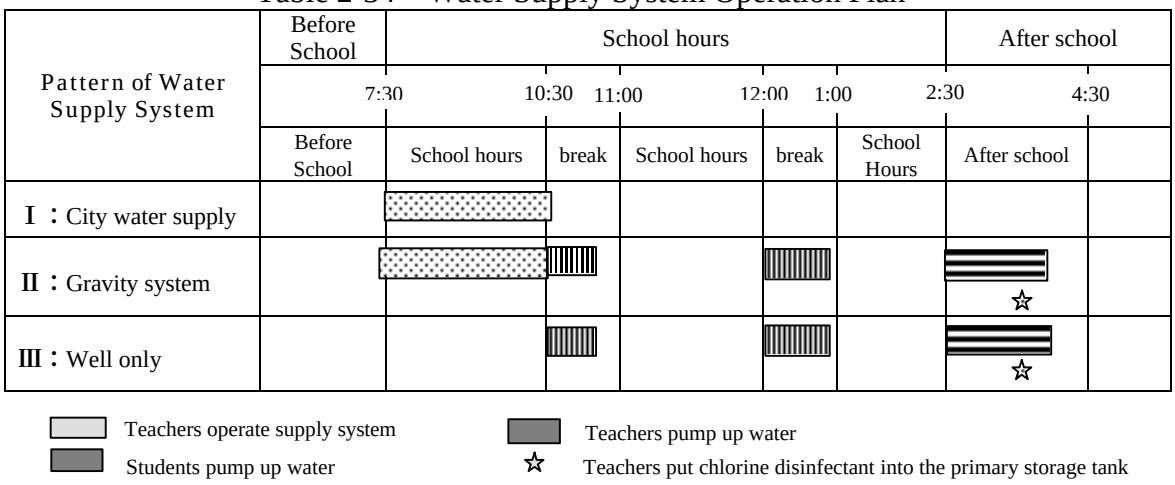
| No | School | Time fill up primary reservoir tank by Hand Pump | Time to fill up pit latrine tanks by supply pipe | Total Required Time |
|---|---|---|---|---|
| 1 | Mahlabatheng | 2 h 10 min | 35 min | 2 h 45 min |
| 2 | Lihaseng | 2 h 30 min | (0 min) | 2 h 30 min |
| 3 | Ha Tlhakanelo | 1 h 10 min | 20 min | 1 h 30 min |
| 5 | Senyotong | 1 h 40 min | (0 min) | 1 h 40min |
| 6 | Maseru East | - | 45 min | 45 min |
| 8 | Thetsane | - | 30 min | 30 min |
| 10 | Maseqobela | 2 h 00 min | 35 min | 2 h 35 min |
| 11 | Leqele | - | 55 min | 55 min |
| 12 | Mabote | - | 1 h 10 min | 1 h 10 min |
| 13 | Ntjabane | - | 30 min | 30 min |
| 14 | Ha Mpiti | 1h 10 min | (0 min) | 1 h 10 min |
| 15 | Ramaqhanyane | 2 h 10 min | 35 min | 2 h 45 min |
| 16 | Semphatenyane | - | 1 h 00 min | 1 h 00min |
| 17 | Abia | - | 45 min | 45 min |
| 18 | Tsolo | - | 30 min | 30 min |
| 19 | Lenono | 1 h 10 min | 20 min | 1 h 30 min |
| 20 | Lancers Gap | 3 h 20 min | (0 min) | 3 h 20 min |

* The site covered by WASA

If the school uses a well, because the water in the reservoir tank cannot be used for one hour after chlorine disinfectant is put into the tank and according to pump operation hours and school curriculum, it is desirable to pump up water and put chlorine disinfectant into the tank after school, and supply water to pit latrines the following morning. In large primary schools, it takes many hours to pump up water as shown in the Table 2-33. Because it is actually impossible for the teachers to complete the delivery of water by themselves, it is desirable to have the children handle the hand pump as a part of the education.

Table 2-34 shows the planned daily operation cycles according to the timetable of standard primary schools.

