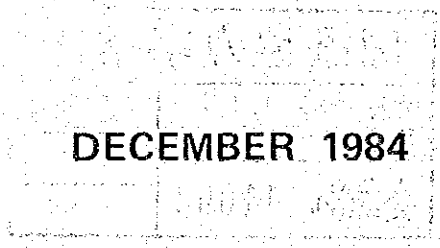
No. 04

BASIC DESIGN STUDY
FOR
THE ESTABLISHMENT
OF
THE MATARA COLLEGE OF EDUCATION
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

DECEMBER 1984

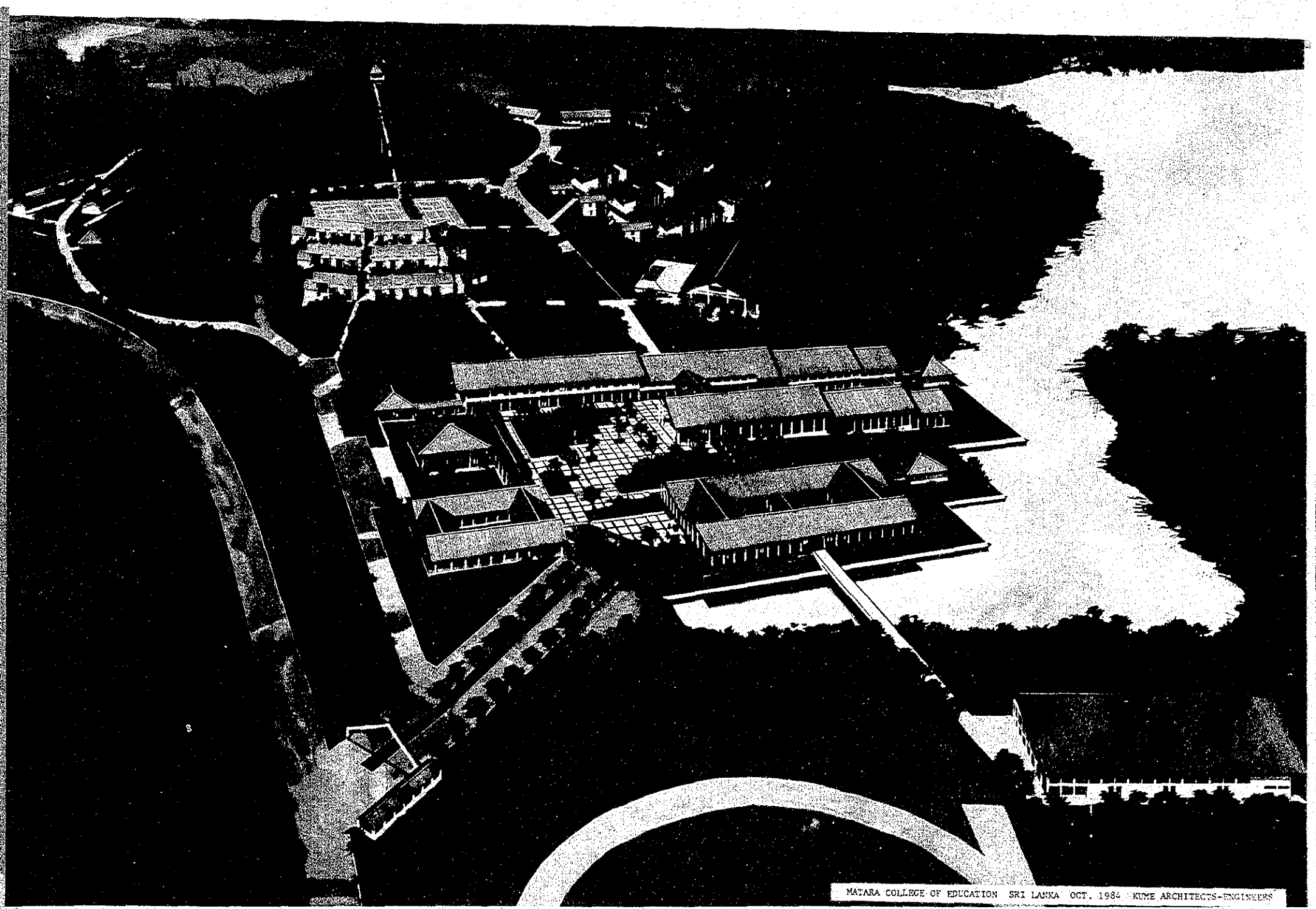
