

MINISTRY OF EDUCATION AND HIGHER EDUCATION
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR
IMPROVEMENT OF JUNIOR SCHOOLS
IN
THE DEMOCRATIC SOCIALIST REPUBLIC
OF
SRI LANKA

JULY 1998

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MOHRI, ARCHITECT & ASSOCIATES, INC.
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PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka the Government of Japan decided to conduct a basic design survey study on the Project for Improvement of Junior Schools and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a study team from February 15 to March 11, 1998.

The team held discussions with the officials concerned of the Government of Sri Lanka, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Sri Lanka in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Sri Lanka for their close cooperation extended to the teams.

July, 1997



Kimio Fujita
President
Japan International Cooperation Agency

July, 1998


Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Junior Schools in the Democratic Socialist Republic of Sri Lanka.

This study was conducted by Mohri, Architect & Associates Inc. and Kume Sekkei Co. Ltd., under a contract to JICA, during the period from February 4, 1998 to July 14, 1998. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Sri Lanka and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



Shiro Sasaki

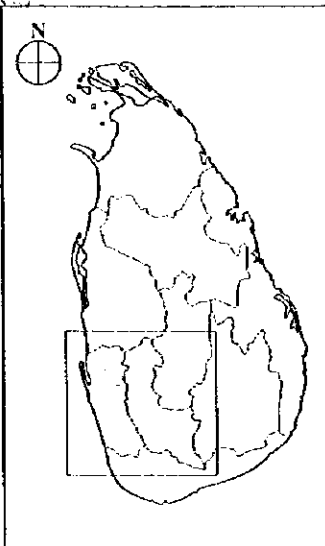
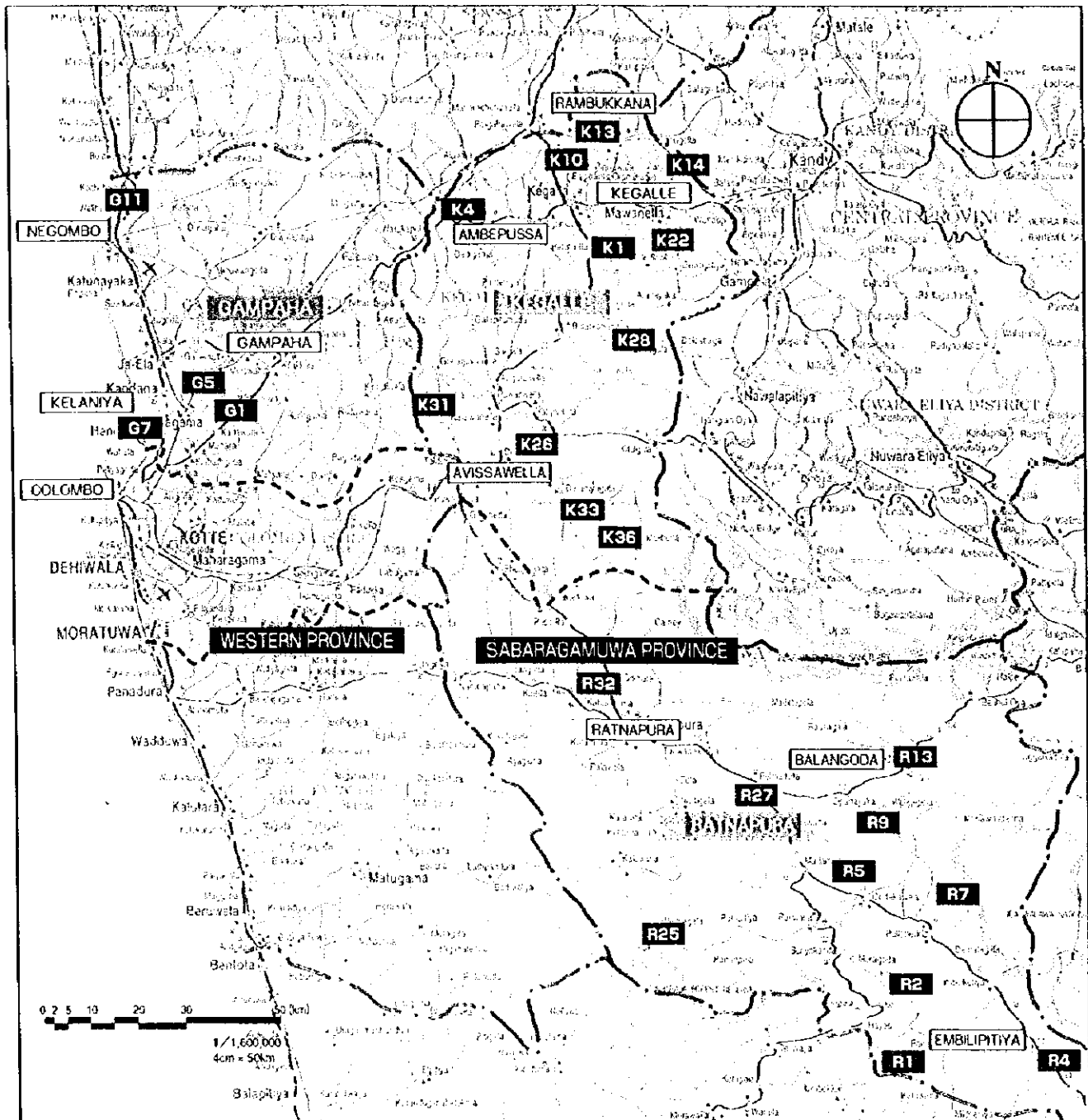
Project Manager

Basic design study team on

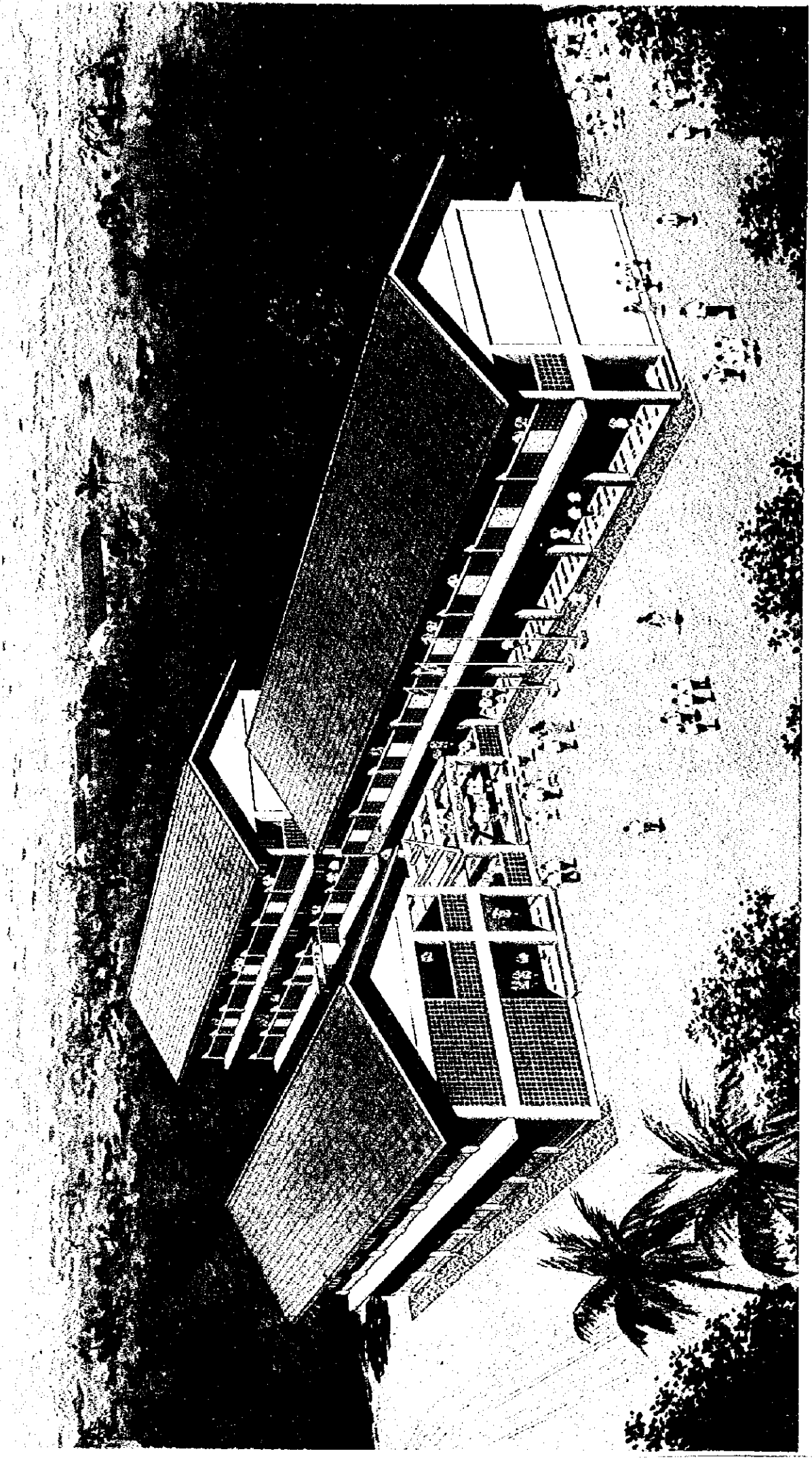
The Project for Improvement of Junior Schools

Mohri, Architect & Associates Inc.

PROJECT LOCATION MAP



No.	School Name	Zone	Div. Ser.
Sabaragamuwa			
1	R1 Godawela School	Embilipitiya	Kolonna
2	R2 Madumawela Sri Sarananda School		Embilipitiya
3	R4 Haimittaketiya School		Godakawela
4	R5 Rahula Elementary School	Balangoda	Opana/Weligapola
5	R7 Galpaya School		Balangoda
6	R9 Ranwala School		Kalawana
7	R13 Damahana School		Pelmadulla
8	R25 Waddagala South School	Nuwaraigala	Ratnapura
9	R27 Panawenna South School	Ratnapura	
10	R32 Hiddelana Junior School		
Kandy			
11	K1 Hettimulla New Jr Sch.	Kegalle	Kegalle
12	K4 Dedigama Junior School		Dedigama
13	K10 Samunugama Mallyadewa Jr Sch.		Gallimawa
14	K13 Ashoka Junior School	Mawanella	Rambukkana
15	K14 Baddegwela Junior School		Aranayake
16	K22 Ussapitiya Sri Sumangala Jr Sch.		Dehiwita
17	K26 Dehiwita Buddhist Elem. Sch.	Dehiwita	Dehiwita
18	K28 Dedugala Elem. School		Yatiyantota
19	K31 Amithingala Junior School		Ruwanwella
20	K33 Kadiresan Junior School		Deraniyagala
21	K36 Piyadeniyakanda School		
Western Province			
22	G1 Manikuma Jandara Junior School	Gampaha	Gampaha
23	G5 Welipillawa Junior School	Kelaniya	Mahara
24	G7 Hettitaha Christ King School		Wattala
25	G11 Dehawakotawa St. Anne's School	Negombo	Negombo



The Project for Improvement of Junior Schools in the Democratic Socialist Republic of Sri Lanka Perspective Drawing

ABBREVIATIONS

ADB	Asian Development Bank
B/A	Banking Arrangement
BS	British Standard
E/N	Exchange of Notes
GDP	Gross Domestic Product
GEP	General Education Programme
GNP	Gross National Product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IDA	International Development Association
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standard
MOEHE	Ministry of Education and Higher Education
MOFP	Ministry of Finance and Planning
NIE	National Institute of Education
PEA	Provincial Education Authority
PPRD	Policy, Planning and Review Division
P/Q	Pre-qualification
PSC	Project Steering Committee
PSEDP	Plantation Schools Education Development Project
PVC	Polyvinyl-chloride
SDS	School Development Society
SEDP	Secondary Education Development Project
Sida	Swedish International Development Authority
SRS	School Rationalization Survey
SWD	School Works Division
TETD	Teacher Education and Teacher Deployment Project
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISEF	United Nations Children's Fund
WID	Women in Development
WB	World Bank
ZEO	Zonal Education Office

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CHAPTER 1 BACKGROUND OF THE PROJECT

Chapter 1 Background of the Request

1 -1 Background of the Request and Project

As a result of actively investing in the educational field, such as providing free education, the Government of Sri Lanka, according to UNESCO data, has succeeded in achieving 113% in elementary school attendance and 9.8% in illiteracy in adults in 1995. The educational gap between men and women is also disappearing. The improvement of school facilities is also being conducted. However, the educational facilities in regional areas are still insufficient, in addition to a lack of qualified teachers.

Thus, the Government of Sri Lanka is placing greater importance on improving the regional differences. Through the help of foreign aid organizations, it aims to improve these differences, improve educational facilities to upgrade the quality of education and reeducate the teachers. The school facilities have been improved with the aid of Sida, the World Bank and ADB, together with the country's own budget. As a result, the quantity of school facilities is now adequate. However, most of the lessons are conducted simultaneously in large single rooms, and the schools have inadequate water supply and sanitary facilities. Thus, the quality of school facilities is still very much behind.

Although the number of schools are adequate as mentioned above, the quality of the education in Sri Lanka is problematic. In order to improve this situation, the Government set up the NEC (National Education Commission), an advisory council of the President, in 1991 to promote the Educational Reforms. It aims to clearly divide the present schools into Junior Schools (1st to 9th grade) and Senior Schools (10th to 13th grade), as well as reeducating the teachers, improving the curriculum and improving educational administration systems nationwide. In addition, to achieve these goals the educational facilities that are the bases of the educational system and method need to be improved. The content of the aid programs of various aid organizations are connected with the Educational Reforms. Under the GEP Phase II (General Education Programme Phase II) of the World Bank, the MOEHE (Ministry of Education and Higher Education) is conducting the SRS (School Rationalization Survey) based on the Educational Reforms promoted by the Government of Sri Lanka. An investment plan for the improvement of educational facilities will be drawn up according to the demands of the schools.

The Government of Japan has received a request from the Government of Sri Lanka for the Project for improvement of Junior Schools under the Grant Aid Program and the Preliminary Study was conducted in August 1997. At the meeting with the study group, the Government of Sri Lanka reviewed the request, and confirmed that the contents of the request will be the rebuilding and addition of educational facilities and provision of

necessary equipment, based on the idea of the Educational Reforms.

Based on the results of the study, the Government of Japan decided to conduct the Basic Design Study of the Project and JICA dispatched the Basic Design Study Team from February 1998.

1 -2 Contents of the Request

The contents of the request from the Government of Sri Lanka are as follows:

1) Regions for the Requested Project

During the preliminary study period the Government of Sri Lanka prepared a list of junior schools in the country to be constructed under the Project and confirmed that the priority of each Project area be assessed after comparing the situation of the Province. However, without objectively assessing the priority of the Province, the Government of Sri Lanka requested the Western Province of Gampaha, Ratnapura in Sabaramugawa Province and Kegalle in the Southern Province as the Project Area.

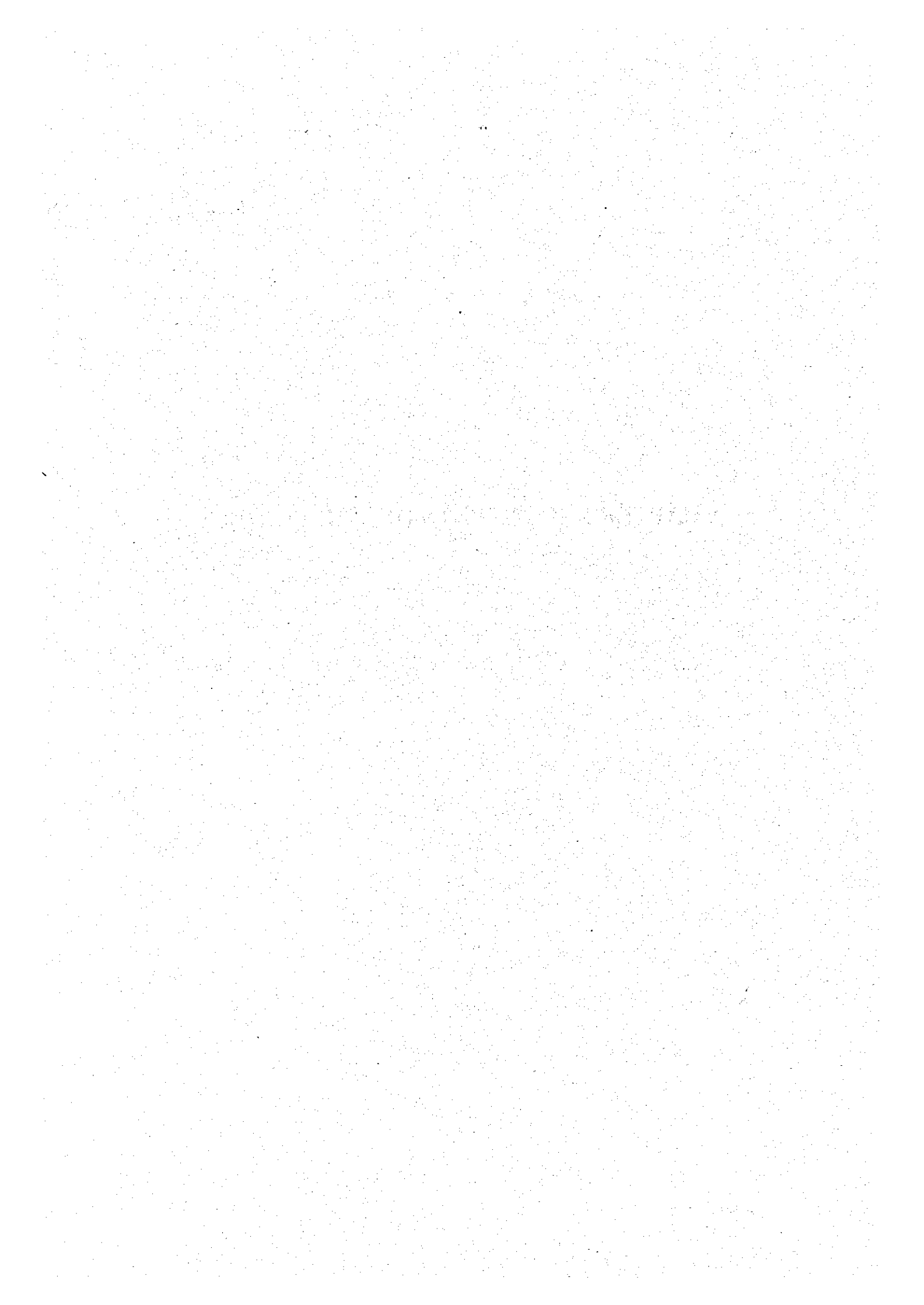
2) Contents of the Requested Project

- ① Constructing facilities for Junior Schools (1st to 9th grades) such as classrooms, multipurpose rooms, teacher's room, storage and toilets.
- ② Providing Educational Equipment
Providing basic furniture such as desks, chairs and blackboards and basic educational material for junior schools.