Table 2-34 Water Supply System Operation Plan



## 2-5 Cost Estimate of the Project

### 2-5-1 Cost Estimate of the Project

This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant. Under the conditions described below, Japan and Lesotho will share the cost as follows. However, the estimated costs shown below shall not indicate a ceiling amount of the Exchange of Notes.

#### (1) Conditions of Estimate

- Time of estimate: July 2003
- Exchange rate: 1US$ = ¥120.37
  1M (Maloti) = 1R (Rand) = ¥16.15
- Construction term: One fiscal year. The detailed design and construction period are as shown above i.e. Sub-clause 2-4-6 (3).
- Construction period: Twelve (12) months
- Contractor: Lump-sum Contract to a Japanese Contractor
- Other: The Project shall be implemented according to the Japan's Grant Aid Scheme.

#### (2) Japan's Share

**Estimated Costs**

(Approx. 935 million Yen)

17 schools, 229 classrooms, 79 pit latrines, 9 water reservoirs (Total Floor Area: 22,350.24m2)

| Classification | | ¥ (million Yen) | |
|---|---|---|---|
| Facilities | Classrooms Building | 608 | 842 |
| | Kitchen / Store Unit | 140 | |
| | Pit Latrines | 9 | |
| | Furniture / Equipments | 85 | |
| Detailed design, Supervision, Technical Guidance | | | 93 |

Note: This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

#### (3) Lesotho's Share

**Estimated Costs**

(Approx. 2,250 thousand Maloti)

| Classification | M (thousand Maloti) |
|---|---|
| (1) Construction of Access Road | 25 |
| (2) Site Clearance and Leveling | 1,147 |
| (3) Main City Water Intake | 46 |
| (4) Demolition | 61 |
| (5) External Works (including Fence Work) | 971 |
| Total | 2,250 |

## 2-5-2 Operation and Maintenance Costs

### (1) Budget for Allocation of Teachers

Budget allocation of teachers would be appropriated after the scale of the Project is finalized. Estimated costs at the time of the completion of the Project (Year 2006) are shown in the Table 2-35, assuming that at least equal numbers of teachers would be placed to the numbers of classrooms at each school. Projection of number of school children in 2006 per teacher is 48.3[20], which is below the number of school children per classroom, 50. On the other hand, Projection of number of children per classroom is 51.2[21]. Thus, the number of teachers shall be sufficient compared to the number of classrooms. Projection number of teachers (10,108) is more than the classrooms (9,547). The number of teachers mentioned above includes both qualified and unqualified teachers. As to allocation of teachers to the schools of the Project, by increase of the qualified teachers by DTEP (500 teachers in 2006, 250teachers per year from 2007), and by re-allocation of teachers, the MOET can allocate necessary numbers of teachers to the schools of the Project[22].

Table 2-35 Salaries and Wages for Teachers to be Allocated to the Schools of this Project

| | | A | | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| No. | Name of School | # of Class room | Large School *a | Principal | Senior Qualified Teacher*b (Senior/Deputy) | Experienced Teacher | Qualified Teacher | Unqualified Teacher (COSC) |
| | | | | 1 | A×0.2*c | A×0.3*d | A×0.25*e | A×0.25*f |
| 1 | Mahlabatheng | 13 | | 1 | 3 | 4 | 3 | 3 |
| 2 | Lihaseng | 15 | | 1 | 3 | 5 | 4 | 3 |
| 3 | Ha Tlhakanelo | 7 | | 1 | 1 | 2 | 2 | 2 |
| 4 | Masowe | 0 | | 0 | 0 | 0 | 0 | 0 |
| 5 | Senyotong | 10 | | 1 | 2 | 3 | 3 | 2 |
| 6 | Maseru East | 15 | | 1 | 3 | 5 | 4 | 3 |
| 7 | Khubelu | 0 | | 0 | 0 | 0 | 0 | |
| 8 | Thetsane | 10 | | 1 | 2 | 3 | 3 | 2 |
| 9 | Likotsi | 0 | | 0 | 0 | 0 | 0 | |
| 10 | Maseqobela | 12 | | 1 | 2 | 4 | 3 | 3 |
| 11 | Leqele | 19 | | 1 | 4 | 6 | 5 | 4 |
| 12 | Mabote | 24 | ○ | 1 | 5 | 7 | 6 | 6 |
| 13 | Ntjabane | 11 | | 1 | 2 | 3 | 3 | 3 |
| 14 | Ha Mpiti | 7 | | 1 | 1 | 2 | 2 | 2 |
| 15 | Ramaqhanyane | 13 | | 1 | 3 | 4 | 3 | 3 |
| 16 | Semphatenyane | 21 | ○ | 1 | 4 | 6 | 6 | 5 |
| 17 | Abia | 15 | | 1 | 3 | 5 | 4 | 3 |
| 18 | Tsolo | 11 | | 1 | 2 | 3 | 3 | 3 |
| 19 | Lenono | 7 | | 1 | 1 | 2 | 2 | 2 |
| 20 | Lancers Gap | 19 | | 1 | 4 | 6 | 5 | 4 |
| Total | | 229 | | 17 | 45 | 70 | 61 | 53 |