JAPAN INTERNATIONAL COOPERATION AGENCY

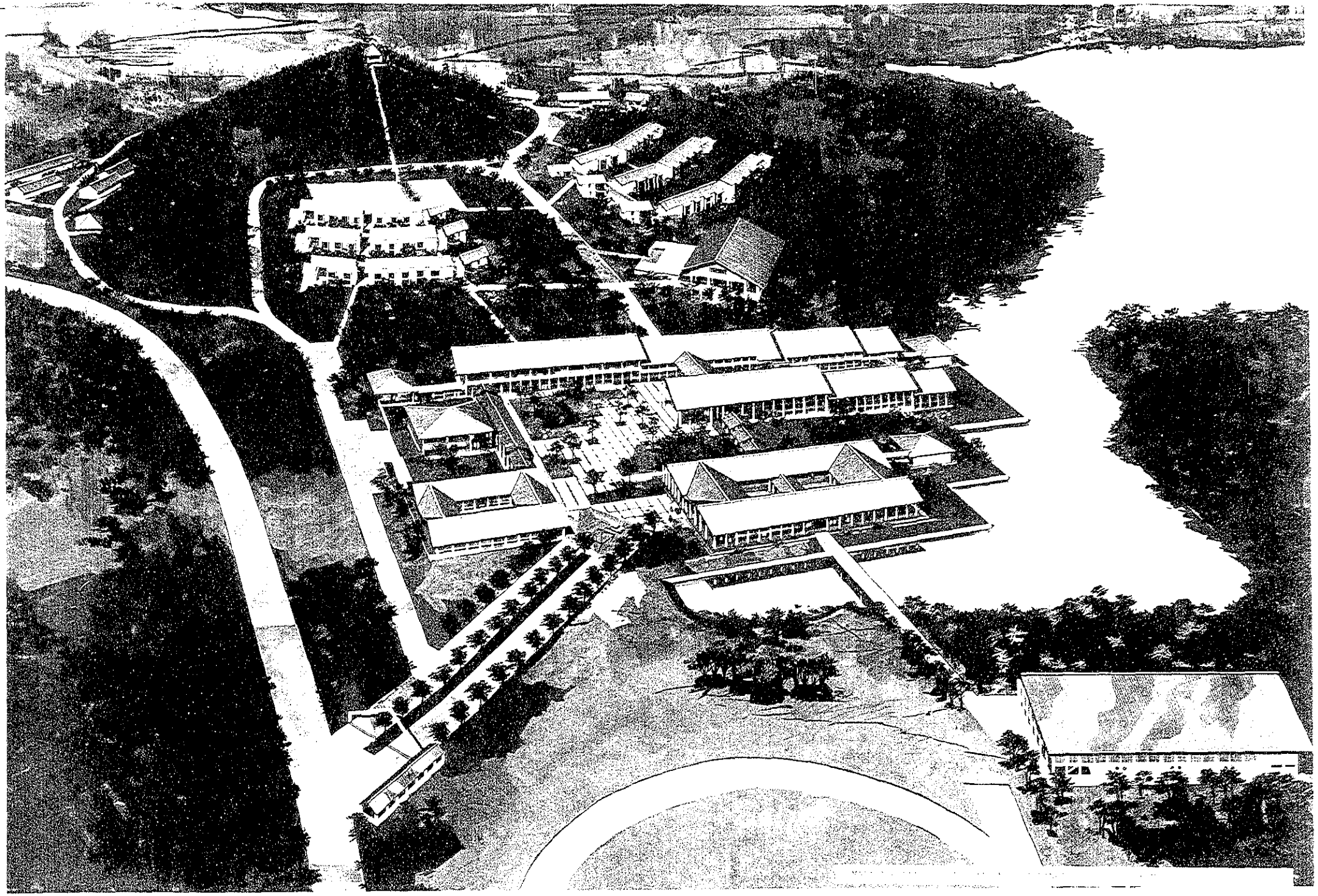
BASIC DESIGN STUDY
FOR
THE ESTABLISHMENT
OF
THE MATARA COLLEGE OF EDUCATION
IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