3) Requested Number of Schools in Each District

Province	District	Requested No. of Schools
Western Province	Gampaha	18
Sabaramugawa Province	Ratnapura	14
Southern Province	Kegalle	Not decided

CHAPTER 2 CONTENTS OF THE PROJECT



Chapter 2 Contents of the Project

2 -1 Objectives of the Project

As a result of active investment in the educational field and providing free education the government of Sri Lanka, according to UNESCO data, has achieved 113% in primary school attendance rate and 9.8% in illiteracy rate in adults. However, there are still various problems with the quality of education. Inefficient educational organization, unreasonable system for entrance into a school of higher grade, curriculum that do not suit actual needs, and unqualified teachers are pointed out as the problems. It is said that the number of schools are sufficient. Yet educational facilities in regional areas are still insufficient. Classrooms without windows or doors are being used simultaneously by various classes. As the schools are not clearly divided into primary, junior and senior secondary schools, it is affecting the course of students who wish to move on to higher grades.

In order to improve the situation, the government of Sri Lanka has set up the National Education Commission (NEC), an advisory council to the President, to reform the educational system. With the fund of the World Bank, it is conducting the School Rationalization Survey (SRS) to reorganize the present primary, junior and senior secondary schools into a new Junior School and Senior School System.

Thus, the objective of this Project is to improve the Junior Schools in Ratnapura and Kegalle Districts in the Sabaragamuwa Province and Gampaha District in the Western Province, where SRS is already being conducted, by constructing classrooms and other facilities and providing equipment.

2 -2 Basic Concept of the Project

2 -2 -1 Appropriateness of the Project

An ordinary classroom in Sri Lanka is a large room used by various classes. As different lessons are conducted simultaneously, the students are not able to concentrate and adequate lessons cannot be carried out. Furthermore, most of the roofs are composed of plain tiles with no waterproofing, and there are no windows in the classrooms, causing lessons to be suspended in times of rain. Although teacher's rooms are a necessity in the running of any school, most teachers can only find space to work in such places as storage rooms. Most schools do not have toilets with adequate water supply or drainage facilities, causing sanitary problems.

The government of Sri Lanka committed 3% of the country's GNP to the educational field to improve the situation. Although other aid organizations are making improvements, such as building school facilities, strengthening the operations of the MOEHE, improving the school curriculum and retraining teachers, the only project in progress regarding junior school facilities is the improvement of libraries by the World Bank. SRS is in progress in the Project area and classrooms are becoming a real necessity for sixth to ninth graders, as the primary school (first to fifth grade) is being modified.

This Project aims to improve the quality of junior school education, in terms of the educational environment and educational management, by constructing schools, increasing classrooms and supplying equipment in Ratnapura and Kegalle in Sabaragamuwa Province and Gampaha District in the Western Province where SRS is being conducted. The objective of this Project corresponds to the priority plans of the country and the education sector and is thought to be of utmost necessity in the promotion of the country's policy.

The government of Sri Lanka has distributed 3% of its GNP to the education sector during the period of 1991 to 1996. The government is placing emphasis on the improvement of junior schools, by allocating 72% of the total educational budget to this area. The ratio of students to teachers in 1996 was 22.1% which indicates that an adequate number of teachers has been secured. With loan from the World Bank and grant by other organizations, The Teacher Education and Teacher Deployment Project (TETD) have been started, aiming to improve the quality of teachers. All the factor mentioned above indicates that there should be less problems in operating the schools once the Project has been completed.

In addition, the Project will not coincide with other aided projects for physical facility improvement of junior schools, thus, the implementation of this Project is judged to be appropriate.

2 -2 -2 Evaluation of Project Regions and Project Facility Contents

(1) Project Regions

During preliminary study period the Government of Sri Lanka prepared a list of junior schools in the country to be constructed under the Project and confirmed that the priority of each Project area to be assessed after comparing the situation of the Province. However, without objectively assessing the priority of the Province, the government of Sri Lanka requested the Western Province of Gampaha, Ratnapura in the

Province of Sabaramugwa and Kegalle in the Southern Province as the Project Area.

As the aim of the Project is to construct as many school facilities as possible and provide educational equipment in a short period, it is appropriate to divide the Project Area into each Province. In order to maintain the conformity of the Project with higher level projects, a higher priority for the Project was given to those Provinces that are already conducting SRS. As a result, it was agreed with the government of Sri Lanka to include Ratnapura and Kegalle in Sabaragamuwa Province and a region in the Western Province which was a test area for Educational Reforms

(2) Project Facility Contents

The facilities requested by the government of Sri Lanka were Junior Schools (first to ninth grade) comprised of ordinary classrooms, multipurpose rooms, library, a teacher's room, a storage room and toilets, together with basic furniture such as desks and chairs for teachers and students, blackboards and other basic educational items. The requested facilities and equipment are the basic needs for junior schools. As existing rooms will be able to be converted into libraries in the future, it was agreed upon with the government of Sri Lanka that libraries will be omitted from the Project.

2 -2 -3 Selection of Project Schools

(1) Selection of Candidate Project Schools

Requests from a total of 53 schools were received: 13 in Gampaha in the Western Province; 14 in Ratnapura District and 26 in Kegalle District (which was requested at the time of meeting with the MOEHE in the Province of Sabarugamuwa. Furthermore, the MOEHE requested that one school be selected from each divisional secretariat. Including the two to three schools selected from each divisional secretariat, a total of 84 schools were selected as candidates. As a result of site inspection of some of these schools and examination of data of these schools, those located on steep slopes, those with access problems, those dealing only with first to sixth grades at 2001 (as shown in the SRS data), and those expecting a decrease in the number of students were omitted from the Project. Thus, it was agreed upon with the MOEHE that a total of 46 schools were to be selected as candidates (5 schools in Gampaha District in the Western Province, 19 schools in Ratnapura District and 22 in Kegalle District in the Sabarugamuwa Province). In order to select as many Project schools as possible from each divisional secretariat, if the site inspection of one school from each divisional secretariat proved acceptable, the inspection moved on to the next divisional secretariat.

Thus, a total of 37 site inspections were conducted. The following table shows the schools surveyed by the basic design study team:

Table 2 -1 List of the Schools Surveyed by the Basic Design Study Team

Sabarugamuwa Province				
Ratnapura				
No.	School Name	Zone	Div. Scr.	
R1	Godewala School	Embilipitiya	Kolonna	
R2	Maduwanwela Sri Sarananda School		Embilipitiya	Godakawela
R4	Halmillaketiya School			Opana/ Weligepola
R5	Rahula Elem. School			Imbulpe
R7	Galpaya School		Balangoda	Balangoda
R8	Hatangala School			
R9	Ranwala School			
R11	Aluthnuwara Shastralankara School			
R13	Dhanahana School			
R15	Mewdekanda Tamil School			
R18	Pebotuwa Elem. School	Niwithigala	Niwithigala	
R25	Wewdagala South School		Kalawana	
R27	Panawenna South School	Ratnapura	Pelmadulla	
R28	Narangoda School			
R29	Erapola Srimahinda School			
R30	Nugadanda School		Eheliyagoda	
R32	Hidellana Junior School			
R33	Gairenagama Junior School		Ratnapura	
Kegalle				
K1	Hettimulla New Junior School	Kegalle	Kegalle	
K2	Kegalle Walagamba Junior School		Deligama	
K4	Dedigama Junior School		Galigamuwa	
K10	Bamynugama Maliyadewa Junior Sch.		Rambukkana	
K13	Ashoka Junior School	Mawanella	Kahawandala	
K14	Baddewela Junior School		Aranayake	
K17	Kahawattala Junior School			
K21	Galatara Junior School			
K22	Ussapitiya Sri Sumangala Jr. Sch.			
K26	Dehiowita Budedhist Elem. Sch.	Dehiowita	Dehiowita	
K28	Dedugala Elem. School		Yatiyabtota	
K31	Amithirigala Junior School		Ruwanwella	
K33	Kadirewan Junior School		Deraniyagala	
K36	Pothdeniya Kanda School			
Western Province				
Gampaha				
G1	Maddumandara Junior School	Gampaha	Gampaha	
G5	Welipillawa Junior School	Kelaniya	Mahara	
G7	Hekittaha Christ King School		Wattala	
G9	Wegowwa Junior School	Minuwango	Minuwangoda	
G11	Daluwakotuwa St. Anne's School	Negombo	Ngombo	

(2) Criteria for Selecting Project Schools

In selecting the Project schools, the schools were first selected based on site conditions according to the criteria agreed upon by the MOEHE and then selected based on the necessity of classrooms. The criteria for selection are shown below.

Table 2 -2 The Criteria for Selection of Project Schools

	ITEM	CONTENT	
Criteria for selection relating to site condition	①	Land ownership	Existing and new sites to be public property.
	②	Condition of construction site	Construction site already available with possible access by construction vehicles.
	③	Degree of investment in the school	Priority to be given to schools with low budget allotments and no new buildings under construction.
	④	No overlapping with other aid organizations	No on-going projects by other aiding organizations for the construction or improvement of school buildings.
	⑤	Others	The safety of the workers involved in construction must be secured, etc.
Criteria for selection relating to educational condition	⑥	Deterioration of classrooms	No windows, doors or partitions in classrooms, causing difficulty in conducting lessons. Temporary classrooms and damaged roofs. Such schools will be given priority.
	⑦	Necessity of Classroom	The number of school children in the year 2003 will be calculated and those schools with inadequate classrooms will be given priority.
	⑧	Others	Priority given to schools making effort to improve the quality of education.

1) Evaluation on the Site Conditions and Educational Conditions

The site conditions of each candidate school were evaluated according to the following criteria:

① Land Ownership

Land must be under the ownership of the Provincial Council. Even if it is public land, should there is any housing on the site (excluding staff housing), it will be omitted from the Project. In order to confirm land ownership, a copy of the certificate must be submitted before construction begins.

② Condition of Construction Site

Sites located on steep slopes requiring extensive ground preparation and presenting difficulty in securing construction space will be omitted, as well as sites where construction vehicles may not enter.

③ Degree of Investment in the School

Schools where new buildings are being constructed, or have budget allotment for the construction of new buildings at the time of inspection, will be omitted.

④ Overlapping with Other Aid Organizations

If the construction of classrooms is already under way or is being planned with the aid of other organizations, these schools will be omitted from the Project. If multipurpose rooms, teacher's rooms and toilets are to be constructed by other organizations, these rooms will be omitted from the Project.

⑤ Others

Schools where the safety of the construction workers may not be secured due to dangerous sites, such as from landslides or due to terrorist activities, will be omitted from the Project.

The educational conditions of each candidate school were evaluated according to the following criteria:

⑥ Deterioration of Classrooms

The existing schools may be greatly separated into temporary facilities and permanent facilities made of brick masonry and reinforced concrete. Regarding the criteria for reconstructing temporary facilities, those that are structurally dangerous will be rebuilt. For permanent buildings, they may only be rebuilt if they are severely deteriorated and have damaged roofs, no partitions or windows preventing adequate lessons, difficulty in converting existing rooms to libraries, special rooms for music, art, etc. For those schools not having secured temporary use classrooms during the Project construction period, it will be necessary to conduct double shift classes by using the remaining classrooms. Thus, the number of existing classrooms to be demolished for replacement shall be limited to one half of the total existing classrooms.

⑦ Necessity of Classrooms

The necessity of classrooms will be judged using the following criteria.

a) Data on the number of students and teachers

As SRS has already been conducted in the Western and Sabarugamuwa Provinces, the number of students and teachers calculated based on the result of SRS will be used in principle. The reliability of this data will be checked with the data obtained during site inspections.

b) Utilization of the classrooms

- Single and double shift system

Most of the inspected schools have a single shift system. SRS was also examined as a single shift school system. Thus, the utilization rate of the classrooms is 100%.

- Grades

This Project has been targetted at first to ninth grade schools. However, schools having more than ten grades were also included. Thus it has been agreed upon by the MOEHE that the Project will be centered on the first to ninth grade schools on the condition that schools with more than ten grades will be separated into two schools in the future.

⑧ Others

Schools which are motivated to develop teaching techniques and require the improvement of facilities in order to achieve the results are given priorities.

2) Selection of Project Schools and Size of the Facilities

The selection of the schools and the size of the facilities were evaluated according to the following stages:

① First Stage: Selection of Project Schools

Based on the criteria for site conditions, the following schools will be omitted from the Project: Schools on non-public land; schools where construction space cannot be secured; schools where construction vehicles cannot enter; schools where new buildings are already under construction or are being planned; schools where classrooms are being constructed or are planned by other aid organizations; and schools where the safety of the construction workers may not be secured.

② Second Stage: Evaluation on the Number of Project Classrooms

The estimation of the number of classrooms will be conducted according to the following items:

a. Number of classes to be accommodated

Although the delivery of completed Project schools is scheduled for the year 2000 ~ 2001, the number of classrooms for the Project shall be decided upon based on the estimated classrooms that can accommodate the number of 1 to 9th grade students that will be minimum in year 2003. Following the guideline of the MOEHE, the maximum number of classes per grade will be five, thus totalling 45 classes.

b. Floor space of Project classrooms

The new standard by the MOEHE for a class of 40 students stipulates that the floor spaces be 1.4 m² (15 sq. ft.) for each student. Thus, the floor space of the classroom will be 56 m².

c. Number of Classes to be Accommodated by Existing Classrooms

As a result of the site study, the number of classes to be accommodated by existing classrooms shall be equivalent to the number of classrooms that will remain after demolishing existing classrooms. As for the calculation method of the classes that will be accommodated by existing classrooms, those classes that are taught in rooms permanently separated by reinforced concrete walls shall be counted as the present number of classes. Classes taught in rooms without partitions or are separated by wooden movable partitions shall be recalculated by dividing the present number of classes by the floor space of 56m².

d. Utilization rate of existing and new classrooms

As most of the schools have a single shift system, the coefficient 1.0 will be multiplied.

Based on "a" through "d" above, the number of necessary classrooms will be the number decided upon in accordance "a" minus the number of existing classrooms specified in "c". Thus, the number of necessary new classrooms will be calculated by the following equation:

$$\text{Number of new classrooms} = (a - c) \times (d : 1)$$

③ Third Stage: Evaluation of the possible and necessary number of classrooms to be allocated.

a. Deciding upon the possible number of new classrooms to be allocated.

The possible number of classrooms that can be arranged at each site will be

decided upon based on site inspection results.

- b. The number of necessary classrooms per site, estimated in (2) will be evaluated to see whether or not they satisfy the number decided upon in (a).
- c. As a result of the above evaluation, if the necessary number of classrooms are not allocated due to site conditions, the MOEHE shall provide the necessary number of classrooms to meet the needs.

3) Evaluation Results

As the result of the SRS data investigation, it was found that G7 Hekittaha Christ King School had calculated the number of classrooms based on the premise of a future population increase eventhough there will be no population increase in the future. Thus, the number of classrooms was recalculated based on the SRS method. As for the K33 Kadiresan School, the number of students to be relocated to other schools was included in the classroom calculation figure. Thus, the number of the students in year 2003 was estimated based on the present number and distribution at each grade after eliminating those students who will be relocated to other schools. The number of necessary classrooms was then reevaluated. Results of each Project school's examination that was conducted based on the site study results are as follow (see "the Appendix 6. Proposed Number of Classrooms" for details of the examination results of each Project school):

① Number of Project Schools:	25
② Number of New Classrooms:	200
③ Number of Multipurpose Rooms:	25
④ Number of Teachers, Principal, and Storage Rooms:	25

Based on the evaluation results, the schools that were omitted and the reason for omission from the Project and the schools that were accepted are shown in the table below. The evaluation process is shown in flow chart Figure 2 -1.