*a) We call a "Large School" that has more than 20 classrooms.
*b) In case of the large schools, one of the Senior Qualified Teachers is to be the Deputy Head Teacher.
*c) Senior Teacher or Deputy Head Teacher. We project the number would be 20% of all teachers.
*d) Experienced Teacher. We project the number would be 30% of all teachers.
*e) Qualified Teacher. We project the number would be 25% of all teachers. In case the number of this category be bigger than (A+B+C+D) as a result of round off, we substruct 1 teacher from this category.
*f) Unqualified Teacher. We project the number would be 25% of all teachers. Even though they are unqualified, as long as they work in the government schools, salaries are to be paid by the Government.

[20] Projection of number of school children and teachers, which is calculated on the basis of data from EMIS 2002 and TSD Teacher allocation plan, shall be 488,390 and 10,108. 488,390 / 10,108 = 48.3.

[21] Projection of number of teachers, which is calculated on the basis of EMIS 2002 and the number of constructed classrooms by MOE in 2002/03, shall be 9547 classrooms. 488,390 / 9547 = 51.2.

[22] We assume that TSD's Teacher Supply and Recruitment Policy will be implemented.

## (2) Cost of Repairing Facilities

### a. Maintenance Cost for Buildings

Basically the facilities and furniture to be constructed, and procured for this Project are easy to maintain and, therefore, the maintenance cost is estimated to be quite low when they were used normally.

The cost of painting, which would be one of the main items of maintenance cost, is estimated as follows.

It is assumed that the outside and metal/iron fittings including burglar proof grilles would be repainted once every five (5) years and the inside would be repainted once every decade.

| | | | | |
|---|---|---|---|---|
| Outside | 12.83R/$m^2$ | $\times$ 6,010$m^2 \times 2$ | = | 154,216.60M |
| Inside | 11.60R/$m^2$ | $\times$41,175$m^2$ | = | 477,630.00M |
| Ironmongery | 15.98R/$m^2$ | $\times$11,240$m^2 \times 2$ | = | 359,230.40M |
| Total | | | | 991,077.00M |

As calculated above, the total amounts to 991,077.00M in ten years. Therefore, it is necessary to save 99,107.70M every year.

### b. Maintenance Cost for Water supply

The costs of maintaining the water supply facilities include the costs of operating and maintaining the water source, pumps, and water pipes.

If the school uses a hand pumps, the costs of maintaining the water supply facilities include wages to the Care taker, labor costs for maintenance and repair, costs of maintenance and spare parts, the cost of training the Care taker, the cost of cleaning the well, the water supply tank, and the cost of exchanging the pump (the price of the pump and wages). However, because the India Mark III-type hand pump used for this project is in accordance with the concept of the Village Level Operation and Maintenance (VLOM), it is possible for school employees to carry out regular inspection and maintenance when they receive technical guidance. The following table shows the costs of maintaining the water supply facilities except the water pipes.