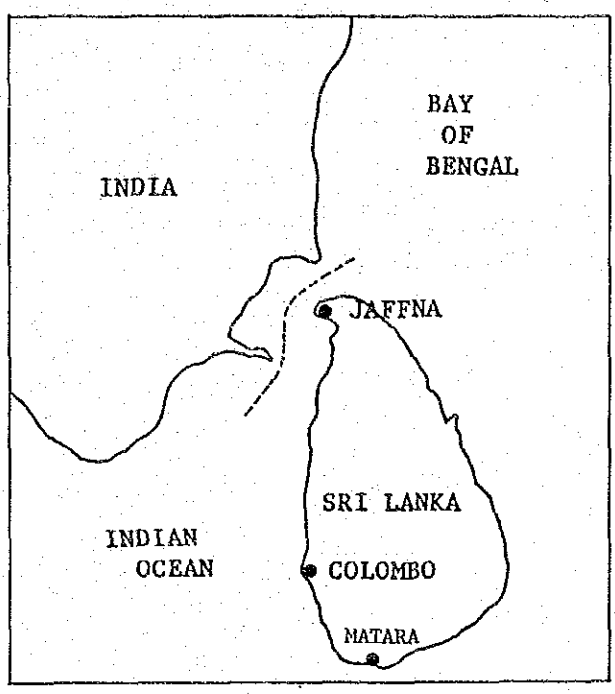


DECEMBER 1984

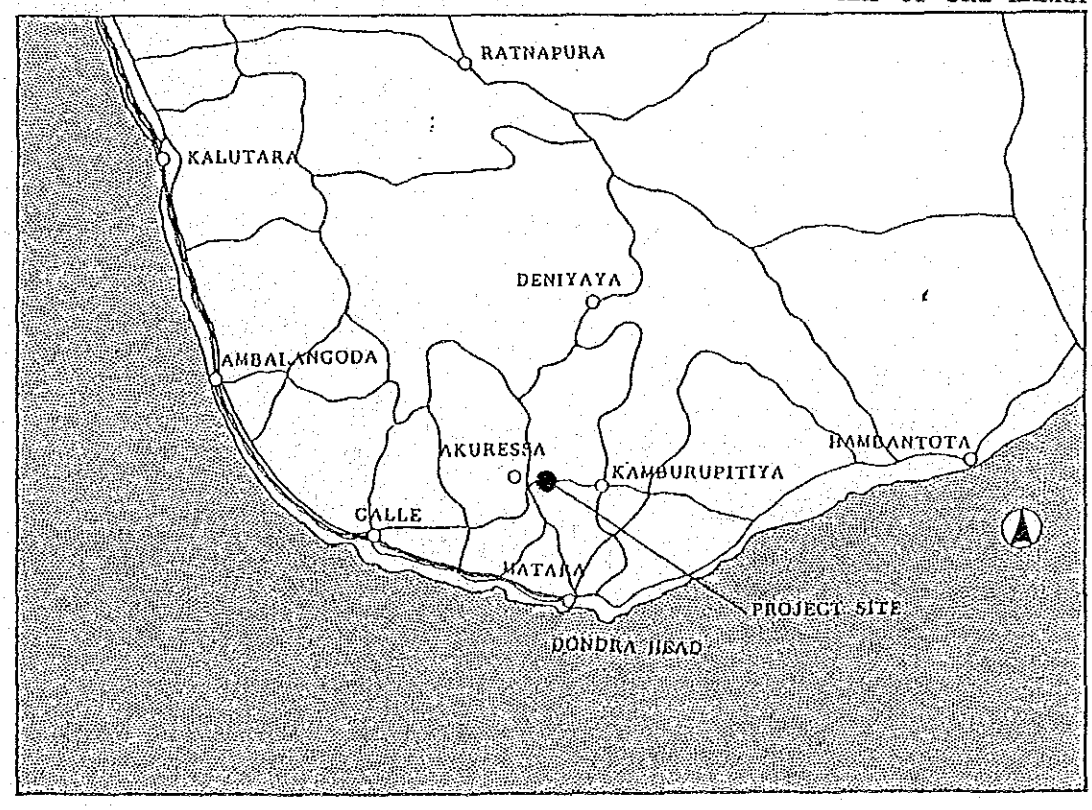
JAPAN INTERNATIONAL COOPERATION AGENCY


MATARA COLLEGE OF EDUCATION SRI LANKA OCT. 1984 KUME ARCHITECTS-ENGINEERS





MAP OF SRI LANKA



PREFACE

In response to the request of the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a basic design study on the Project for the Establishment of the MATARA College of Education and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Sri Lanka a study team headed by Mr. Seiko FUKUDA, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs from August 11 to 30, 1984.

The team had discussions on the Project with the officials concerned of the Government of Sri Lanka and conducted a field survey in Matara area. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the team.

December, 1984

Keisuke ARITA
President
Japan International Cooperation Agency

SUMMARY

Since the begining of independence in 1948, the Democratic Socialist Republic of Sri Lanka has worked actively on the improvement of their education system and has established a free and compulsory education system in which the medium of instruction are their national languages Sinhala and Tamil. As a result of this, today, Sri Lanka has achieved an impressive 86.5% literacy figure which is one of the highest in Asia. After independence, there were frequent scrumbles for political powers. However, the Jaywardena administration of the United National Party emerged through the general electin in 1977 and has created an open economy policy to promote the economic development of country. Consequently, Sri Lanka has achieved averaged 6.2% per annual during the period 1978 - 82 in economic growth.