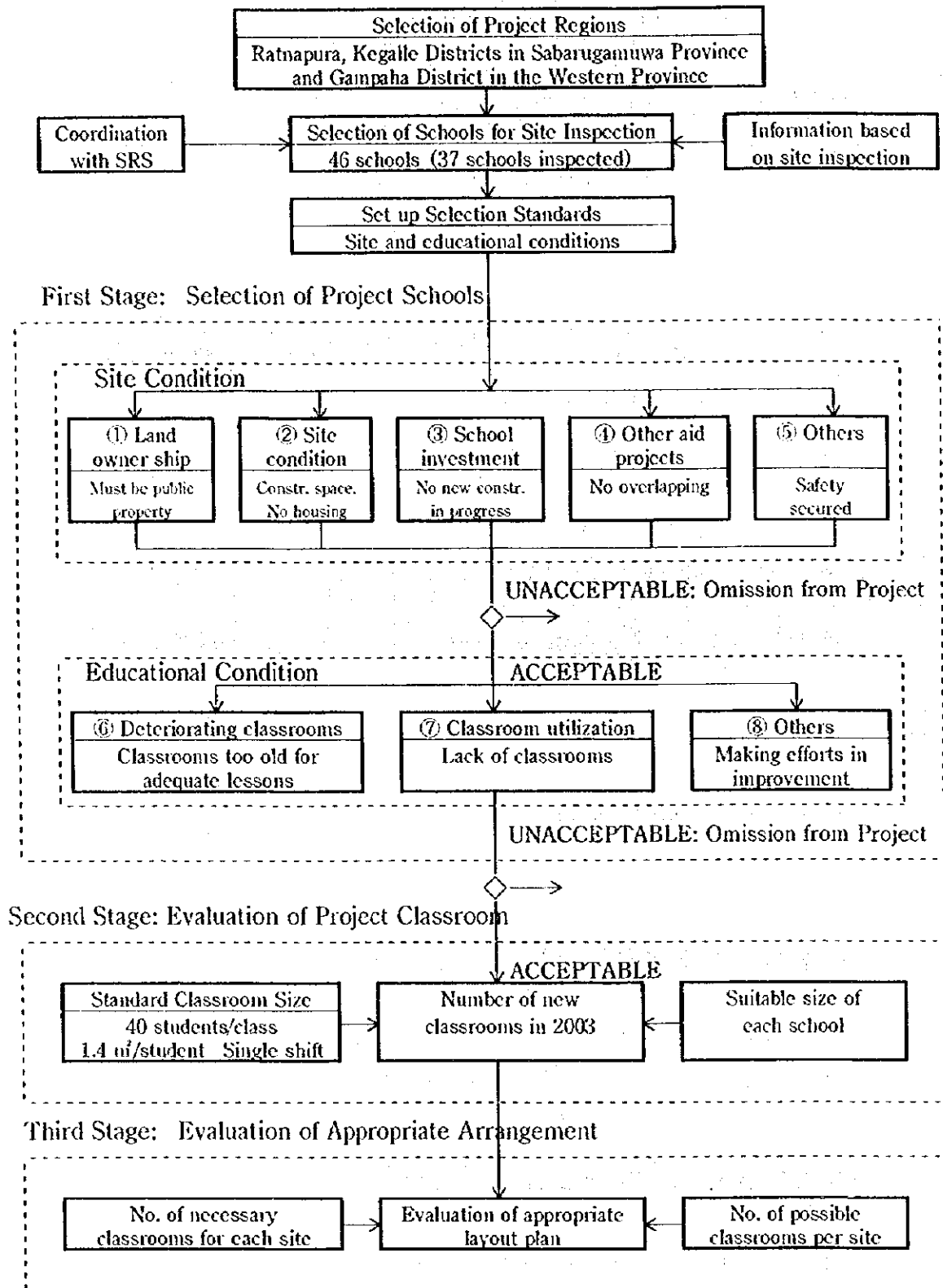
Table 2 -3 Schools to Be Omitted from the Project and the Reasons for Omission

No.	School Name	Reason for Omission	Criteria for Selection
Sabarugamuwa Province			
Ratnapura			
R8	Hatangala School	Adequate classrooms No deterioration of school buildings	6, 7
R11	Aluthnuwara Shastralankara	Adequate classrooms	7
R15	Mewdekanda Tamil School	Site located on steep slopes No access for construction vehicles No deterioration of school buildings	2, 6
R18	Pebotuwa Elem. School	Adequate classrooms	7
R26	Sri Gnanananda School	No construction space	2
R28	Narangoda School	No construction space No access for construction vehicles	2
R29	Erapola Srimahinda School	Adequate classrooms	7
R30	Nugadanda School	New school building under construction No access for construction vehicles No deterioration of school buildings	2, 3, 6
R33	Gairenagama Junior School	No construction space	2
Kegalle District			
K2	Kegalle Walagamba Jr. Sch.	No construction space	2
K17	Kahawattala Junior School	Site located on steep slopes No access for construction vehicles	2
K21	Galatara Junior School	No construction space	2
Western Province			
Gampaha			
G9	Wegowwa Junior School	Adequate classrooms New school building under construction	3, 7

Table 2 -4 Selected Project Schools

No.	School Name	Zone	Div. Scr.
Sabarugamuwa			
Ratnapura			
1	R1	Godawela School	Embilipitiya
2	R2	Maduwanwela Sri Sarananda School	Kolonna
3	R4	Halmillaketiya School	Embilipitiya
4	R5	Rahula primary School	Godakawela
5	R7	Galpaya School	Balangoda
6	R9	Ranwala School	Opana/Weligepola
7	R13	Damahana School	Balangoda
8	R25	Weddagala South School	Niwithigala
9	R27	Panawenna South School	Ratnapura
10	R32	Hidellana Junior School	Ratnapura
Kegalle			
11	K1	Hettimulla New Jr. Sch.	Kegalle
12	K4	Dedigama Junior School	Dedigama
13	K10	Bamunugama Maliyadewa Jr. Sch.	Galigamuwa
14	K13	Ashoka Junior School	Mawanella
15	K14	Baddewela Junior School	Rambukkana
16	K22	Ussapitiya Sri Sumangala Jr. Sch.	Aranayake
17	K26	Dehiowita Buddhist Elem. Sch.	Dehiowita
18	K28	Dedugala Elem. School	Yatiantota
19	K31	Amithirigala Junior School	Ruwanwella
20	K33	Kadiresan Junior School	Deraniyagala
21	K36	Pothdeniyakanda School	
Western Province			
Gampaha			
22	G1	Maddumadandare Junior School	Gampaha
23	G5	Welipillawa Junior School	Kelaniya
24	G7	Hekittaha Christ King School	Wattala
25	G11	Daluwakotuwa St. Anne's School	Negombo

Figure 2 – 1 Evaluation Flow Chart for the Selection of Project Schools and School Size



2 - 2 - 4 Establishing Project Facility and Equipment Components

(1) Evaluation of Project Facilities and Equipment

In Sri Lanka, emphasis has so far been placed on quantity of schools rather than quality and this has been achieved on a nationwide level. However, as mentioned previously, the quality side has various problems. Thus, the MOEHE is aiming to improve the educational surroundings, by increasing opportunities for education and improving the quality of teachers and administration. In order to improve the quality of school facilities, the MOEHE is setting new standards and reorganizing the educational system by conducting SRS with the aid of the World Bank. With this in mind, plans for facilities and equipment which will be the standard for the government of Sri Lanka in the future will be examined.

The Project facility and equipment will be evaluated into the following groups: 1 to 3 storied classroom building comprising of ordinary classrooms, multipurpose room, teacher's room, principal's room and storage room; separate toilet building because of odor problem; basic furniture and educational material.

1) Conditions for Preparing Project Facility

① Classroom Building

The MOEHE has modified the necessary floor space in a classroom per student from 10 sq.ft. (approx. 0.9 m²) to 15 sq.ft. (approx. 1.4 m²), with one classroom accommodating 40 students. According to the new standard, the floor space for the classroom will be 56 m². The standard furniture for a student in a junior school stated by the MOEHE is a desk, chair and shelves. Considering the arrangement of furniture and efficiency in conducting lessons, the size of the classroom will be as follows:

Ordinary classroom: 7.0m x 8.0m = 56.0 m²

Floor space per student: 1.4 m²

As the multipurpose room will be used for group work, such as science experiments, arts and crafts, tables for four people will be used. Considering the arrangement of furniture and efficiency in conducting lessons, the size of the room will be 1.5 times that of ordinary classrooms, 84.0 m² (7.0m x 12.0m).

One multipurpose room is planned for each school. The multipurpose room will also be utilized as a place of meeting for area residence. Under the present conditions and school curriculum, the teacher's room need not accommodate all the teachers, with one desk being shared by three teachers at the most. Two types of room will be planned according to the number of teachers in that school.

The principal's room should have enough space for meetings consisting of a small number of teachers and parents. The storage room, storing educational material, will be located next to the teacher's room in terms of operation.

② Toilet Building

The existing ordinary toilets simply have toilet bowls in the ground with partitions up to the waist. Although there is a simple drainage facility, there is no water supply. Thus, the Project aims to improve the sanitary conditions of each Project school by providing water supply and drainage facilities and adequate toilets to meet the needs of each school.

2) Conditions for Preparing Equipment

As decided upon by the MOEHE and the National Institute of Education (NIE), the equipment to be chosen will be that used on a daily basis, that can be easily handled by teachers and principals and that can be easily repaired or replaced in the future. The equipment may be separated into furniture and educational material. Furniture will be comprised of basic furniture, such as desks and chairs for teachers and students, shelves and blackboards, etc. The educational material will be based on the curriculum and lesson contents. As material for first to fifth grades has almost been provided, the ones from sixth to ninth grades will be prepared. As for the quantity of furniture and equipment, it will only apply to Project facilities.

(2) Evaluation on the Arrangement of Project Facilities

There are no standards regarding school playgrounds. Some Project schools have playgrounds, whereas some have none due to lack of space. School buildings have been built mostly without securing space for playgrounds. As outdoor space is necessary for such activities as sports, enough space for playgrounds will be secured if possible when arranging the school building, taking into consideration the line of flow of the building, emergency routes and space for additional classrooms in the future.

(3) Evaluation on the Procurement Method, Maintenance and Management

1) Evaluation on the Procurement Method

In order to facilitate the maintenance and management of the facility after completion, and to keep costs at a minimum, the construction material and equipment will basically be procured locally. However, the quality of some local goods may be inferior or costly compared to goods that may be procured from other countries without tax.

Under such conditions, the method will be evaluated by comparing locally procurable goods and those procured in Japan and other countries, in terms of ease of maintenance, quality control and low cost.

2) Evaluation on Maintenance and Management

The maintenance and management fee of the junior schools in Sri Lanka is provided by the Provincial Councils and donations from parents and supporters. However, it is presumed that adequate fees may not be provided due to the difficult financial status of Provincial Councils. Thus, the facility and equipment must be selected so that it can be easily managed and maintained.

(4) Consideration for WID

The school attendance rate for boys and girls in Sri Lanka shows the same figures. More girls seem to attend higher grades. Educational opportunities are thought to be the same for both boys and girls. In terms of school facilities, separate boys and girls toilets will be built. The entrance to the booths in the toilet will be built so that it cannot be seen directly.

(5) Specifications of the Facility and Equipment

The facility and equipment requested were evaluated according to the basic concept as follows:

Table 2- 5 Evaluation of Facility and Equipment Scale and Specifications

FACILITY		
Request Content	Project Facility Content	Size and Specifications
Classroom Teacher's room Storage room Multipurpose room Library	<p>Classroom Building Type (1 - 3 floors)</p> <p>① Classroom Floor Unit Classroom next to teacher's room: Type 1A (1 room) For more than Two floors: Type 3A (3 rooms) Type 4A (4 rooms)</p> <p>③ Teacher's room Floor Unit (1st floor) For single story building: Type SB·S: Teacher's room (small) For 2 to 3 floors: Type SB·M: Teacher's room (small) Type LB·M: Teacher's room (big)</p>	<p>The necessary number of classrooms will be decided according to each site condition and the type will be set for 1-3 floor buildings.</p> <ul style="list-style-type: none"> • The size of each classroom should accommodate 40 people as mentioned in the new standards of the MOEHE • For management purposes, the teacher's room (big/small), principal's room, storage room and multipurpose room will be considered as one component. • The library will be provided by the MOEHE.
Toilet	<p>Toilet Building Type</p> <p>Type CL- Boys: 2 booths & urinals for 3 boys Girls: 4 booths</p> <p>Type CM- Boys: 3 booths & urinals for 5 boys Girls: 6 booths</p>	<ul style="list-style-type: none"> • Considering WID, separate toilets will be built for boys and girls. • 2 types will be planned according to the number of students in each school.
EQUIPMENT		
Request Content	Project Facility Content	Size and Specifications
Basic Furniture	<p>① Classroom Furniture: Student's desks and chairs, shelves, teacher's desk and chair, cabinet, blackboard, bulletin board.</p> <p>② Multipurpose Room: Work benches, chairs, teacher's table and chair, blackboard, bulletin board.</p> <p>③ Teacher's Room: Teacher's desks and chairs, cabinets, blackboard, bulletinboard.</p> <p>④ Principal's Room: Desk, chair, side cabinets, cabinet, bookshelves, visitor's chairs.</p> <p>⑤ Storage Room: Fixed shelves</p>	<ul style="list-style-type: none"> • Only applies to newly built facilities. • Desks and chairs for 40 students per class. • Teacher's desk, chair, cabinet, blackboard and bulletin board for one teacher. • Open shelves per classroom for all students. • Work benches and chairs in multipurpose room for groups of four. • Teacher's desk, chair, blackboard and bulletin board for multipurpose room for 1 teacher. • Desks and chairs in teacher's room to be shared by maximum 3 teachers.
Basic Educational Material	① Science equipment for 6th to 9th grades.	<ul style="list-style-type: none"> • Educational material for 6th to 9th grades. • Science equipment to be used in multipurpose room. • Schools where 6th to 9th grade material have already been provided will be omitted

(6) Evaluation Results on the Requested Facilities and Equipment

The requested facilities and equipment for each project site were evaluated according to the basic concept and the results are shown in the following table:

Table 2--6 Evaluation Results of Requested Facilities and Equipment

No.	School Name	Facility							Equip.	
		Type	CL Rm	TE Rm	PR Rm	MP Rm	TL	FR	EQ	
SABARUGAMUWA PROVINCE										
RATNAPURA DISTRICT										
1	R1	Godawela	SB-M 1A 4A	5	1	1	1	CS	1	1
2	R2	Maduwanwela Sri Sarananda	SB-M 1A 4A	5	1	1	1	CS	1	1
3	R4	Halmillaketiya	SB-M 3A	3	1	1	1	CS	1	1
4	R5	Rahula	SB-M 3Ax2	6	1	1	1	CS	1	1
5	R7	Galpaya	SB-M 3Ax2	6	1	1	1	CS	1	1
6	R9	Ranwala	SB-M 3Ax2	6	1	1	1	CS	1	1
7	R13	Damahana	SB-M 3Ax2	6	1	1	1	CS	1	1
8	R25	Weddagala South	SB-M 3Ax2	6	1	1	1	CS	1	1
9	R27	Panawenna South	SB-M 1A 4Ax2	9	1	1	1	CS	1	1
10	R32	Hidellana	SB-M 3A	9	1	1	1	CS	1	1
		Sub-Total		61	10	10	10		10	10
KEGALLE DISTRICT										
11	K1	Hettimulla New	SB-M 3Ax2	3	1	1	1	CS	1	1
12	K4	Dedigama	SB-M 1A 4Ax2	9	1	1	1	CM	1	1
13	K10	Bamunugama Mahiyadewa	SB-M 1A 4A	5	1	1	1	CS	1	1
14	K13	Ashoka	SB-M 1A 4Ax2	9	1	1	1	CS	1	1
15	K14	Baddewela	SB-M 3Ax2	6	1	1	1	CS	1	1
16	K22	Ussapitiya Sri Sumangala	SB-M 3A	3	1	1	1	CS	1	1
17	K26	Dehiowita Buddhist	SB-M 1A 4Ax2	9	1	1	1	CS	1	1
18	K28	Dedugala	SB-M 3Ax2	6	1	1	1	CS	1	1
19	K31	Amithingala	SB-M 1A 4A	5	1	1	1	CS	1	1
20	K33	Kadiresan	SB-M 3Ax2	3	1	1	1	CS	1	1
21	K36	Pothdeniyakanda	SB-M 3A	3	1	1	1	CS	1	1
		Sub-total		61	11	11	11		11	11
WEST PROVINCE										
GAMPAHA DISTRICT										
22	G1	Maddumadandare	LB-M 3Ax8 4Ax3	36	1	1	1	CS x2	1	1
23	G5	Welipillawa	SB-M 3Ax2	6	1	1	1	CS	1	1
24	G7	Hekittaha Christ King	LB-M 3Ax6	18	1	1	1	CM	1	1
25	G11	Daluwakotuwa St. Anne's	SB-M 3Ax2 4Ax3	18	1	1	1	CM	1	1
		Sub-total		78	4	4	4		4	4
		Total		200	25	25	25		25	25

Abbreviation : CL=classroom, TE=teacher's room, PR=principal's room, MP=multipurpose room, TL=toilet type, FR=furniture, EQ=equipment

2 -3 Basic Design

2 -3 -1 Design Concept

The objective of this Project is to improve the quality of education in junior schools in the Sabarugamuwa and Western Provinces, by improving school facilities and supplying basic educational equipment. After close evaluation of the requests of the Sri Lanka government and the contents of the meetings during field survey, the Basic Design for the facilities and equipment shall be conducted according to the following policy:

(1) Natural Conditions

The Project area has a tropical monsoon climate all year round with high temperatures and humidity. Thus, the facilities should be designed in order to cope with such natural conditions as strong sunlight and heavy rain. Therefore, the plan will maximize the use of natural shades and ventilation, without wholly depending on electrical appliances.

(2) Social Conditions

Construction material will be procured locally as much as possible, and the facilities will be designed so as to fit into the natural surroundings. Considering the topography of the site as well as the position of existing facilities, various facility types will be designed avoiding long buildings. A rational arrangement plan will be drawn up. Toilets will be designed according to local styles, with improvement to sanitary conditions. Furniture and educational material will be planned and selected according to local standards.

(3) Maintenance and Management

Considering the difficult financial situation of the Sri Lanka government, the facilities should be designed so that maintenance and management will be easy and less costly. By procuring construction material and equipment locally, they may be easily replaced in cases of deterioration or damage.

(4) Evaluation and Measures Regarding the Implementation of the Project

The facility plan will be simple and rational to meet the ability of the local workers. As construction of various school facilities will be conducted simultaneously throughout a wide area, the Project regions should be grouped into sections, each with a construction headquarters and a rational and efficient construction plan. The safety of the students

must be secured during construction, and the safety of the construction workers must also be considered.

(5) Design Standards

The design standards for the Project will be based on local standards.

1) Architectural Design Standards

The MOEHE has drawn up a new standard for school classrooms. The floor space for one student will be 15 sq ft (approx. 1.4 m²), with 40 students to a class. Although standards for school toilets according to the size of the school have been set, there are no other particular standards. Thus, local construction standards will be taken into consideration when designing.

2) Structural Design Standards

As there are no specific regulations regarding structure design in Sri Lanka, the structure design standard of the Architectural Institute of Japan will be used for this Project. Locally used British Standards and specifications will also be considered.

3) Facility Design Standards

① Electric installation:

Fluorescent lighting which is less costly will be used. Light switches and receptacles will be installed.

② Water supply and drainage (Sanitary facilities):

Those sites with city or well water will have a piped water supply. If there is no source of water supply within the site, rainwater will be stored in tanks and water will be delivered by human hands. The drainage plan will consist of sewage and waste water being combined and treated in an infiltrating septic tank.

4) Material and Construction Standards

The standards set by the MOEHE and those thought to be appropriate for each type of item will be used, as well as BS and JIS standards.

(6) Reasons for Size Selection

The size of the rooms in the Project facilities will be based on the standards of the MOEHE. The following table shows the figures adopted for the Project, together with the figures mentioned in the Building Design Data Manual of the Architectural Institute

of Japan.