Table 2-36 Cost of O/M for Pumping System

| | Items of O/M | Unit Price (Maloti) | Cost/year (Maloti) | Notes |
|---|---|---|---|---|
| 1 | Regular inspection | 0 | 0 | Carried out by teachers |
| 2 | Spare parts | 75 | 75 | Only a parts fee. It is change by teachers |
| 3 | Borehole clean up | 1500 | 100 | At the time of hand pump renewal. |
| 4 | Pump renewal | 11500 | 767 | Every 15 years |
| 5 | Clean up water supply facilities | 0 | 0 | Clean up is carried out by teachers. |
| | | Total | 942 | |

The maintenance of the water pipes includes the exchange of taps and valves and the repair of clogged or leaking pipes. The cost is estimated to be about 1% of the direct cost of the initial installation. Table 2-37 shows total maintenance costs of water supply facilities at every site.

Table 2-37 Cost of O/M for Water Supply Facilities (Maloti)

| | | **A** | **B** | **C** | **D** | **E** | **F** |
|---|---|---|---|---|---|---|---|
| No | Name of School | Number of students | Water facilities installation Cost | Cost of O/M for Water facilities | Cost of O/M for Pumping system | Total cost of O/M | The cost per student |
| | | Calculated numbers | Fixed Value | **B**×0.01 | Refer to Table 5-2 | **C**+ **D** | **E** / **A** |
| 1 | Mahlabatheng | 650 | 38,009.73 | 380.10 | 942.00 | 1,322.10 | 2.03 |
| 2 | Lihaseng | 750 | 35,402.85 | 354.03 | 942.00 | 1,296.03 | 1.73 |
| 3 | Ha Tlhakanelo | 350 | 35,652.18 | 356.52 | 942.00 | 1,298.52 | 3.71 |
| 4 | Masowe | - | | | | | |
| 5 | Senyotong | 500 | 28,173.88 | 281.74 | 942.00 | 1,223.74 | 2.45 |
| 6 | Maseru East | 750 | 13,603.32 | 136.03 | -- | 136.03 | 0.18 |
| 7 | Khubelu | - | | | | | |
| 8 | Thetsane | 500 | 8159.66 | 81.60 | -- | 81.60 | 0.16 |
| 9 | Likotsi | - | | | | | |
| 10 | Maseqobela | 600 | 36,151.20 | 361.51 | 942.00 | 1,303.51 | 2.17 |
| 11 | Leqele | 950 | 21,393.47 | 213.93 | -- | 213.93 | 0.23 |
| 12 | Mabote | 1,200 | 16,537.06 | 165.37 | -- | 165.37 | 0.14 |
| 13 | Ntjabane | 550 | 9,402.73 | 94.03 | -- | 94.03 | 0.17 |
| 14 | Ha Mpiti | 350 | 28,173.88 | 281.74 | 942.00 | 1,223.74 | 3.50 |
| 15 | Ramaqhanyane | 650 | 38,420.31 | 384.20 | 942.00 | 1,326.20 | 2.04 |
| 16 | Semphatenyane | 1,050 | 12,680.45 | 126.80 | -- | 126.80 | 0.12 |
| 17 | Abia | 750 | 12,228.28 | 122.28 | -- | 122.28 | 0.16 |
| 18 | Tsolo | 550 | 11,585.89 | 115.86 | -- | 115.86 | 0.21 |
| 19 | Lenono | 350 | 33,060.42 | 330.60 | 942.00 | 1,272.60 | 3.64 |
| 20 | Lancers Gap | 1,000 | 34,976.54 | 349.77 | 942.00 | 1,291.77 | 1.29 |
| Total | | 11,500 | 413,611.85 | 4,136.11 | 8,478.00 | **12,614.11** | 1.10 |

### (3) Running Costs

#### a. Water Supply Facilities

The running costs of the water supply facilities differ between the schools that are supplied water from WASA and the schools that pump up water from wells.

- WASA's water rate is 3.78 Maloti per ton, except for household water supply.

- The schools that pump up water from wells need to put chlorine disinfectant into water to kill coliform and other bacteria. The cost is calculated assuming that 0.57 gram of chlorine disinfectant is put into a ton of water. The reliability of a result of inspection is low as described in 2-2-2 c. 4), though the amount of coliform is based on the result examined by two laboratories. Therefore in this project, chlorine disinfection was decided to be used at 9 schools where a well was constructed. The water quality test of fecal coliform will be carried out again at the stage of the detail design. It will be decided that sterilization by the chlorine disinfection doesn't apply, if fecal coliform is not found. Moreover, it is necessary to examine water twice a year (in summer and winter) to keep the quality of water.