In order to continue this "development-oriented" economic policy, Sri Lanka must promote public investment, improve public educational standards, develope useful manpower and facilitate education for specialists in various fields. These matters are very significant in maintaining a high economic growth rate and correspondingly decrease the national budget deficits. And as a foundation of these, Sri Lanka must stabilize primary and secondary educational quality, but in recent years, the quality of education especially in primary and secondary cycles has failed to keep pace with expansion. Reasons for lowered education standards include, natural increase of population, increase rate in participation and lack of teachers forcing the use of uncertificated teachers in primary and secondary schools. The Sri Lanka government has planned to establish 10 fully Residencial new institutions, and requested Japanese Grant aid assistance for construction of one of the colleges in the southern district of Sri Lanka. The Government of Japan sent the Basic Design Study Team to Sri Lanka for a survey from August 11 to August 30, 1984. Purposes of the delegation are as follows:

1) Confirmatin of the request

2) Determination the feasibility of cooperating in the project under the Japanese Grant Aid Programme

3) Inspection of the proposed project site

4) Investigation of the related infrastructure

5) Determination of the scale and arrangement of the facilities

6) Completion of the basic design to include the selection of necessary equipment

This plan is to upgrade the quality of teaching staffs, which will have a direct impact on improving the educational standard of primary and secondary schools. To reach this goal, Sri Lanka is establishing one of those new colleges for education in Matara, the southern region of Sri Lanka. The Matara College of Education will be established as a model for the rest of the institutions for educating new teachers. The Matara College stresses an amended system for teacher training, intended for new graduates of Grade 12 (G.C.E.A.L). All students are required by school policy to live in the dormitories.