Table 2 – 7 Standards for Floor Space of the Project Rooms

Name of Room		Adopted Figure	Building Design Data Manual
Ordinary Class- room	Area/Student	1.4 m ² /student (MOEHE Std.)	1.6 m ² /student
	No. of Students	40 students (MOEHE Std.)	40 students (maximum 45)
	Size of Room	7.0 x 8.0m	8.0m x 8.0m
Multi- purpose room	Area/Student	2.1 m ² /student	2.5 m ² /student
	No. of Students	40 students (MOEHE Std.)	42 Students
	Size of Room	7.0m x 12.0m	9.0m x 12.0m
Teacher's room (Big/small)		3.5 m ² /person	3.5 ~ 5.2 m ² /person
Principal's room		3.5m x 4.0m = 14.0 m ²	*26 ~ 36 m ² (including reception and meeting room)
Toilets		1 toilet bowl and 1 urinal (girls: 2 toilet bowls)/200students. 1 toilet bowl each will be added for every additional 200 students. For over 1000 students, 1 toilet each will be added for every additional 400 students. (MOEHE Standards)	Urinal: 1 for every 25 male students. Toilet bowl: 1 for every 50 male students and 1 for every 20 female students. (School Environmental Hygiene Standard in Japan)

Note * Based on the Class Size Standard set by the Ministry of Education in Japan.

2 – 3 – 2 Basic Plan

(1) Facility Arrangement Plan

As the site conditions are different for each site, the most appropriate arrangement plan must be drawn up by assessing the shape of the site, condition of infrastructure and position of existing facilities. The points to be noted in the arrangement plan are as mentioned below.

- 1) In order to avoid direct sunlight coming into the rooms, the classroom building will be arranged on an east to west axis if possible.
- 2) A rational arrangement plan will be made by taking into account the traffic flow in the existing buildings.
- 3) If possible, space for a school yard to conduct outdoor activities such as sports will be secured.
- 4) Space will be secured as much as possible for additional construction in the future.
- 5) The teacher's room and principal's room should be arranged in a location that will facilitate the management of the entire facility including existing facilities.

- 6) The space between buildings should be considered to allow for adequate natural ventilation and light.
- 7) Project sites with more than two classroom-buildings should have one connecting corridor with a roof so that moving from the buildings will be easy during times of rain.
- 8) The toilets should not be arranged near wells to avoid contamination of well water.

(2) Architectural Plan

1) Floor Plan

① Classroom and Teacher's Room Building

a. Classroom Unit

The floor space for the classroom will be 15 sq ft (approx. 1.4 m²) per student, as stated in the MOEHE's new standard, with 40 students to a class, which works out to be 56 m². Considering the arrangement of blackboard, furniture and cabinets for teachers and 40 students, the classrooms will be 8m long by 7m. For emergency evacuation purposes, the classroom will have two entrances. In order to be adaptable to various construction space and necessity, the classroom buildings will be divided into 3 types: 3 classrooms unit, 4 classrooms unit, and one classroom unit with teacher's room unit.

b. Teacher's Room Unit

For management and maintenance purposes, the teacher's room, principal's room, storage room and multipurpose room will be planned as one unit. The multipurpose room will be used for group lessons such as science experiments and arts and crafts. Considering that the lessons will be conducted in groups of four students and in order that various arrangements can be made, the size of the room will be 1.5 times that of ordinary classrooms, which will be 84 m² (12m x 7m). A counter with sinks will be installed at the back of the room in order that equipment may be washed after lessons. A storage room for necessary material will also be planned. In order that the storage room may be effectively used, it will be accessible both from multipurpose room and the teacher's room. The multipurpose room will also be used as a meeting place for local residents. The floor space of the teacher's room will be 3.5 m² per person. One desk will be shared by three teachers at most. Two types for the teacher's room will be considered, one for 12 teachers with a floor space of 42 m² (6m x 7m) and the other for 16 teachers with a floor space of 56 m² (8mx7m). A separate

principal's room will be constructed, with a floor space of 14 m² (4m x 3.5m) in order that small meetings with parents or teachers may be held.

If two or more buildings are planned for the site, one connecting corridor should be built with a roof in order that teachers carrying equipment or materials will not get wet on rainy days. If the buildings have three floors, a connecting corridor without roof will be set up on the second floor. The corridor under this level will be used as a passage on rainy days. The table below shows the unit arrangement of classrooms / teacher's room and their size.

Table 2 – 8 Structural Content of Each Unit and Floor Space (m²)

Content \ Unit	3A	4A	SB·S	SB·M	LB·M	SB·M+1A
1 classroom	--	--	--	--	--	57.20
3 classrooms	171.60	--	--	--	--	--
4 classrooms	--	228.80	--	--	--	--
Teacher's room (small)	--	--	42.90	42.90	--	42.90
Teacher's room (large)	--	--	--	--	57.20	--
Principal's room	--	--	14.30	14.30	14.30	14.30
Storage	--	--	21.45	21.45	14.30	21.45
Multipurpose room	--	--	85.80	85.80	85.80	85.80
Outer corridor	56.00	72.00	55.15	63.15	56.00	79.15
Staircase	28.60	28.60	--	28.60	28.60	28.60
Total	256.20	329.40	219.60	256.20	256.20	329.40

Note: The floor space will be measured from the column centers.

② Toilet Building

The MOEHE's standard states that for 200 students, the boys' toilet will have 1 toilet bowl and 1 urinal and the girls' toilet will have 2 toilet bowls. A toilet bowl will each be added for an additional 200 students. For over 1000 students, 1 toilet bowl will be added for every additional 400 students. This standard will be used for the Project and, as shown in the table below, two types of toilets will be considered according to the size of each school. For ventilation and hygiene purposes, the toilets will be planed separate from the classroom and teacher's room buildings. If these buildings are in the vicinity, a non-roofed corridor will be installed.

Table 2 – 9 Contents of Each Toilet Type and Floor Space

Toilet Type	Max. No. of Students	Content		Toilet Space (m ²)		
				Toilet	Corridor	Total
CS	800	Boys	2 toilet bowls / Urinal for 3 boys	36.00	16.00	52.00
		Girls	4 toilet bowls			
CL	1,400	Boys	3 toilet bowls / Urinal for 5 boys	46.80	20.80	67.60
		Girls	6 toilet bowls			

Based on the above evaluation results, the facility scale for each of the Project sites are as shown below:

Table 2 – 10 Facility Scale of Each Project School

No.	School Name	Contents of Facility					Floor Space (m ²)				
		CR	TE	PR	MR	TL	CR/TE	Toilet	Corr.	Total	
SABARUGAMUWA PROVINCE											
RATNAPURA DISTRICT											
1	R1	Godewala	5	1	1	1	CS	658.80	52.00	0.00	710.80
2	R2	Maduwanwela Sri Sarananda	5	1	1	1	CS	658.80	52.00	0.00	710.80
3	R4	Halmillaketiya	3	1	1	1	CS	512.40	52.00	0.00	564.40
4	R5	Rahula	6	1	1	1	CS	768.60	52.00	0.00	820.60
5	R7	Galpaya	6	1	1	1	CS	768.60	52.00	0.00	820.60
6	R9	Ranwala	6	1	1	1	CS	768.60	52.00	0.00	820.60
7	R13	Dhanahana	6	1	1	1	CS	732.00	52.00	8.00	792.00
8	R25	Wewdagala	6	1	1	1	CS	768.60	52.00	0.00	820.60
9	R27	Panawenna South	9	1	1	1	CS	988.20	52.00	0.00	1,040.20
10	R32	Hidellana	9	1	1	1	CS	1,024.80	52.00	8.00	1,084.80
Sub-total			61	10	10	10	--	7,649.40	520.00	16.00	8,185.40
KEGALLE DISTRICT											
11	K1	Hettimulla New	3	1	1	1	CS	512.40	52.00	0.00	564.40
12	K4	Dedigama	9	1	1	1	CM	988.20	67.60	0.00	1,055.80
13	K10	Bamunugama Maliyadewa	5	1	1	1	CS	658.80	52.00	0.00	710.80
14	K13	Ashoka	9	1	1	1	CM	988.20	52.00	0.00	1,040.20
15	K14	Baddewela	6	1	1	1	CS	768.60	52.00	0.00	820.60
16	K22	Ussapitiya Sri Sumangala	3	1	1	1	CS	512.40	52.00	0.00	564.40
17	K26	Dehiwita Buddhist	9	1	1	1	CS	988.20	52.00	0.00	1,040.20
18	K28	Dedugala	6	1	1	1	CS	768.60	52.00	0.00	820.60
19	K31	Amithirigala	5	1	1	1	CS	658.80	52.00	0.00	710.80
20	K33	Kadirewan	3	1	1	1	CS	512.40	52.00	0.00	564.40
21	K36	Pothdeniyakanda	3	1	1	1	CS	512.40	52.00	0.00	564.40
Sub-total			61	11	11	11	--	7,869.00	587.60	0.00	8,456.60
WESTERN PROVINCE											
GAMPAHA DISTRICT											
22	G1	Maddumandara	36	1	1	1	CSx2	3,294.00	104.00	114.00	3,512.00
23	G5	Welipillawa	6	1	1	1	CS	768.60	52.00	0.00	820.60
24	G7	Hekittaha Christ King	18	1	1	1	CM	1,793.40	67.60	52.00	1,913.00
25	G11	Daluwakotuwa St. Anne's	18	1	1	1	CM	1,756.80	67.60	16.00	1,840.00
Sub-total			78	4	4	4	--	7,612.80	291.20	182.00	8,086.00
TOTAL			200	25	25	25	--	23,131.20	1,398.80	198.00	24,728.00

CR=classroom; TE=Teacher's room; PR=principal's room; MR=multipurpose room; TL=toilet; corr.=corridor; PH=pump house

2) Sectional Plan

① Classroom/Teacher's Room Building

Based on the standard for school buildings in Sri Lanka, the height of the ceiling will be 3.0m and the floor height will be 30cm above the ground surface. The under surface of reinforced concrete slab will become the ceiling of the lower floors. The gable roof of the top floor will itself be the

ceiling. In order to ventilate the hot air at the top of the room, the walls of the upper beam on the outer corridor side will be left open at the top floor. Wire mesh will be installed to prevent burglary. Each room shall be provided with aluminum sliding windows and a wooden door in order to prevent rainwater from entering the room as well as for security purposes. Ventilation Bricks shall be installed above the windows for natural ventilation. A piece of wood will be installed on the wall at the back side of each classroom for the display purpose of students. Canopies will also be installed to prevent sunlight and rain getting into the rooms and the outer corridor. The rooms on the first floor will have steel grilles to prevent burglary and to protect the glass. Iron grill doors shall be also installed at the staircase at the 1st floor for each building to prevent burglary at upper floors.

② Toilet Building

The floors of the toilets will have slopes for washing the floors with water. Drainage outlets will be installed in the lower part of the outer wall. The walls will be open at the top for ventilation and canopies will be installed at the front of the toilets for easy access in times of rain. There will be no suspended ceiling and the roof will be a gable roof, in coordination with the classroom building.

3) Structure Plan

① Design Load

a. Live load:	Roof:	50Kg/m ²
	Classroom:	230Kg/m ²
	Multipurpose room:	300Kg/m ²
	Teacher's room:	230Kg/m ²

b. Earthquake Force

Sri Lanka is not included in the world's earthquake zones and also neighboring countries have no records of earthquakes. Thus, earthquake force will not be considered for this Project.

c. Wind Load

As there are no records of cyclones or powerful winds, the design wind load will be 35m/sec (approx. 75 miles/sec.).

② Foundation Plan

The soil of the Project area is mostly composed of laterite which is relatively stable. Past results show that 10 to 15t/m² of allowable bearing strength may be obtained, thus the direct foundation method will be used.

For this Project, buildings with less than two stories will have an independent foundation, whereas three-story buildings will in general have a mat foundation. As different sized buildings close to each other on the site may cause sinking, structures will be separated by installing expansion joints.

③ Structure Plan

Reinforced concrete frame structures which are the popular method in Sri Lanka will be used.

④ Materials to be Used

The materials to be used will mostly be procured locally. However, those that are unavailable or inferior in quality will be procured from Japan or other countries. If the materials are to be procured from countries other than Japan, they should be cheaper and acceptable in quality.

Concrete: On-site mixed concrete

Cement: Portland cement

Aggregate: Local crushed stone and river sand

Manufacture: As there are no ready mixed concrete plants nearby, the concrete will be mixed on site. Thus, adequate measures must be taken when selecting the material, mixing, transporting, placing and curing.

Reinforcing bars: Japanese deformed reinforcing bar
Under D13: SD295A
Over D16: SD345

Concrete blocks, bricks: To be procured locally

4) Facility Plan

① Electric Facility Plan

Galupaya School (G7) and Dedugala Elementary School (K28) are located 1Km away from nearest electric cables. Galupaya School is scheduled to be provided with electricity in near future. All other Project schools have electric cables within 300m from the road by the school. It is assumed that electricity will be provided by the time the facilities are completed except for Dedugala Elementary School (K28). Thus, the electric facility plan for all the sites, except Dedugala Elementary school (K28), will be planned according to the following policy:

The Sri Lanka side will be responsible for servicing low voltage power of 230V, 50Hz from the electric-light poles on the street to the poles within the site by overhead electric wires. After this has been completed, wiring will be

installed by the Japanese side. Lighting fixtures will be installed in the teacher's room and principal's room where deskwork will be conducted, and the multipurpose room where meetings will be held by local residents in the evening. Lighting fixtures will not be installed in the classrooms as lessons will finish during the daytime. In order to save costs and energy, fluorescent lights will be installed. It is assumed that the lights will not be used constantly.

As lessons in the future will be conducted using tape recorders, a receptacle will be installed in each of the classrooms, and several in the multipurpose room, teacher's room and principal's room. A power control panel will be installed in the pump room to control the pump. The installation of telephone lines is not included in this Project. However, for future installations, a wiring sleeve will be installed in the principal's room.

The average luminosity of the lights installed will be as follows: As for Dedugala school (K28), empty conduits will be installed to prepare for electric power supply in the future.

Teacher's room: 70Lx (on desks)

Multipurpose room: 60Lx (on desks)

Principal's room: 45Lx (on desk)

② Water Supply and Drainage, Sanitary Facility Plan

a. Water Supply Facility Plan

The Project schools may be separated into those with water supplied from city water or spring water, from wells and those without any source of water supply. In the case of water supplied by city water or springs, it will be directly connected to the facility if there is no difference of elevation. If there is difference of elevation, water will be stored in a ground type reinforced concrete tank (3.0 - 4.0 m³). The water will be pumped by an electric pump into an elevated tank (1.0 m³) made of reinforced concrete, then supplied to necessary facilities through gravity flow. Water from wells will be pumped by electric pumps to elevated tanks and supplied. At schools without water sources, water will be hand carried by teachers and students. Also, rainwater on the roofs will be collected through pipes and stored in tanks (3.0 m³) during rainy season.

The water pipes made of PVC will supply the water to the sink in the multipurpose room, feet washing basins to be installed at the teacher's room unit (to be installed at the rain water tank at the schools without water supply), toilet wash basins, booths and urinals. Types of water supply method at each school site is shown in the table below.

Table 2-11 Types of Water Supply Method at Each School Site

Source	Water Supply Method	No. of School
City Water	Direct Connection	G7, K13, K28, K33, K36, R2, R4, R5, R9, R25
	Water Tank + Electric Water Pump + Elevated Water Tank	K26
Well	Electric Pump + Elevated Water Tank	G1, G5, G11, K4, K10, K14, K22, K31, R1, R7, R13, R32
Rain Water	Delivery by Hands	K1, R27

b. Drainage Facility Plan

Drainage facilities will be needed for the multipurpose room sink, feet washing basins, toilet wash basins, booths and urinals.

Reinforced concrete septic tanks will be installed beside the toilets to collect both sewage and waste water. Treated water will be infiltrated into the ground through an infiltration tank. If the drainage of the multipurpose room is far from the toilets, a separate infiltration system will be installed. The sewage facility will be according to the standards of the MOEHE. Toilet bowls will be the local Asian type and urinals in the boys' toilets will be the connected type and tiled. The wash basins and feet washing basins will be of tile on reinforced concrete.

(3) Construction Material Plan

The following table shows the finishing and construction methods for the buildings in the Project, the reasons for their choice and comparison with local methods.

Table 2 – 12 Construction Methods to be Used in the Project and Reasons for Selection

Building Portion	Local Method	Project Method	Reason for Selection	
Foundation	Reinforced Concrete	Same	Corresponds to local method	
Column/ Beams	Reinforced Concrete	Same		
Floor	Base	Reinforced Concrete		Same
	Finish	Classroom	Mortal Finish	Same
Toilet		Mortal Finish	Ceramic tiles	Easy maintenance
Wall	Base	Bricks	Same	Corresponds to local method
	Finish	Mortal coating	Same	
Roof	Base	Wooden/steel truss	Reinf. conc. truss	Strong durability
	Finish	Tiles	Same	Corresponds to local method
Ceiling	Lower floors	Mortal coating	Same	Water proof
	Top floor	None	Waterproof sheet on plywood	
Fixtures	Window	Wooden sash/ Glass	Alum. sash/ glass	Durability
	Door	Wood	Same	Similar to local method

(4) Equipment Plan

The equipment will be limited to basic educational material that was confirmed necessary at the time of site study and to those that will definitely be used, managed and maintained by the teachers. The equipment will only be provided to the Project facilities.

1) Educational Furniture and Appliances

The basic furniture and appliances will be based on the standard specifications of the MOEHE and will be procured locally. The contents are shown in the following table:

Table 2 – 13 Furniture and Appliances for Each Project Room

Room	Item	No	Size (mm)			Note
			With	Length	Height	
Classroom	Student desk	40	600	450	740	For 1 student
	Student chair	40	400	500	800	
	Student shelf	10	500	350	650	For 4 students
	Teacher's desk	1	1,200	760	760	
	Teacher's chair	1	450	500	900	
	Teacher's cabinet	1	900	400	1,830	Steel
	Blackboard	1	4,500	30	1,200	
	Buletine board	1	1,100	25	200	
Multipurpose Room	Student work bench	20	1,200	600	850	For 2 students
	Student stool	40	360	360	600	
	Teacher's demo. table	1	1,800	760	760	
	Teacher's chair	1	450	500	900	
	Blackboard	1	4,500	30	1,200	
	Buletin board	1	1,000	25	1,200	
Teacher's room (L)	Teacher's desk	16	1,200	760	760	
	Teacher's chair	16	450	500	900	
	Teacher's cabinet	5	900	400	1,830	Steel
	Blackboard	1	4,500	30	1,200	
	Buletine board	2	1,000	25	1,200	
Teacher's room (S)	Teacher's desk	12	1,200	760	760	
	Teacher's chair	12	450	500	900	
	Teacher's cabinet	4	900	400	1,830	Steel
	Blackboard	1	4,500	30	1,200	
	Buletine board	2	1,000	25	1,200	
Principal's room	Principal's desk	1	1,200	760	760	
	Side Cabinet	2	400	760	760	
	Teacher's cabinet	1	900	400	1,830	Steel
	Bookshelf	2	1,200	300	1,850	
	Principal's chair	1	450	500	900	
	Visitor's chair	2	450	500	900	

2) Educational Equipment

The following items will be noted when drawing up the equipment plan:

- ① Items that are in accordance with the curriculum and lesson contents and that are definitely usable by the teachers will be selected.
- ② The necessary quantity will be calculated after taking into account the type of lessons that are being conducted locally.
- ③ The items will be in accordance with the level of study of junior schools.
- ④ High-grade items requiring manuals or training of teachers will be omitted.
- ⑤ Expendable items will be omitted from the Project.