Table 2-38 Running Cost of Water Supply Facility (per Year)

| | | A | B | C | D | E | F | G | H | |
|---|---|---|---|---|---|---|---|---|---|---|
| No | Name of School | No. of Students | Daily Demand (KL/day) | Annual Demand (KL/year) | Water tariff per year (3.78M/1000L) | Amount of chlorine (g/day) | Amount of chlorine per year (Maloti) 15M/ 1 kg | Water quality test fee (coliform) | Total Cost per year (Maloti) | Cost per student (Maloti) |
| | | Calculated No. | A×2L/1000 | B×22days × 9months | C×3.78 | B×0.57g | E×22days ×9months× 15/1000 | @60M twice a year | D + F + G | H/A |
| 1 | Mahlabatheng | 650 | 1.30 | 257.40 | — | 0.74 | (2.20) | 120 | 120 (122.20) | 0.18 (0.19) |
| 2 | Lihaseng | 750 | 1.50 | 297.00 | — | 0.86 | (2.55) | 120 | 120 (122.55) | 0.16 (0.16) |
| 3 | Ha Tlhakanelo | 350 | 0.70 | 138.60 | — | 0.40 | (1.19) | 120 | 120 (121.19) | 0.34 (0.35) |
| 4 | Masowe | — | — | — | — | — | — | — | —- | — |
| 5 | Senyotong | 500 | 1.00 | 198.00 | — | 0.57 | (1.69) | 120 | 120 (121.69) | 0.24 (0.24) |
| 6 | Maseru East | 750 | 1.50 | 297.00 | 1,122.66 | — | — | — | 1,122.66 | 1.50 |
| 7 | Khubelu | — | — | — | — | — | — | — | — | — |
| 8 | Thetsane | 500 | 1.00 | 198.00 | 748.44 | — | — | — | 748.44 | 1.50 |
| 9 | Likotsi | — | — | — | — | — | — | — | — | — |
| 10 | Maseqobela | 600 | 1.20 | 237.60 | — | 0.68 | (2.02) | 120 | 120 (122.02) | 0.20 (0.20) |
| 11 | Leqele | 950 | 1.90 | 376.20 | 1,422.04 | — | — | — | 1,422.04 | 1.50 |
| 12 | Mabote | 1,200 | 2.40 | 475.20 | 1,796.26 | — | — | — | 1,796.26 | 1.50 |
| 13 | Ntjabane | 550 | 1.10 | 217.80 | 823.28 | — | — | — | 823.28 | 1.50 |
| 14 | Ha Mpiti | 350 | 0.70 | 138.60 | — | 0.40 | (1.19) | 120 | 120 (121.19) | 0.34 (0.35) |
| 15 | Ramaqhanyane | 650 | 1.30 | 257.40 | — | 0.74 | (2.20) | 120 | 120 (122.20) | 0.18 (0.19) |
| 16 | Semphatenyane | 1,050 | 2.10 | 415.80 | 1,571.72 | — | — | — | 1,571.72 | 1.50 |
| 17 | Abia | 750 | 1.50 | 297.00 | 1,122.66 | — | — | — | 1,122.66 | 1.50 |
| 18 | Tsolo | 550 | 1.10 | 217.80 | 823.28 | — | — | — | 823.28 | 1.50 |
| 19 | Lenono | 350 | 0.70 | 138.60 | — | 0.40 | (1.19) | 120 | 120 (121.19) | 0.34 (0.35) |
| 20 | Lancers Gap | 1,000 | 2.00 | 396.00 | — | 1.14 | (3.39) | 120 | 120 (123.39) | 0.12 (0.12) |
| Total (No use of chlorine) | | | | | | | | | 10,510.34 | |
| Total (Use of Chlorine) | | | | | | | | | 10,527.96 | |

*Chlorine disinfections chemical of 0.57g is needed for water of 1000 l.
* Cost of parentheses includes chlorine disinfectant.