The school is shceduled to be built about 25km north of Matara located at the southern most point of Sri Lanka. The area is approximately 43 acres of hilly land surrounded by a forest. Part of the low area is a paddy field, so a considerable amount of reclamation and leveling work are required. In basic preparations for the facility, the electrical work is progressing well but a deep water well will be necessary for a fresh water supply.

The facility is made up of an Administrative building, Academic buildings, a welfare and library, a Gymnasium, Dormitories, Dining hall, Staff quarters and Outdoor sports facilities, as shown below.

Administrative building:	Principal Room, Deputy Principal Room, Administrative Office, Conference Room, etc.	616 m^2
Academic Buidlings:	Class Room, Audio-Visual Equipment Training Room, Laboratory (for Physics, Chemistry, Biology), Workshop (for Technical Education and Life Skills, Home Economics) Art Room and Music Room, Academic Staff Room	5,633 m^2
Large Lecture Theatre:	125 students	341 m^2
Welfare and Library:	Canteen, Medical Room, Shop, Library	1,559 m^2
Gymnasium:	Arena, Stage, Green Room, Storage Rooms, etc.	1,170 m^2
Dormitories:	Dormitory Rooms, Counselor's Room, Study Room, Shower Room, Laundry Room, etc.	6,226 m^2
Dining Hall:	Dining Hall, Kitchen, Storage Space, etc.	2,013 m^2
Staff Quarters:	15 Housings (Sri Lankan Side work)	1,498 m^2
Out Door Facilities:	400m Track, Parking	
	Total	19,096 m^2

The Government of Japan will be responsibile for all facilities and equipment, while the Government of Sri Lanka will be responsible for reclamation, leveling work for outside facilities, construction of access road, basic infrastructure works and the construction of staff quarters approximately.

Construction schedule is as follows;

- o 4 months for detail designing
- o 2 months for tender procedure
- o 18.5 months for constructions

This project execution body in Sri Lanka is the Ministry of Education (MOE), and Secretary of Education organizes the project committee to implement the project.

The Matara college of education will aim at raising levels of quality and quantity of teachers in the primary and secondary cycles. Hopefully, The Matara college with all its new facilities will serve to be model for the other colleges of education. For that reason, the earliest opening date is expected.

The significance of cooperating in the project under the Japanese Grant Aid Assistance is quite great.
It is expected that the establishment of the college of education in the southern district will produce immence incentive effects.

CONTENTS

PREFACE

SUMMARY

CHAPTER 1. INTRODUCTION 1

CHAPTER 2. BACKGROUND OF THE PROJECT 3
2-1 General Condition of Education and Society of Sri Lanka . 3
2-2 Education System 5
2-2-1 General Education 6
2-2-2 Higher Education 10
2-2-3 Technical/Vocational Education 12
2-3 Present Situation of Teachers Education 13
2-3-1 Present Situation of Recruitment of Teachers 13
2-3-2 Present Situation of Teachers' College 19
2-3-3 Teachers Education Programme 21
2-3-4 Academic Staffs of Teacher Education 24

CHAPTER 3. CONTENT OF THE PROJECT 25
3-1 Objective of The Project 25
3-2 Proposed Course of Study in the College of Education ... 26
3-3 Facilities of the College of Education 28

CHAPTER 4. GENERAL CONDITION OF THE PROJECT SITE .. 30
4-1 Location and Environmental Condition 30
4-2 Condition of Construction Site 33
4-3 Condition of Infrastructure 34
4-4 Climatic Conditions 37

CHAPTER 5. BASIC DESIGN 38
5-1 Basic Design Principle 38
5-2 Layout Planning 39
5-3 Facilities Planning and Scale of Element 41

5-4 Materials Planning 50
5-5 Structure Planning 53
5-6 Mechanical Planning 56
5-6-1 Ventilation System 56
5-6-2 Plumbing System 56
5-7 Electrical System 64
5-8 Equipment 69