As most of basic materials for first to fifth grade such as arithmetic and science packages is already provided by the provincial educational offices, these will be omitted from the Project. This Project will center on materials for sixth to ninth grades. As a detailed list of educational material has not yet been submitted by the MOEHE, the selection will be made from the science materials list prepared by the MOEHE.

Although the list (6th– 13th grades) was prepared by the MOEHE in 1993, the contents of the new curriculum do not widely differ from that of the old one. Thus, the selection will be made with this list in mind, together with data from the teachers obtained during site inspections. As the Project involves junior schools, the equipment will be in accordance with the junior school texts. Although lessons using dissecting tools are not being conducted, anatomical charts are very effective in teaching children and they do not require any special training for the teachers, thus they have been included. The evaluation results of the science material are shown below:

Table 2 – 14 Evaluation Results of Science Material

List No.	Item	Evaluation	Reason	List No.	Item	Evaluation	Reason
Permanent Equipment							
1-2	Ammeter 0-5A	○	-	1-95	Masses - Slotted, Set of 110g	○	-
1-9	Balance - Spring, 100g/1N	×	1	1-100	Microscope - x 600	×	2
1-10	Balance - Spring, 500g/5N	×	1	1-101	Mirror - steel, curved	○	-
1-11	Balance - triple beam	○	-	1-112	Periodic Table	○	-
1-12	Barometer - Aneroid	×	4	1-114	Plier - Combination	×	3
1-14	Bimetallic strip	○	-	1-115	Plier - long nose	×	3
1-18	Burner - Bunsen	○	-	1-121	Pulleys - Bench type- Vertical	○	-
1-26	Cell- Lead / Acid (demo)	×	6	1-122	Pulleys - Double	○	-
1-30	Chisel - flat	×	3	1-123	Pulleys - Single	○	-
1-31	Circuit Board	○	-	1-124	Pulleys - System of 3	×	5
1-33	Clock - stop	×	3	1-137	Rod - Acryle (perspex)	○	-
1-35	Compass - traveller's	○	-	1-138	Rod - Ebonite	○	-
1-39	Corks borer	×	3	1-139	Rod - Polythene	○	-
1-42	Cutter- glass (Glazier's Diamond)	×	3	1-141	Rule - 1/2m	×	-
1-43	Dissecting forceps - pointed	×	4	1-142	Rule - 1m	×	-
1-44	Dissecting forceps - blunt	×	4	1-144	Saw - Hand	×	-
1-45	Dissecting needle	×	4	1-145	Screw Driver - flat	×	-
1-46	Dissecting scissor - small	×	4	1-145	Screw Driver - philips	×	-
1-48	Dissecting scissor - curved	×	4	1-151	Snips - Tinaman's	×	-
1-50	Dissecting tray	×	4	1-152	Solar Cell kit	×	-
1-53	Drill - Hand	×	3	1-153	Soldering iron	×	-
1-54	Dynamo - Demonstration	×	4	1-162	Stand - Laboratory	○	-
1-58	File - triangular	×	3	1-163	Stand - test tube	○	-
1-59	File - flat	×	3	1-164	Stand - tripod	○	-
1-60	Friction board/Inclined plane	×	4	1-165	Stove - pressure	×	-
1-61	Galvanometer	○	-	1-167	Tape measure - 2m	×	-
1-62	G - Clamp	×	3	1-168	Tape measure - 20m	×	-
1-65	Hammer - Claw	×	3	1-175	Tongs - Crucible	○	-
1-68	Holder - Lens/mirror	○	-	1-178	Tuning Forks on Resonance Box	○	-
1-69	Holder - test tube	○	-	1-180	Voltmeter - 5V	○	-
1-85	Lens - Hand x 3	×	3	3-5	Test Tube Brushes	○	-
1-91	Magnet - Bar	×	3	3-63	Gauze, Iron	○	-
1-93	Magnet - Horse shoe	○	-	-	Anatomy Chart	○	-
Glassware							
2-1	Plastic Water Basin	○	-	2-60	Lens - Biconcave f = 100mm	○	-
2-4	Beaker - 250ml	○	-	2-61	Lens - Biconcave f = 150mm	×	4
2-5	Beaker - 500ml	○	-	2-62	Lens - Biconcave f = 200mm	○	-
2-6	Beaker - 1000ml	×	4	2-63	Lens - Biconvex f = 100mm	○	-
2-8	Block - glass/acrylic	○	-	2-64	Lens - Biconvex f = 150mm	×	4
2-10	Bottle - Dropping 30ml	×	4	2-65	Lens - Biconvex f = 200mm	○	-
2-13	Bottle - Reagent- 125ml Clear	×	7	2-66	Lens - Biconvex f = 500mm	×	4
2-14	Bottle - Reagent- 125ml Amber	×	7	2-71	Mirror - Concave f = 100mm	○	-
2-17	Bucket - Plastic	×	5	2-72	Mirror - Concave f = 150mm	×	4
2-18	Burette - 25ml	○	-	2-73	Mirror - Convex f = 100mm	○	-
2-23	Clock Glass	○	-	2-75	Mirror - Plane	○	-
2-26	Crucible - With Lid 30ml	×	4	2-78	Petri dish	○	-
2-27	Cylinder - Measuring 10ml	×	4	2-79	Pipette - 10ml	○	-
2-30	Cylinder - Measuring 100ml	○	-	2-81	Prism 60° x 60° x 60°	×	4
2-31	Cylinder - Measuring 250ml	○	-	2-82	Prism 45° x 45° x 90°	○	-
2-32	Cylinder - Measuring 500ml	×	4	2-83	Prism 30° x 60° x 90°	×	4
2-34	Desiccator - 150mm	×	4	2-88	Spot Plate	×	4
2-36	Dishes - Evaporating (Basin)	○	-	2-89	Syringe 10ml	○	-
2-37	Electroscope - Gold Leaf	○	-	2-90	Thermometer 50°C	×	5
2-39	Flask - Conical 250ml	○	-	2-91	Thermometer 110°C	○	-
2-40	Flask - Flat Bottom 250ml	○	-	2-93	Thermometer Clinical	×	4
2-42	Flask - Round Bottom 250ml	○	-	2-97	Tube - T	×	4
2-48	Funnel - Glass- 75mm dia.	○	-	2-98	Tube - U	×	4
2-49	Funnel - Plastic- 100mm dia.	○	-	2-99	Tube - Y	×	-
2-51	Funnel - Thistle	×	4	3-32	Rod Glass	○	-
2-59	Lamp - Spirit	○	-	3-38	Test Tube	○	-

Note: Evaluation: ○ = Included in the Project ○ = Omitted from Project

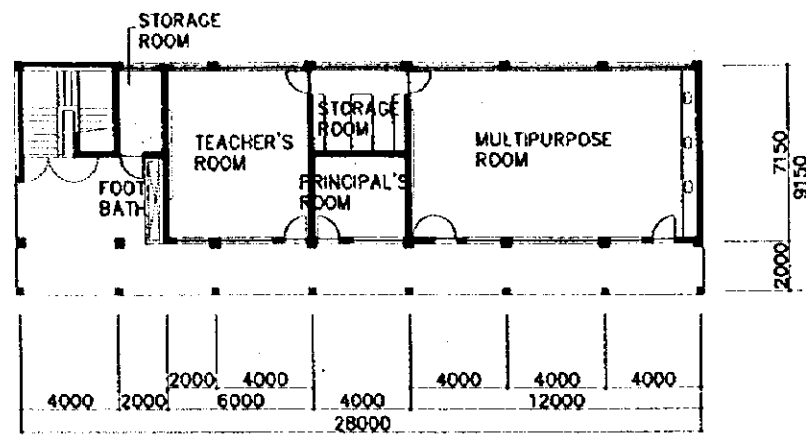
Reason: 1=Overlaps with equipment for lower grades, 2=Maintenance and management problems,
3=Easily obtained locally; 4=Use by teachers, 5=May be replaced by other items; 6=Expendable items,
7=Related to expendable items

Regarding the quantity of science material, one set will be provided for the teacher's demonstration purposes, and (or) 10 sets for 10 groups of 4 students. The science material to be provided by this Project and the necessary quantity are shown in the following table:

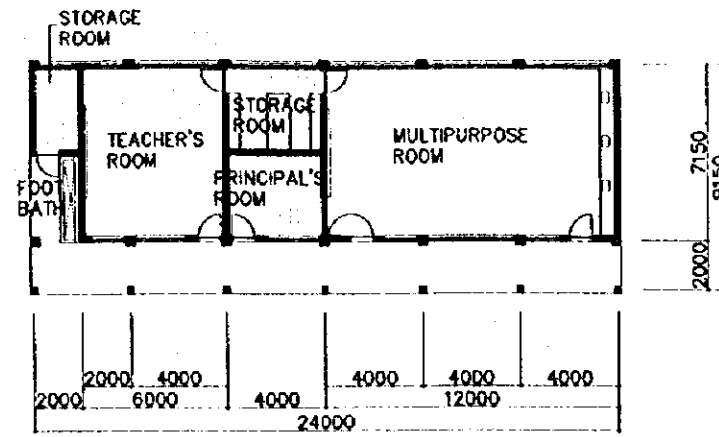
Table 2 – 15 Science Material for Each School

No	Item	Purpose of Use	Quantity			List No.	
			Basis	Stu.	Tea.		Total
Permanent Equipment							
1	Ammeter 0-5A	Study electric currents.	Demo. by teacher		1	1	1-2
2	Balance – triple beam	Study weights.	"		1	1	1-11
3	Bimetallic strip	Study heat on metals.	"		1	1	1-14
4	Burner – Bunsen	Various heating experiments.	"		1	1	1-18
5	Circuit Board	Study electric circuits.	"		1	1	1-31
6	Compass- traveller's	Magnetic field and direction	1 for ea.group	10	1	11	1-35
7	Galvanometer	Measuring electric circuits.	Demo.by teacher		1	1	1-61
8	Holder– Lens/mirror	To hold lens and mirrors.	1 for ea. group	10	1	11	1-68
9	Holder– test tube	To handle test tubes.	Demo. by teacher		1	1	1-69
10	Magnet- Horse shoe	Study magnetic field/force	1 for ea. group	10	1	11	1-93
11	Masses- Slotted (Set of 110g)	Weigh chemicals.	Demo. by teacher		1	1	1-95
12	Mirror– steel, curved	Study reflection of light.	"		1	1	1-104
13	Periodic Table	Study chemical elements.	1 for multiprm.			1	1-112
14	Pulleys- System of 3	Study pulley mechanism.	Demo. by teacher		1	1	1-121
15	Rod- Acrylic (perspex)	Study static electricity.	"		1	1	1-137
16	Rod- Ebonite	"	"		1	1	1-138
17	Rod- Polythene	"	"		1	1	1-139
18	Stand- Laboratory	For various experiments.	"		1	1	1-162
19	Stand- test tube	To hold test tubes.	1 for ea. group	10	1	1	1-163
20	Stand- tripod	Heating experiments.	Demo. by teacher		1	1	1-164
21	Tongs- Crucible	Heating experiments.	"		1	1	1-175
22	Tuning Forks on Resonance Box	Study sound.	"		2	2	1-178
23	Voltmeter – 5V	To measure voltage.	"		1	1	1-180
24	Test Tube Brush	To clean test tubes.	1 for ea. group	10		10	3-5
25	Gauze, Iron	Heating experiments.	Demo. by teacher		1	1	3-65
26	Anatomy Chart	To study function of organs.	"		1	1	-
Glassware							
27	Plastic Water Basin	Various experiments.	Demo. by teacher		1	1	2-1
28	Beaker – 250ml	"	1 for ea. group	10	1	11	2-4
29	Beaker – 500ml	"	Demo. by teacher		1	1	2-5
30	Block – glass/Acrylic	Study nature of light.	"		1	1	2-8
31	Burette – 25ml	Measure and drop reagents.	"		1	1	2-18
32	Clock Glass	Take out reagents.	"		1	1	2-23
33	Cylinder– Measuring 100ml	Measure liquids.	"		1	1	2-30
34	Cylinder– Measuring 250ml	Measure volume of solids.	1 for ea. group	10	1	11	2-31
35	Dishes– Evaporating (basin)	Evaporate specimen.	Demo. by teacher		1	1	2-36
36	Electroscope– Gold Leaf	Static electricity test.	"		1	1	2-37
37	Flask– Conical 250ml	Various experiments.	1 for ea. group	10	1	11	2-39
38	Flask– Flat Bottom 250ml	"	"	10	1	11	2-40
39	Flask– Round Bottom 250ml	"	Demo. by teacher		1	1	2-42
40	Funnel– Glass– 75mm dia.	Instill reagents.	"		1	1	2-48
41	Funnel– Plastic– 100mm dia	" Filtration	"		1	1	2-49
42	Lamp – Spirit	Heating/combustion experiments.	"		1	1	2-59
43	Lens– Biconcave f=100mm	Study nature of light.	1 for ea. group	10		10	2-60
44	Lens– Biconcave f=200mm	"	Demo. by teacher		1	1	2-62
45	Lens– Biconvex f=100mm	"	1 for ea. group	10		10	2-63
46	Lens– Biconvex f=200mm	"	Demo. by teacher		1	1	2-65
47	Mirror-Convex f=100mm	Study reflection of light.	"		1	1	2-71
48	Mirror-Convex f=200mm	"	"		1	1	2-73
49	Mirror-Plane	"	1 for ea. group	10		10	2-75
50	Petri Dish	Study for sprout	Demo. by teacher		1	1	2-78
51	Pipet-10ml	Take liquid and get a drip	"		1	1	2-79
52	Prism	Study nature of light	"		1	1	2-82
53	Syringe 10ml	"	"		1	1	2-89
54	Thermometer 100 °C	Measurement of temperature	"		1	1	2-91
55	Rod Glass	Kinds of experiment	1 for ea. group	10	1	11	3-32
56	Test Tube	Kinds of experiment	3 for ea. group	30	6	36	3-32