**b. Collection of Excreta**

The average number of students per excreta tank is 185.

When a student discharges 0.1 L of excreta, assuming the number of school days per year is 198 (22 days x 9 months) and the attendance rate is 85%, 185 students discharge the following amount of excreta a year:

$185 \times 0.1 \times 198 \times 0.85 = 3{,}113.55$ L/year

Because the capacity of a tank is approx. 24 $m^3$, it would take eight (8) years to fill the excreta tank.

In case of staff toilet, average number of teachers per excreta tank is 20 of which is the average number of teachers for 17 schools. Thus, when a teacher discharge 0.2 L of excreta, assuming the number of school days per year is 198 (22 days x 9 months), 20 teachers discharge the following amount of excreta a year:

20 x 0.2 x 198 = 792 L/year

Because the capacity of a tank is approx. 9 $m^3$, it would take eleven (11) years to fill the excreta tank.

As the capacity of an excreta truck is approx. 6 $m^3$; four (4) excreta trucks and one and a half (1.5) excreta trucks would be necessary for a tank every eight (8) years and eleven (11) years for students' toilet and staff toilet respectively. Because the total number of excreta tanks is 62 for students' toilet and 17 for staff toilet, and as the cost of collection and disposal is 150M per truck and the cost of transportation is 120M per truck, the cost of collecting excreta for a year is estimated as follows:

Students: 4 trucks $\times$ 62 tanks x (150M + 120M) / 8 = M8,370

Teachers: 1.5 trucks x 17 tanks x (150M + 120M) / 11 = M626

Therefore, annual cost would be approximately M8,996.

**(4) Summary of Running and Maintenance Costs**

The summary of running and maintenance costs are as shown in Table 2-38 herein below. Total running cost and maintenance costs (about 131.2 thousand Maloti) is approx. 0.074% of the total budget for FPE in 2006 (176,563.5 thousand Maloti), which is being calculated by using the rate of revenue increase of 3.67% (2002/03 – 2003/04). And, therefore, it is assumed that the said running and maintenance costs would be within the limit of the budget. At the same time, the schools of this Project are all government schools.

The MOET has given first priority for securing necessary budget for the government schools. Furthermore, the Government of Lesotho came out with the policy that the Government would bear the entire running and maintenance costs for all the government schools. Thus, the running and maintenance costs required for this Project shall definitely be borne by the Government of Lesotho.

Table 2-39 Summary of Running and Maintenance Cost

(Unit: Maloti)

| Cost of Repairing Facilities | | Running Cost | | | Total | |
|---|---|---|---|---|---|---|
| | | Water Supply | | Collection of Excreta (0.73M / Students) | | |
| Maintenance Cost for Buildings (8.99M / Students) | Maintenance Cost for Water Supply | No Use of Chlorine | Use of Chlorine | | No Use of Chlorine | Use of Chlorine |
| 99,107.70 | 12,614.11 | 10,510.34 | 10,527.96 | 8,996.00 | 131,228.15 | 131,245.77 |

# CHAPTER 3
# PROJECT EVALUATION AND RECOMMENDATIONS

# CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

## 3-1 Project Effects

It is expected the following direct and in-direct effects and some improvement to current educational environment shown in Table 3-1 herein below are assumed by the implementation of the Project.

### (1) Direct Effects

1) The Project would provide learning environment/facilities for a projected enrollment of 11,450 school-aged children within target area, as the Project consists of the construction of 17 primary schools in Maseru and Berea.

2) It would become possible to supply safe water for a projected enrollment of 11,450 school-aged children as well as their teachers by providing a water supply facility for all 17 primary schools to be constructed under the Project.

3) The Project includes the construction of a headmaster's room and a staff room for all 17 schools of which is incorporated into the classroom building. It means that each dedicated space for headmasters to conduct a day-to-day affair for running school and for teachers/staff to prepare for a class and to mark test papers as well as to exchange information among themselves would be provided. Consequently, it would provide a firm basis for running schools smoothly.

4) Hygienic and sanitary conditions in schools would be improved by educating all school children of school hygiene such as strict observance of washing hands after using the toilet each time, as the Project provides toilet buildings and hand washing water taps either attached to the toilet buildings or provided nearby.