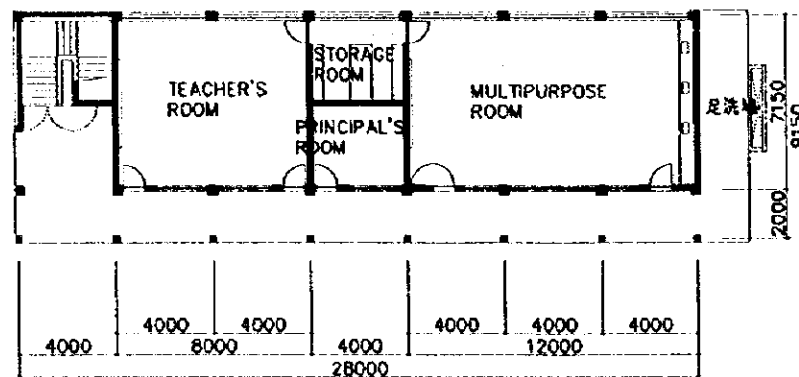
(5) Basic Design Drawings



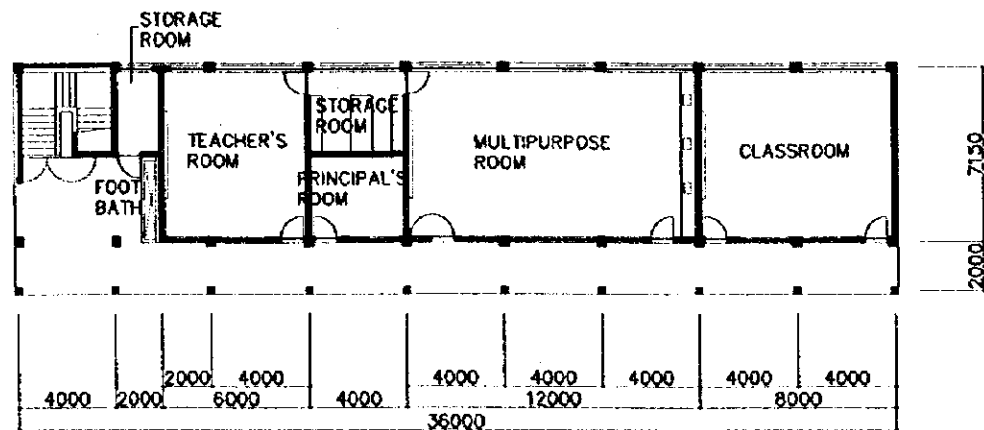
SB·M UNIT



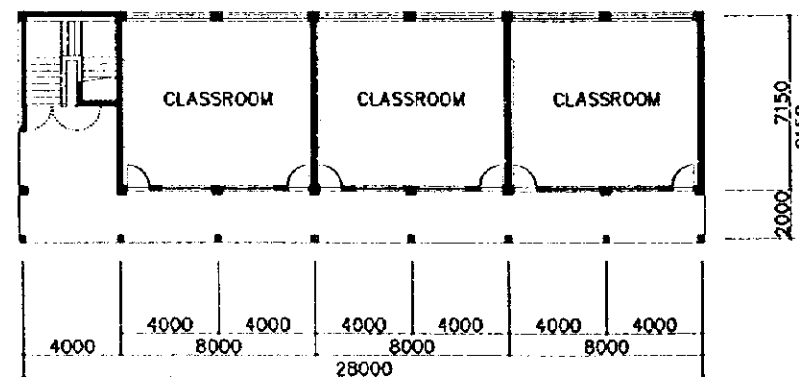
SB·S UNIT



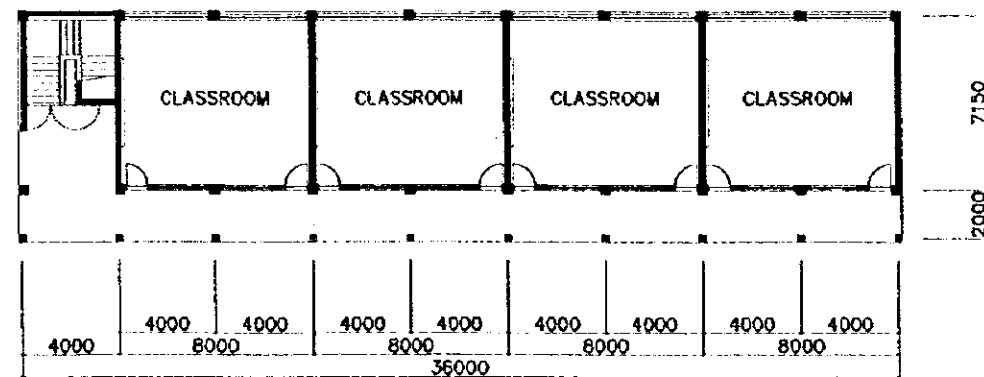
LB·M UNIT



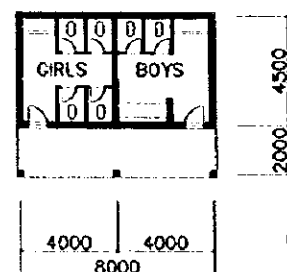
SB·M+1A UNIT



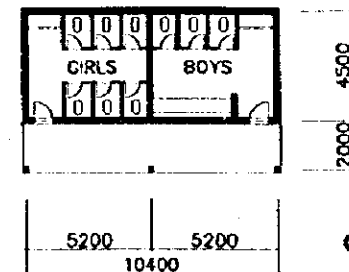
3A UNIT



4A UNIT



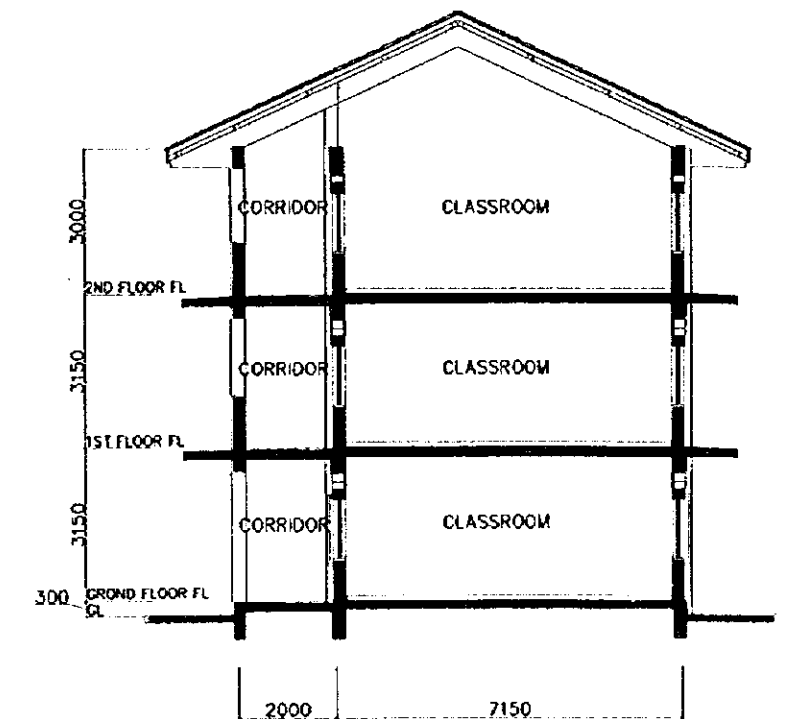
CS UNIT



CM UNIT

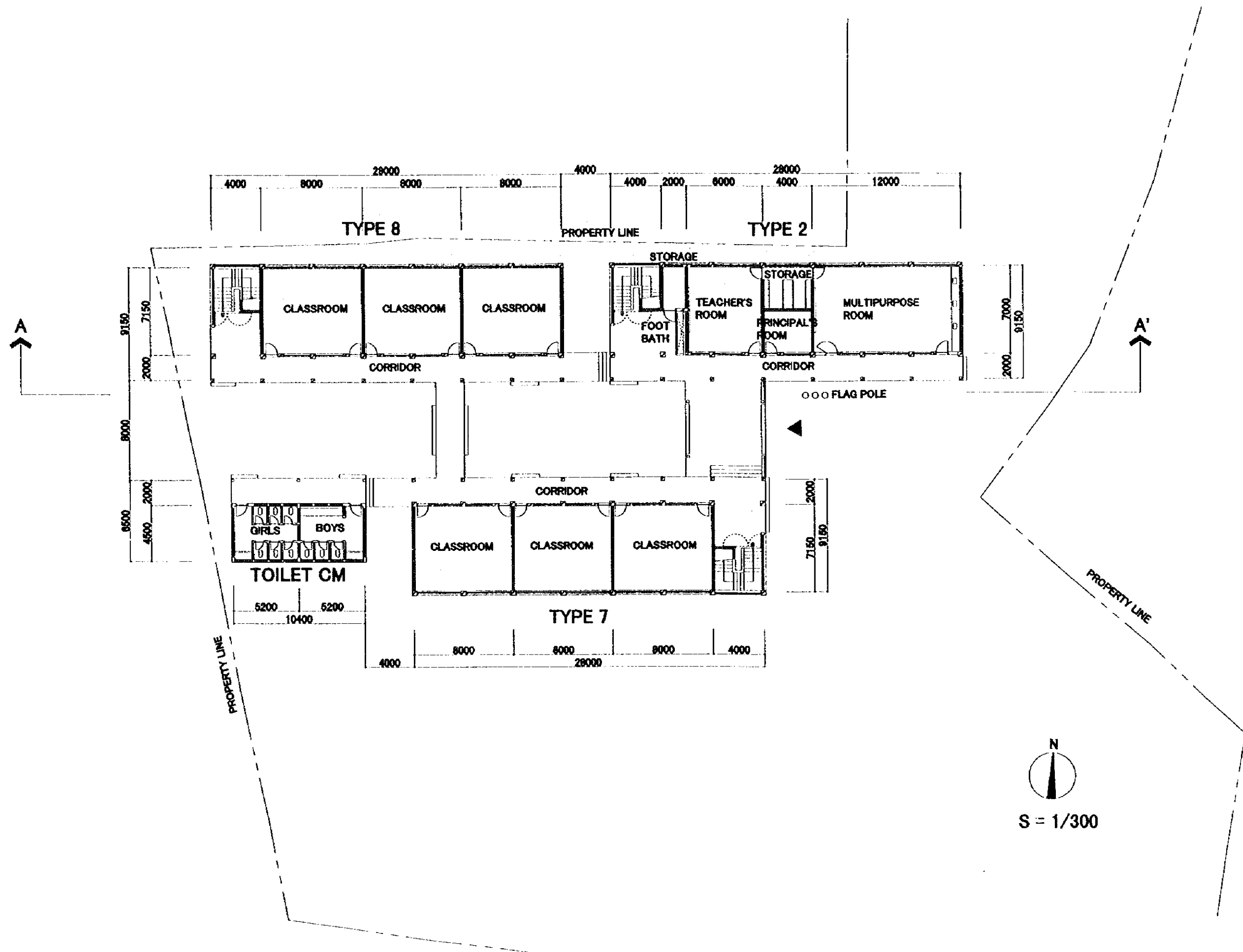
BUILDING TYPE SCHEDULE

BUILDING TYPE	COMPONENT UNIT			NUMBER OF CLASSROOM	FLOOR AREA (m ²)
	GROUND FLOOR	1ST FLOOR	2ND FLOOR		
TYPE 1	SB·S			0	219.60
TYPE 2	SB·M	3A		3	512.40
TYPE 3	SB·M	3A	3A	6	768.60
TYPE 4	LB·M	3A	3A	6	768.60
TYPE 5	SB·M+1A	4A		5	658.80
TYPE 6	SB·M+1A	4A	4A	9	988.20
TYPE 7	3A	3A		6	512.40
TYPE 8	3A	3A	3A	9	768.60
TYPE 9	4A	4A	4A	12	988.20



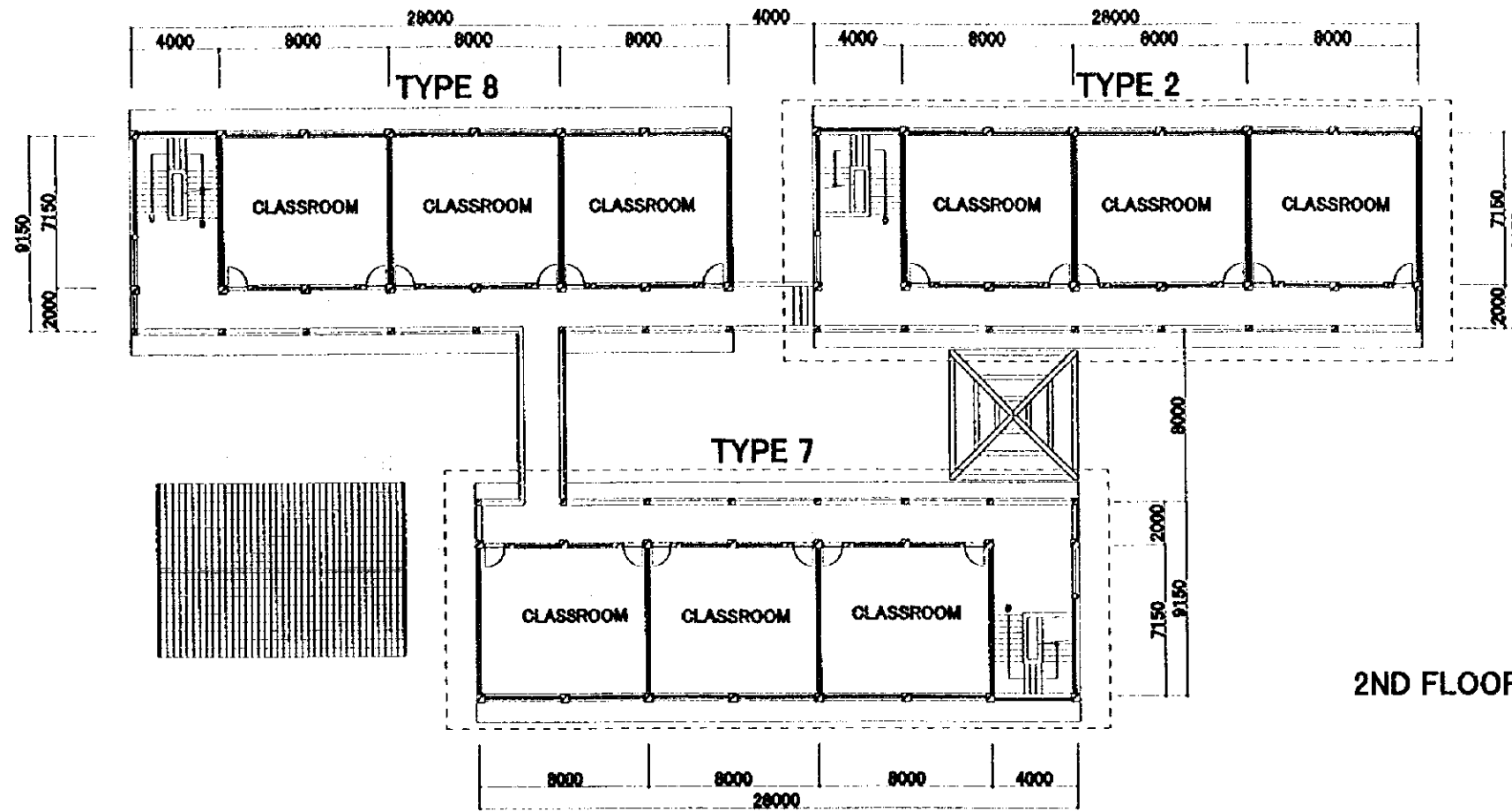
TYPICAL SECTION

UNIT PLAN S=1/300 TYPICAL SECTION S=1/150

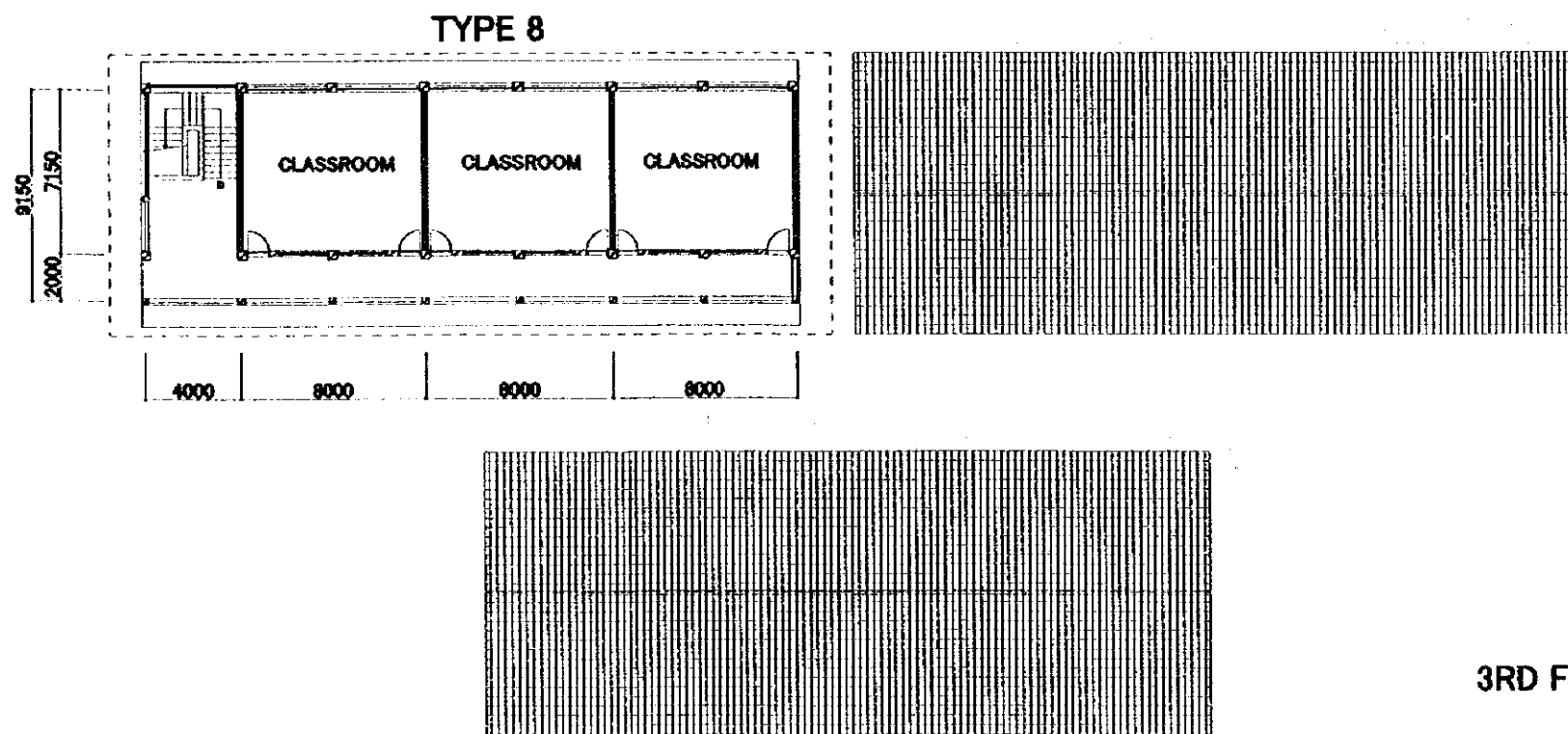


GROUND FLOOR PLAN (G-7 HEKITTAHA CHRIST KING V.)

THE PROJECT FOR IMPROVEMENT OF JUNIOR SCHOOLS IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI-LANKA

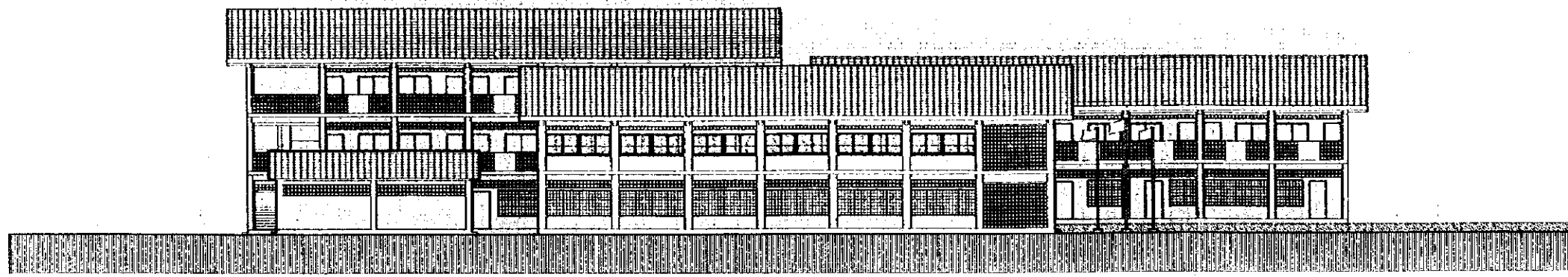


2ND FLOOR PLAN S=1/300



3RD FLOOR PLAN S=1/300

2ND & 3RD FLOOR PLAN (G-7 HEKITTAHA CHRIST KING V.)