### (2) In-direct Effects

1) The Project will improve a shortage of classrooms by constructing 17 new schools with 229 classrooms for a projected enrollment of school-aged children for the new schools and existing neighboring schools totaling 98,700; (229 new classrooms + 1,745 existing classrooms) x 50. Consequently, it is expected to improve a learning environment for students by reducing the number of students per classroom within the subject districts.

2) By improving an enrollment environment in Maseru and Berea, it is expected to serve as improvement of educational quality and internal efficiency (improvement of an educational environment) within the subject districts.

3) By providing water supply facilities and constructing toilet buildings, it is expected to spread the concept of hygiene to school children and teachers by strict observance

of supplying safe water and washing hands after using toilet each time for children to be enrolled to new schools as well as their teachers

4) It is expected to activate the local resident participation in various activities organized by the parents and/or by the community, as the Project would raise the interest of the parent in education living within the subject school districts.

5) As explained in the foregoing chapter, the contractor for the Project should be selected from among Japanese general contractors. Therefore, the Japanese contractor who is awarded the Contract would employ local sub-contractors to execute the works for the Project. It is expected to raise local standards in building construction in terms of the construction management, methodology, skills, etc., through technology transfer to be practiced throughout the construction period by the Japanese contractor.

Table 3-1 Expected Effects and Improvement

| Current condition and problems at existing schools | Input / Assistance by the project to the new schools | Output / Effect and/or improvement |
|---|---|---|
| Insufficient number of educational facilities of which is caused by the population influx from the surrounding area. | Construct 229 classrooms at 17 Schools. | Safe and adequate educational environment will have direct effect for 11,450. |
| Low quality of education which is caused by large number of students per classroom | Construct 229 classrooms at 17 Schools. | Decrease number of student per classroom as below and improve educational environment; -59.46 p/class >>> 50.12 p/class in Maseru -59.74p/class >> 54.18 p/class in Berea |
| Lack of safe water | Install water supply system at 17 schools | Improvement of accessibility to safe water for 11,500 students in 17 schools. |
| Lack of habitual behavior concerning washing hands after using toilet | Install wash basins with taps at the toilet building or water taps nearby the toilet building | Implementation of hygienic education by teachers will be envisaged. |

## 3-2 Recommendations

### 3-2-1 Roles and Responsibilities of the Government of Lesotho

#### (1) Budget

Budget required for the management of schools such as salaries for teachers and staffs as well as the costs for the operation and maintenance of the facilities depend entirely on the government fund to be allocated by MOFDP. Since FPE Programme will cover all students for all standards from 2006, it is expected that the said budget for the management of school should increase. Therefore, MOET should improve its planning capacity for securing sufficient and appropriate budget from MOFDP in order to function as a new education system effectively in addition to the old education system.

### (2) Appropriate Deployment of Teachers (teachers' placement)

It is essential for MOET to place appropriate number of teachers to all schools to be constructed under this Project in time for the opening of the schools. MOET is planning to take a course in recruiting more new teachers nation wide, as increasing the number of teachers is necessary while increasing the number of classrooms by the Project. At the same time, in addition to recruiting new teachers, MOET is planning to improve the present shortage situation of qualified teachers; currently approx. 30% of all teachers are unqualified, and to increase the number of qualified teachers by implementing the Distance Teachers Training Programme etc., in aim of improving educational quality.

However, besides dealing with recruiting new teachers and improving educational quality. More importantly, it is necessary to provide equal opportunity in quality of education for all school-aged children without any gaps between schools and/or districts by appropriate deployment of existing teachers. MOET, by implementing foregoing plans, will be able to place sufficient number of qualified teachers for schools to be constructed under this Project appropriately and without fail.