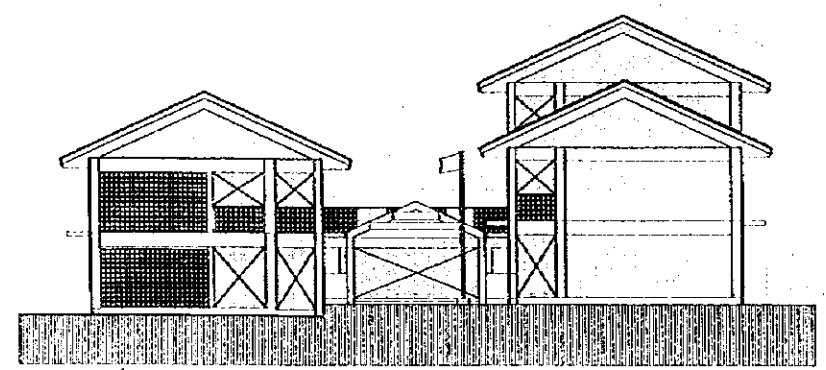
CM SOUTH ELEVATION TYPE 7 TYPE 2



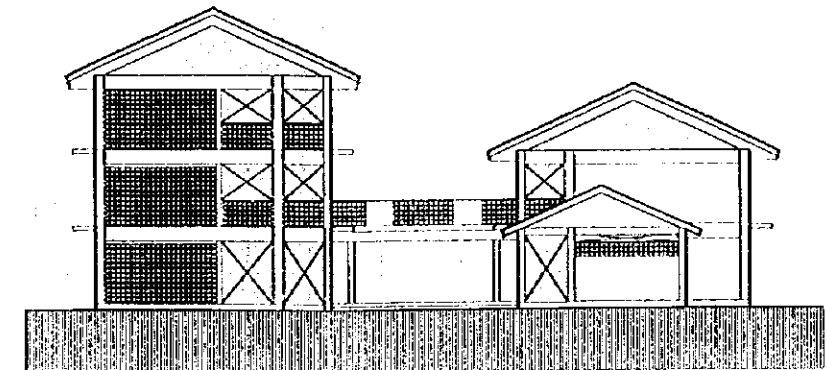
TYPE 8 SOUTH ELEVATION (A-A') TYPE 2



TYPE 2 NORTH ELEVATION TYPE 8



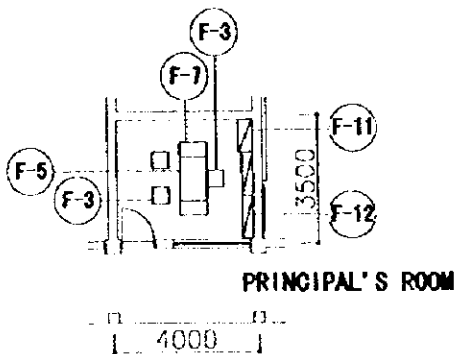
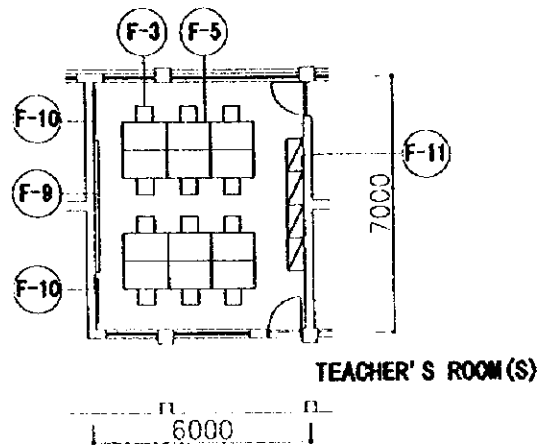
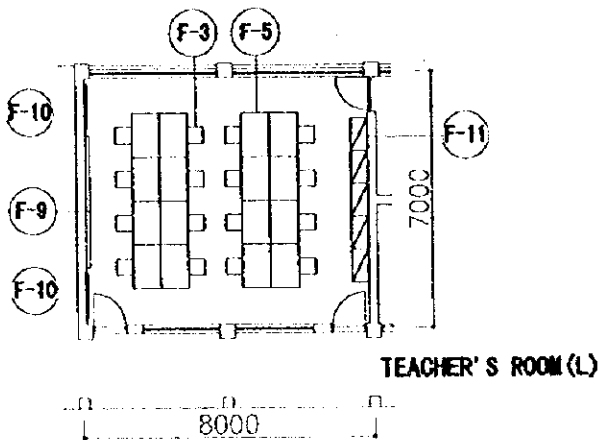
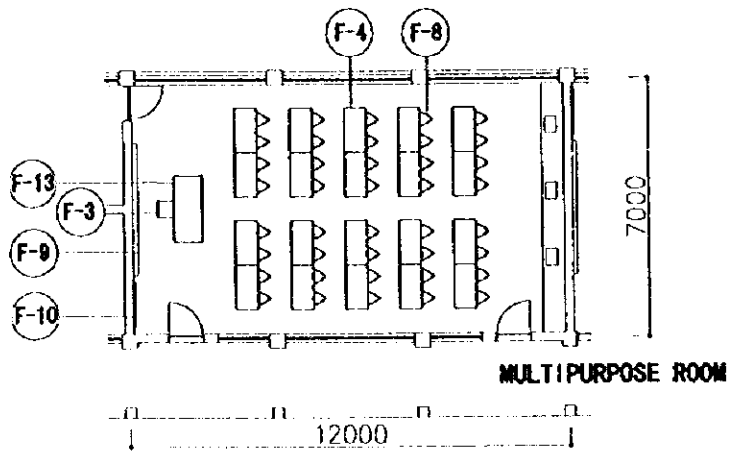
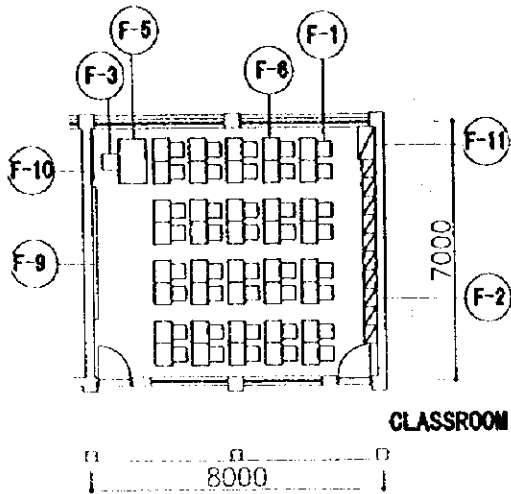
TYPE 7 EAST ELEVATION TYPE 2



TYPE 8 WEST ELEVATION CM

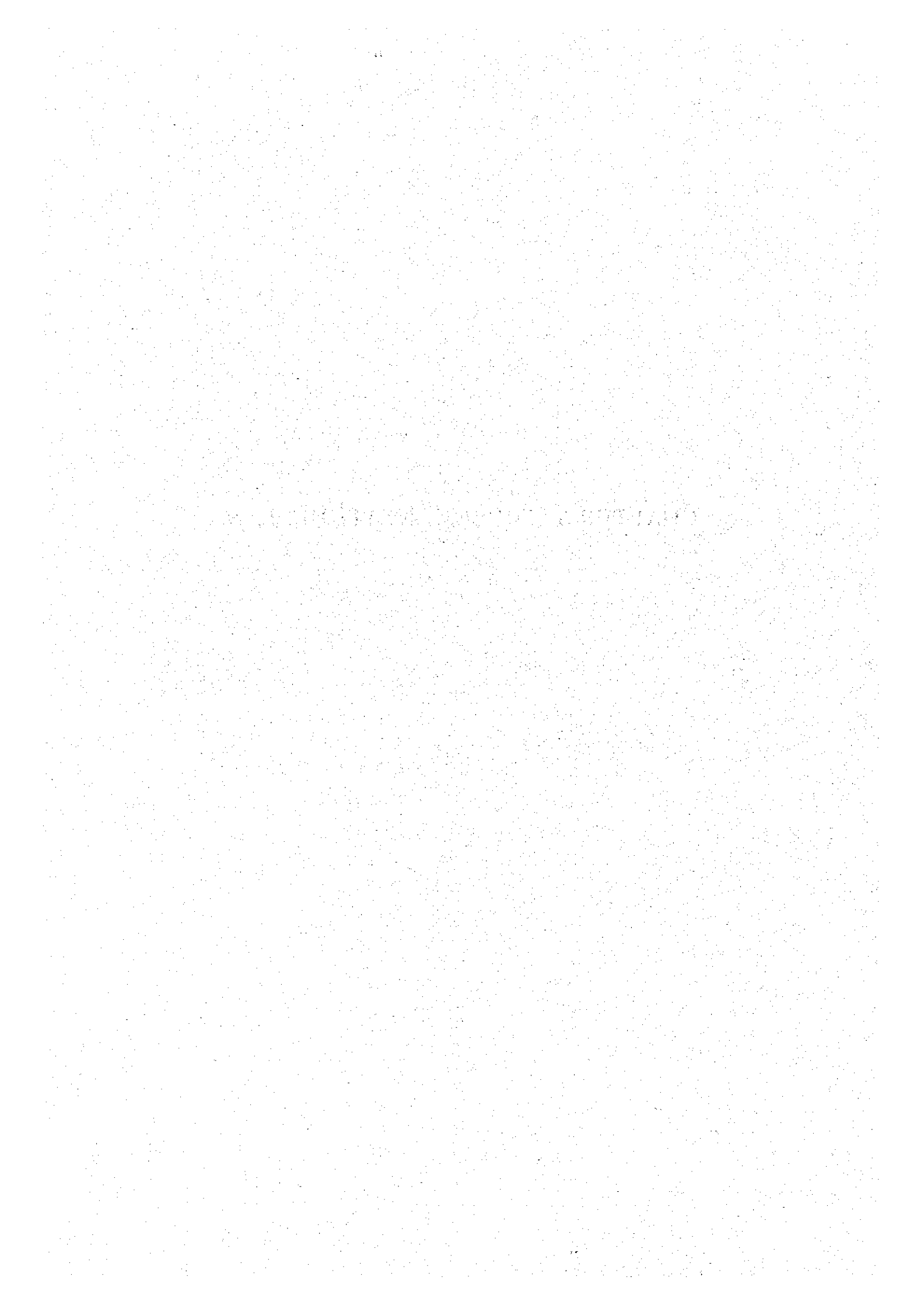
TYPICAL ELEVATION 1/300 (G-7 HEKITTAAH CHRIST KING V.)

THE PROJECT FOR IMPROVEMENT OF JUNIOR SCHOOLS IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI-LANKA



NO.	ITEM	SIZE (W,D,H)
F - 1	STUDENT CHAIR	400×500×800
F - 2	STUDENT SHELF	500×350×650
F - 3	TEACHER'S CHAIR	450×500×900
F - 4	STUDENT WORK BENCH	1,200×600×850
F - 5	TEACHER'S DESK	1,200×760×760
F - 6	STUDENT DESK	600×450×740
F - 7	SIDE CABINET	400×760×760
F - 8	STUDENT STOOL	360×360×600
F - 9	BLACKBOARD	4,500×1,200
F - 10	BULETINE BOARD	1,000×1,200
F - 11	TEACHER'S CABINET	900×400×1,830
F - 12	BOOKSHELF	1,200×300×1,850
F - 13	TEACHER'S DEMO. TABLE	1,800×760×760

CHAPTER 3 IMPLEMENTATION PLAN



CHAPTER 3 IMPLEMENTATION PLAN

3 - 1 Implementation Plan

3 - 1 - 1 Implementation Concept

The Project is to construct a total of twenty five Junior Schools within a limited period using local construction methods and material as many as possible and provide educational equipment and furniture for those schools. The Project should, therefore, be implemented based on proper construction plans prepared by taking into consideration the implementing capabilities of the government of Sri Lanka, the actual situation of local construction business and materials in the project area. Thus, the project construction plan should be prepared based on the following policies;

(1) General Principles for the Project Implementation

When the implementation of the Project is approved by the government of Japan and the Exchange of Notes for the Project is concluded by and between the governments of Japan and Sri Lanka, the Project should be implemented based on the following policies;

- 1) The Project will be implemented under the Japanese Budgetary System making use of taxes paid by the Japanese people.
- 2) MOEHE representing the Government of Sri Lanka shall conclude an agreement with a Japanese consultant and entrust the detailed design, assisting services for the selection of a contractor, and construction supervision for the Project.
- 3) With the assistance of the Japanese consultants, MOEHE will select a Japanese contractor through pre-qualification and competitive bidding and will sign contract with the contractor for the facility construction and equipment procurement.

(2) Basic Policies for the Preparation of the Project Construction Plan

- 1) To efficiently conduct the Project construction within a limited time period, local consultants and contractors who are familiar with the local construction and material procurement situations should be fully utilized.
- 2) Strict safety control, quality control, and schedule management should be practiced at construction sites, and a Japanese prime contractor's construction technologies should be transferred to local personnel through the work.

- 3) For the convenience of the maintenance after the Project is completed, construction materials and equipment and furniture units to be provided for the project schools should be either those that are manufactured in Sri Lanka or imported items that are easily obtainable on local markets as much as possible.

3 - 1 - 2 Implementation Conditions

Upon evaluating the characteristics of the conditions related to this Project, the following points are to be noted during construction:

1) General Conditions

- ① Compared to ordinary constructions, many matters are involved, such as construction, facility and equipment planning, timely procurement of necessary material and introduction of various technicians. In order to keep in time with the construction schedule, it is necessary to draw up a detailed construction schedule without any time loss.
- ② Heavy rain will greatly affect earth and foundation work. The dry season is usually from July to September and December to February. However, due to the unpredictable weather lately, there may be shifts in the wet season. Thus, it is necessary to carefully watch the schedule.
- ③ Before construction may begin, many sites need to have existing facilities removed by the Sri Lanka side. In order that the Project schedule is not affected, it is necessary that the facilities are removed according to schedule.
- ④ As ordinary lessons will be conducted during construction period, measures need to be drawn up not to affect these.

2) Construction Schedule

As the 25 construction sites are spread over a wide area of 100Km east–west and 100Km north–south, construction schedule should be divided into two phases as shown in the table below. 12 Project schools in Gampaha District and adjacent area of Kegalle District, where construction engineers are easily available, will be constructed by the first phase, and by the second phase, remaining 13 schools in Kagalle District and Ratnapula District will be constructed by utilizing the construction engineers employed for the first phase.

Phase	District	School No	Total
First Phase	Gampaha	G1, G5, G7, G11	12 Schools
	Kegalle	K1, K4, K10, K13, K14, K22, K28, K31	
Second Phase		K26, K33, K36	13 Schools
	Ratnapula	R1, R2, R4, R5, R7, R9, R13, R25, R27, R32	

3 - 1 - 3 Scope of Work

(1) Works to be Conducted by the Recipient Country

Based on the rules of the Japanese Grand Aid Programme, the following works necessary for the Project should be carried out by the Government of Sri Lanka:

- 1) Securing of land
- 2) Site levelling work
- 3) Demolition of existing facilities
- 4) Securing or construction of an access road to each site
- 5) Providing electricity, water supply, telephone, drainage, sewage line connections and other incidental facilities into the Project site.
- 6) Boundary walls, a gate construction and outdoor work, such as landscaping including the planting of trees and flowers.
- 7) Procurement of equipment and furniture that are not included in the Project.

(2) Land Levelling Work

Ground preparation work will be borne by the Sri Lanka government. This must be done without delay for the Project to begin on schedule. Especially the five schools mentioned below need to have the ground prepared on schedule as the sites have over 1m difference in elevation:

Table 3 – 1 Project Schools With Over 1m Difference in Elevation

School No	School Name	Construction Site
8	R27 Panawenna South	Classroom, Staff Room Building
11	K4 Dedigama	Toilet Building
13	K13 Ashoka	Classroom, Staff Room Building
17	K28 Dedugala	Toilet Building
23	G7 Hekittaha Christ King	Classroom, Staff Room Building

(3) Removal of Obstacles

The following 22 schools need to have old buildings removed by the Government of Sri Lanka before construction work begins:

Table 3 – 2 Project Schools Required the Removal of Existing Buildings

School No	School Name	Building to be Removed	No. of Bldg	Removal Area	
Ratnapura					
1	R1	Godewala	Classroom, Staff room	4	357 m ²
2	R2	Maduwanwela Sri Sarananda	Classroom	3	425 m ²
3	R4	Halmillaketiya	Classroom, Multipurpose room	1	310 m ²
4	R5	Rahula	Classroom	2	278 m ²
5	R7	Galpaya	Classroom	3	236 m ²
6	R9	Ranwala	Classroom	2	206 m ²
7	R13	Dhanahana	Classroom	2	391 m ²
8	R25	Wewdegala South	Classroom	4	515 m ²
9	R27	Panawenna South	Classroom	2	211 m ²
10	R32	Hidellana	Classroom, Staff room, Storage	1	505 m ²
Kegalle					
11	K4	Dedigama	Classroom, Storage	2	234 m ²
12	K10	Banunugama	Classroom, Science room	4	410 m ²
13	K14	Maliyadewa Baddewela	Classroom, Storage	3	544 m ²
14	K22	Ussapitiya Sri	Classroom, Science room	2	216 m ²
15	K26	Sumangala Dehiowita	Classroom	2	278 m ²
16	K28	Budedhist Dedugala	Classroom, Staff room	1	161 m ²
17	K31	Amithirigala	Classroom, Storage	2	216 m ²
18	K33	Kadirewan	Classroom, Staff room, Storage	3	264 m ²
19	K36	Pothdeniyakanda	Classroom, Staff room, Storage	1	240 m ²
Gampaha					
20	G1	Maddumandara	Classroom, Staff room, Storage	4	828 m ²
21	G7	Hekittaha Christ	Classroom	3	1,116 m ²
22	G11	King Daluwakotuwa St. Anne's	Storage	1	90 m ²

(4) Access Road Construction

None of the Project schools have problems with regard to access roads for construction. However, the construction areas are located far from the school gates at majority of school sites. Thus, the Sri Lanka government needs to secure roads within the school site. For safety reasons, temporary fences along the route will be set up by the Japanese side.

(5) Utility Line Connection

1) Electricity and Telephone Lines

The Sri Lanka side should intake low voltage lines, install a watt meter on the

electric pole to be constructed by the Japanese side, and connect the cables to be drawn on the pole by the Japanese side to the watt meter at each site. Telephone line is not included in the Project.

2) Water Supply

The Sri Lanka side should intake a water supply pipe from city mains, install a water meter, and connect the pipe to the gate valve to be installed by the Japanese side at each site. As G1 Maddumandara School, R1 Godewala School and R7 Galpaya School have no tap or well water, wells will be bored by the government of Sri Lanka. As for K1 Hettimulla New and R27 Panawenna South, a rainwater tank will be installed by the Japanese side.

(6) External Work

As a general principle, exterior work shall be conducted by grant aid recipient countries. Flag poles shall be arranged in a vicinity close to a principle's room and staff room for school management and operation purposes. As existing flag poles are heavily deteriorated, they would be extremely difficult to relocate. Flag pole installation will be undertaken by the Japanese side. Construction of boundary walls and gates is to be borne by the government of Sri Lanka. To effectively utilize land, some of the project sites may require retaining walls along the boundary. In such a case, the retaining wall construction should be borne by the government of Sri Lanka. Landscape work, including the planting of trees and flower beds, shall be undertaken by the government of Sri Lanka.