### (3) Operation and Maintenance System

#### a. Management Committee

Management Committee for each government school; schools to be constructed under the Project are all so-called "government school" should be responsible for the operation and maintenance (O&M) system of the school. Although the said Management Committee's principal role is to make decisions on the matters concerning the management of school, they will take action if they require any manpower from community members and/or parents for the operation and maintenance of the facilities. Such positive participation by the community members and parents will raise their consciousness of ownership and will raise their interest in education. Therefore, it is essential to establish such school management committee and its implementing system immediately after the completion of the Project

#### b. Inspection System by District Field Inspectorate

District field inspectorate officer is responsible for supervision of the condition and the maintenance of educational facilities. Although school inspection system is established and a necessary training is conducted regularly in aim of improving a quality of the field inspectorate offices, currently only one field inspectorate officer is assigned to each district. Therefore, in order for the existing school inspection system to function effectively, it is expected that the number of field inspectorate officers be increased accordingly.

### (4) Educational Information – Static Population Statistic / School Age Population

In Lesotho, basic and important information necessary for educational planning such as static trends in population is not fully grasped due to insufficient static population statistics and statistical information in general since national census is conducted once every 10 years. Especially in Maseru where huge population influx is evident, it is quite difficult to acquire accurate information. As to the situation of school and non-school children, it is possible to grasp the exact number of school children from EMIS being prepared by information reported from each school but there are no means of collecting information regarding non-school children. Therefore, only a presumed achievement of enrollment ratio is acquired, even if the monitoring thereof is carried out. And consequently, it causes a slanted number of students enrolled in the schools and at the same time the children cannot be registered until they complete enrollment procedures and the delivery of textbooks and other school supplies for them is often delayed. Thus, it is necessary to grasp the exact information as to the number of the children in order to enable the appropriate number of children who can be enrolled.

A concrete policy for collecting, processing and analyzing information towards further improvement of planning in the education sector can be expected.

### (5) Implementation of Appropriate Hygienic Education

In primary schools in Lesotho, teachers teach students regarding basic knowledge of hygienic education. Students, however, have no chance to put it into practice in school because there are no water supply facilities or a water tap near or around the toilets. By providing water supply facilities for this Project, it is expected that teachers can let the students to be accustomed with school hygiene through effective use of the water supply facilities in terms of hygienic and sanitary education.

## 3-2-2 Collaboration with Other Donors

There is no duplication concerning the school construction, because the project constructs new schools. For the education sector in Lesotho, other donors such as WB, AfDB and Ireland Aid supported various types of the project to date and it seems to continue to do so.

It is expected to increase the effect and benefit in education sector by the implementation of this Project, if the supply of educational equipment etc of which are not included in the Project could be implemented through collaboration work with other donors by making use of their knowledge/experience and cooperation/assistance.

## 3-2-3 Technical Cooperation by Japan

Although there are no immediate plans for any technical cooperation by Japan in the education sector, the effects by the Project is expected to be much greater, if any

technical cooperation were materialized in the future. It is anticipated that dispatching experts and/or volunteers (Japanese Overseas Cooperation Volunteers: JOCV) as a technical cooperation by Japan to MOET in Lesotho in order to support strengthening its education system would be quite effective.

Since neither a Japanese embassy nor a JICA office exists in Lesotho at present, a sufficient preparation period is required to implement technical cooperation. Based on the above, the possibility of technical cooperation is described here in below:

(1) It seems quite effective to dispatch an expert for educational planning to MOET. The expert would be able to draft and propose specific cooperation project in detail of which would contribute toward improvement of an educational environment in Lesotho as a whole, through gathering related information and management thereof and the results of analysis of statistic data by the expert. Furthermore, the said expert would also be able to follow up any related matters for any projects in the education sector including this Project, such as an establishment of operation and maintenance system.

(2) In addition to the dispatch of experts, it will be more effective, if the support program by JOCV is simultaneously implemented along with dispatch of experts.

One option of the support program by JOCV would be to train students in teachers training college. It is expected that they would upgrade the quality of teachers through an improvement of teaching methods. Expected upgrading of teachers would contribute towards improvements of internal efficiency of education and would lead to increasing enrollment ratio.

(3) JOCV to teach students at schools as a teacher would also be quite effective. They can teach various subjects such as music, gymnastics and art, the subjects of which tend not to be carried out, although they are in the curriculum. Teaching diverse subjects will contribute toward improvement of the quality of education and increasing diverse choice of students in the future.