(7) Other Related Work

Procurement of educational material other than science material, furniture units for guests, computers, copy machines, and other office equipment should be borne by the government of Sri Lanka.

3 - 1 - 4 Construction Supervision

The Project is to build a total of twenty five Junior Schools under the Japanese Budgetary System. The total floor space of school buildings is approximately 25,000 m². As the construction schedule is considerably tight, it is required for the consultant to supervise the construction work with close coordination between the project implementing agency and contractor, and provide the contractor with adequate and timely instructions and advice. Thus, the works of contractor will be supervised by the

consultant as follows:

(1) General Supervision

1) Main Work

General supervision by the consultant includes overall schedule control, overall engineering guidance to the resident engineer, periodical reporting to JICA Headquarters, and other services related to the Project to be provided by the consultant's head office.

2) Management Organization

Consultant engineers in charge of the detailed design will provide the services under the supervision of the project manager who has been involved in the Project from the beginning of the Basic Design Study.

(2) Supervision by Resident Engineer

1) Work of Resident Engineer

Resident engineer's supervision includes daily construction supervision, shop drawing check, technical advice, approval of the project use materials and equipment, general technical guidance, periodical reporting to the Project Implementing Agency as well as the JICA Colombo office, interim and final inspection of the project work, and preparation of the supervision report.

2) Management Organization

A senior engineer involved in the detailed design will reside in the project area and will conduct the project construction supervision with the assistance of local consultants. The project construction management organization charts are shown below.

Figure 3 - 1 The Project Construction Management Organization Charts for the First Phase

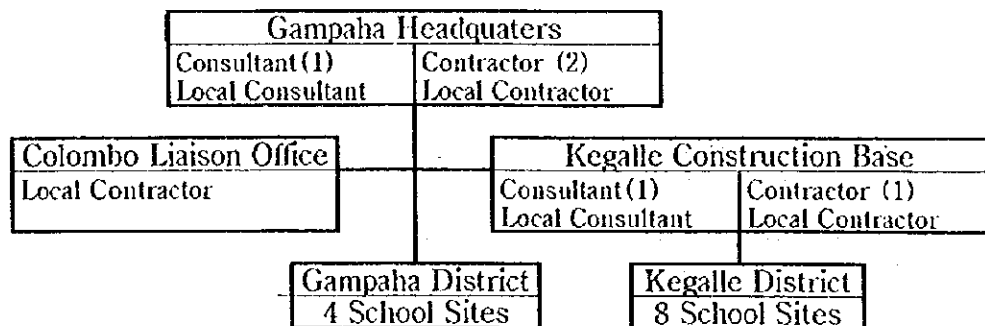
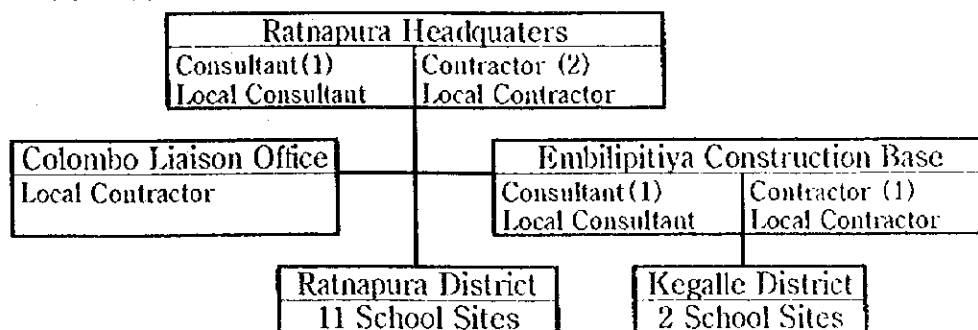


Figure 3 - 2 The Project Construction Management Organization Charts for the Second Phase



3 - 1 - 5 Procurement Plan

(1) Construction Materials

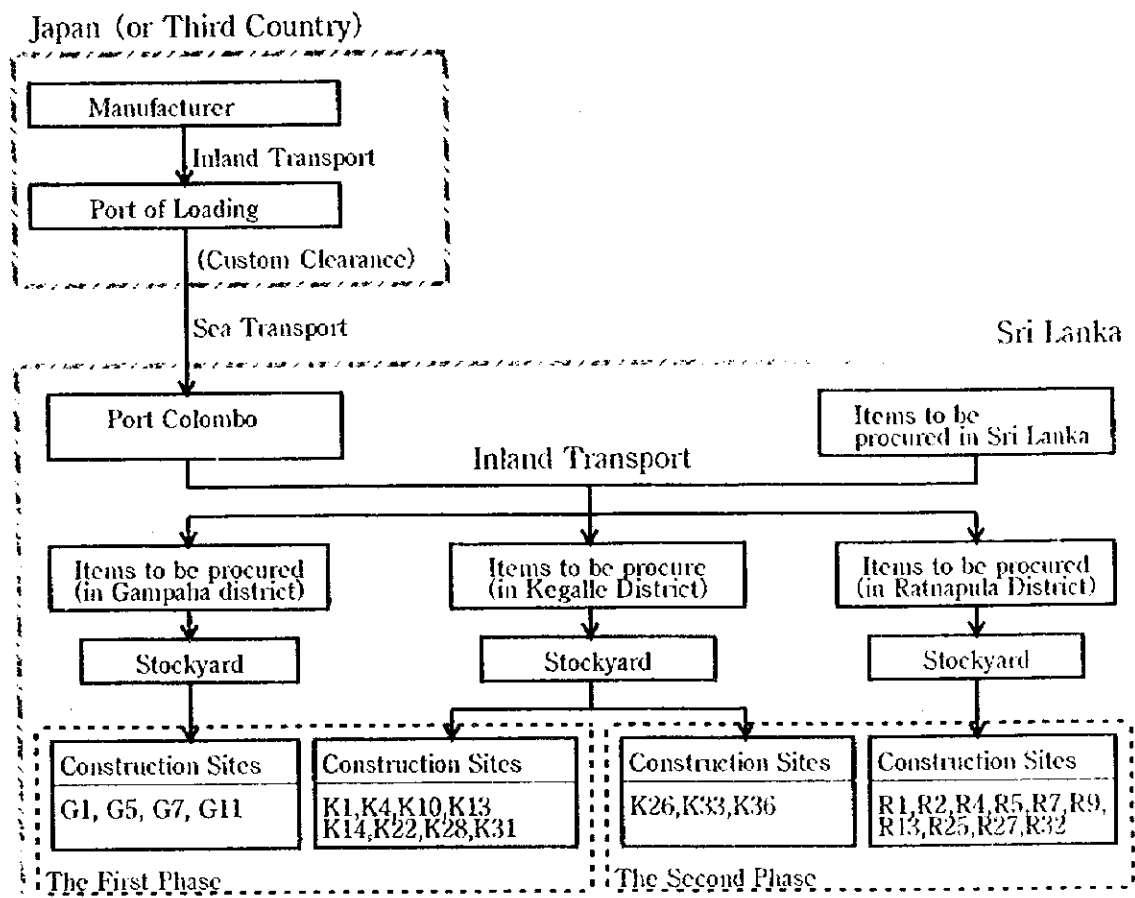
In principle, priority should be given to the use of local products for the construction work. However, the use of local products must be carefully examined in terms of the planned construction schedule, supply capacity, durability, workability, cost and maintenance. Based on the results of the construction materials survey conducted as part of the Basic Design Study, the procurement of the following materials is planned for the Project.

Table 3 - 3 Building Construction Work

Equipment and Materials	Procurement in Sri Lanka	Procurement in Japan or Third Country	Remarks
Cement			Regular local supply is questionable as the cement mill in Trincomalee has stopped operating. Imported cement is also available in the local market.
Sand			River sand from the catchment basin of Kelaniya River will be used. Supply runs short, however, at the time of flooding during the rainy season.
Gravel			Crushed stone will be used.
Reinforcing Bars			As Sri Lanka depends on imported products, reinforcing bars made in Japan will be used.
Structural Steel			Supply availability is limited, however, no problems for this project.
Forms for Concrete			No problems in the availability at local market.
Bricks			Mainly sun-dried bricks. Unsuitable for face finishing. Some procurement problems during the rainy season.
Terrazzo			Terrazzo is popular because durability and workability are good.
Ceramic Tiles			Manufactured by a public corporation. Few in number and product types.
Plywood			Quality is somewhat poor, however available in local market.
Lumber			Supply availability is questionable because of current restriction. However imported lumber is available. Difficult to obtain well seasoned.
Aluminum Sashes			Not manufactured locally.
Wooden doors			Procurement of timber and local manufacture are difficult, but possible.
Metal Fixtures/ Hardware			Depend on quality and available types.
Glass			Available in local market. Few in number and product type.
Paint			High price but local products will be used due to future maintenance needs.
Asphalt			Available in local market.
Water-Proofing			
Roof Tiles			Brittle as the baking temperature is low but is the traditional roofing material in Sri Lanka.
Furniture			Depends on quality, use and delivery conditions.
Plumbing Work			
Vinyl Pipes			Available in local market.
Steel Pipes			Available in local market.
Valves and Pipe Fittings			Available in local market.
Pumps			Procurement and maintenance are locally possible.
Sanitary Fixtures			Available in local market.
Electrical Work			
Power Panel Board			Available in local market.
Wires and Cables			Available in local market.
Lighting Fixtures			Available in local market.
Electrical Appliances			Available in local market.

2) Procurement in Japan and Third Countries

The construction materials and equipment for the Project will be procured locally as much as possible, however Sri Lanka has no special import regulations for products for government organizations. While the imported equipment and materials for the Project will not be exempt from customs duties due to the Sri Lanka system in this regard, such duties will be actually paid by the project implementation agency and will not constitute a financial burden on the Japanese side. It is necessary for the MOEHE to appropriate the necessary amount to pay these customs duties in its annual budget for the smooth customs clearance of the imported equipment and materials. The equipment and materials to be imported from abroad will be transported to the Project site as shown below.



3 - 1 - 6 Implementation Schedule

If the implementation of the Project with the grant assistance of the government of Japan is decided, the actual construction and equipment supply work will be conducted in 3 stages, i.e. (i) preparation of detailed design documents following the conclusion

of the E/N by the two countries, (ii) tender and contracts and (iii) actual construction and equipment supply work.

(1) Detailed Design

The tender documents will be prepared based on the Basic Design and will include detailed design drawings, specifications, calculation sheet and cost estimate, etc. Close consultations will be held between the Consultant and the government of Sri Lanka at the key stages of the detailed design work and the tender process will commence following the approval of the final detailed design by the Sri Lanka side. The period required to complete the detailed design is expected to be approximately 5.0 months.

(2) Tender

Following the completion of the detailed design, applications for the preliminary qualification examination will be invited in Japan. Based on these examination results, the project implementation agency will invite the qualified tenderers for the open tender with the attendance of all related parties. If the contents of the tender with the lowest price are assessed as appropriate, the tender will be announced successful and will conclude the contract with the government of Sri Lanka. The period required to complete the process from tender announcement to the signing of the contract is expected to be approximately 2 months.

(3) Construction and Equipment Supply Work

Following the signing of the construction contract and equipment supply contract, the Contractor will commence the work on receipt of verification by the government of Japan. In view of the sizes and contents of the facilities to be constructed, the period required to complete the work is expected to be 12 months for each phase of the Project provided that the procurement of the construction materials and the work to be undertaken by the Sri Lanka side are smooth conducted.

Table 3-4 Project Implementation Schedule

		1	2	3	4	5	6	7	8	9	10	11	12		
Phase 1	Retailed Design & Tender	□ (Field Works)		□ (Design Work in Japan)				□ (Field Works)		□ (Tender Work)					
	(Total 6.0 months)														
Phase 1	Procurement & Construction Work	□ (Preparation Work)		□ (Foundation Work)				□ (Purchase)		□ (Delivery)					
	(Total 12.0 months)		□ (Building Construction)		□ (Equipment Supply)				□ (Installation & Adjustment)		□ (Utility/Interior Finish work)				
Phase 2	Retailed Design & Tender	□ (Field Works)		□ (Design Work in Japan)				□ (Field Works)		□ (Tender Work)					
	(Total 6.0 months)														
Phase 2	Procurement & Construction Work	□ (Preparation Work)		□ (Foundation Work)				□ (Purchase)		□ (Delivery)					
	(Total 12.0 months)		□ (Building Construction)		□ (Equipment Supply)				□ (Installation & Adjustment)		□ (Utility/Interior Finish work)				
		□ (Exterior Finish Work)													

3 - 1 - 7 Obligation of the Government of Sri Lanka

The purpose of the Grant Aid Programme of the Government of Japan is to provide financial assistance for development projects to countries attempting to implement projects with self-help efforts. Based on this basic policy, the Government of Japan requests recipient countries to share a reasonable burden. The policy is equally applied to any recipient country in the world.

Once the Government of Japan decides to provide Grant Aid for the implementation of the Project, the Government of Sri Lanka shall undertake the following items, besides those described in "Chapter 2-1-3 Scope of Work".

- (1) To provide the Japanese side with information and data pertinent to the Project:
- (2) To bear commission to Japanese foreign exchange bank for banking services based on the banking arrangement:
- (3) To ensure expeditious unloading of project use materials and equipment purchased by grant aid, exemption of taxes, customs clearance fees at the port of disembarkation, and prompt inland transportation.
- (4) To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, domestic taxes, and other levies that may be imposed in Sri Lanka to the supply of products and services under the verified contracts.
- (5) To provide every convenience to Japanese nationals engaged in the Project under the verified contract when they enter into or stay in Sri Lanka to perform their work.
- (6) To adequately and effectively use and maintain the project facilities and equipment under the responsibility of MOEHE.
- (7) To bear all costs necessary for the implementation of the Project excluding those that are to be borne by the Japanese side.
- (8) Reconciliation and solving of problems that may occur with a third party or area residents due to the implementation of this Project.

Furthermore, the Government of Sri Lanka is requested to monitor the operation and maintenance of the facilities and equipment provided under the Grant Aid after the completion and turn over of the Project and submit reports periodically to the Japanese side.

3 - 2 Operation, Management and Maintenance Plan

(1) Operation, Management and Maintenance System

After completion of the school facilities, they will be operated as before, by the Provincial Education Department (district level) and Zonal Educational Offices of each province, under the guidance of the Provincial Ministry of Education of Sabaragamuwa and the Western Provinces.

1) Operation Staff

Each school will be operated by the principal, teachers and other staff. The

teachers for the primary education from first to fifth grades are not be specialized. The lessons are being conducted by the class teacher and the English teacher. The lessons for sixth to ninth grades in junior and senior education are being conducted by teachers specializing in mathematics, science, English and arts. The number of teachers per school, both for primary and secondary schools are decided upon by the number of students, based on the standards of the MOEHE. The following table shows a comparison between the number of teachers estimated by the MOEHE's standards for the year 2003, and the number of teachers from first to ninth grades in 1998

Table 3-5 Comparison of the Estimated Number of Teachers

Province	District	No of Schools	Estimated Number of Teachers			
			1998	2003	Difference	Decrease Rate
Sabaragamuwa	Ratnapura	10	195	171	-24	-13.41%
	Kegalle	11	226	213	-13	-5.75%
Western	Gampaha	4	92	127	+35	+38.04%
Total		25	513	511	-2	-0.39%

As can be seen in the table, the number of teachers will slightly decrease by 0.4% in the project schools. Due to the changes in school structure based on the educational reforms, there will be a change in the number of students per school, however there will be no change in the number of students within the provinces. Thus, the teachers will be transferred, and there will be no need for the employment of new teachers. The employment of janitors and cleaning staff is left to the discretion of each school. These staff are hired by each school using the funds of the school operating committee. Apart from the principal and teachers, the hiring of other staff will be the responsibility of each school, and not the responsibility of the government. Thus, it is judged that there will be no problems in securing operation staff after the Project facilities are handed over.

2) School Income and Expense

The government of Sri Lanka provides each school with 350 rupees for expendable items used in science classes and 750 rupees for home economics and crafts classes besides teacher's pay and allowance. Text books are also provided free of charge until eleventh grade. Fees for electricity, water and telephone are paid for by the Provincial Councils. Although the amount may differ according to schools, around 6 rupees a month is paid by the student. There are some schools collecting 3 rupees a month as parents' association fee. The donations in the project schools average 8,000 rupees a year. These incomes are used for school repairs and purchasing expendable items.

3) Maintenance and Management of School Facility and Equipment

The maintenance and management of the Project schools are basically conducted by each school. The purchase of expendable items and changing of electric lights are done by teachers or other staff, under the directions of the principal. Large scale repairs are done through the Zonal Education Office and Provincial Department of Education, using the funds of the Provincial Council. School management and maintenance is assisted by the school operating committee of each school which is responsible for supporting the school activities. The school operating committee is composed of parents and influential people around the school, and they provide financial assistance for large scale repairs, such as building of libraries and repair of roofs. They also provide funds and labor for buying library books, installation and repair of water tanks, painting furniture and constructing toilets. Thus, they are providing support according to the needs of each school.

(2) Maintenance and Management Costs

1) Maintenance and Management Costs for Project Facilities

The necessary annual management and maintenance costs for each of the 25 Project schools are as shown in the table below:

Table 3 -6 Annual Management and Maintenance Costs (Unit: Rupees)

Cost Item	Detail Description	Cost	Basis of Estimation
Utility Costs	Electricity and water	79,000	
Facility Repair	Fluorescent lumps	99,000	10% of fluorescent lump costs
	Paint repair	3,021,000	10% of paint work costs
	Roof repair	4,451,000	10% of roof work costs
	Building damage repair	34,000	10% of roof work and incidental work costs
	Sanitary equipment repair	267,000	10% of sanitary installation costs
	Sub - total	7,951,000	
Educational Equipment Repair	Furniture	912,000	10% of furniture costs
	Science Equipment	1,013,000	10% of science equipment costs
	Sub - total	1,925,000	
	Total	9,876,000	

2) Additional Expenses of the MOEHE

Another 9,876,000 rupees need to be secured annually by the MOEHE as management and maintenance costs for the 25 Project schools. However, the additional costs immediately after the completion of the Project is expected to be greatly under the above mentioned costs. This amount is approximately 0.05% of the 20.9 billion rupees of the entire 1995 budget of the MOEHE, and the additional expense is thought to be manageable. As costs will greatly vary according to the appropriate use of the facilities, daily cleaning, inspection and early repair, adequate management and maintenance must be conducted.