BASIC DESIGN DRAWINGS 71

CHAPTER 6. PROJECT EXECUTION PLAN 115
6-1 Executive System 115
6-2 Construction Execution Plan 117
6-2-1 Execution Plan 117
6-2-2 Supervisory Plan 119
6-3 Demarcation of Construction 121
6-3-1 Works to be done by the Government of Japan 121
6-3-2 Works to be done by the Government of Sri Lanka.... 122
6-4 Schedule for Execution 125
6-5 Procurement of Construction Material 126

CHAPTER 7. OPERATION AND MAINTENANCE PLAN 127
7-1 Administration System 127
7-2 Operation and Maintenance Plan 127
7-3 Operation and Maintenance Costs 129

CHAPTER 8. PROJECT EVALUATION 130

CHAPTER 9. RECOMMENDATION 133

APPENDIX
1. Dispatch of the Survey Team 137
2. Minutes of Discussions 140
3. Conditions of the Site 151
4. Data for Operation & Maintenance Cost 160
5. Training Equipment 164

ABBREVIATIONS

BS	British Standard
CDC	Curriculum Development Centre Ministry of Education
CEB	Ceylon Electricity Board
DER	Department of External Resources Ministry of Finance & Planning
E/N	Exchange of Notes
GCE A/L	General Certification of Education, Advanced Level
GCE O/L	General Certification of Education, Ordinary Level
GOJ	Government of Japan
GOS	Government of Sri Lanka
HWD	High Way Department Ministry of High Ways
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standard
MOE	Ministry of Education
MOES	Ministry of Education Services
MOHE	Ministry of Higher Education
MOL	Ministry of Labor
MOYA	Ministry of Youth Affairs
R/D	Record of Discussions
SLES	Sri Lanka Education Services

CHAPTER 1. INTRODUCTION

The present Government emerged in July of 1977 to reconstruct Sri Lanka's economy which had been conducted by the privious administration. The first task for the new administration was to release the economy enforced for a long period by the previous administration. The new economic policy was also projected to increase national productivity, improve employment rate and break away from the agricultural-based economy. The Jayewardene administration is based on an open economic policy which allows Sri Lanka's private enterprises to be more active and gives them the ability to obtain long-term economic growth through economic cooperation with foreign countries. Consequently, Sri Lanka has achieved averaged 6.2% per annual during the period 1978 - 82 in economic growth.

In order to continue this "development-oriented" economic policy, the Government must promote public investment, improve public education standards, develope useful manpower and facilitate education for specialists in various fields. But in recent years, deteriorating education standards are impeding the development of useful manpower and the upbringing of specialists. Reasons for lowered quality level of education include the followings, a natural increase in population, an increase in school participation, and a lack of teachers forcing the use of uncertificated teachers with insufficient teaching experience to teach in schools. To resolve these problems, the Sri Lanka government has designed a project to establish colleges of educatin to improve the quality of teachers and consequently bring up education standards.

Sri Lanka government planned to establish a total of 10 all new colleges of education having a fully residential dormitories. The Government of Sri Lanka at this time has requested Grand aid assistance from the Government of Japan and cooperation in constrtruction of the residential college to be built in Matara, the southern region of Sri Lnaka. The Government of Japan responded to this request and

in August of 1984, sent the Basic Design Study Team through JICA to study feasibility of providing to grant aid.

Investigations for preparing a basic design was scheduled for a 20 day period, to start from August 11 to August 30, 1984. During this period, the Team ascertained the contents of the request and the execution body of the Sri Lankan side, and conducted research of other resembling institutions. Important factors required for implementation of the project were investgated and discussed.

The Minutes of Discussion, signed and exchanged between Mr. E.L. Wijemanne, Secretary, Ministry of Education (MOE) and Mr. Seiko Fukuda, the leader of the Basic Design Study Team. (See Appendix.)

This report presents the findings of the said Basic Design Study for the establishment of the Matara College of Education Project.

CHAPTER 2. BACKGROUND OF THE PROJECT

2-1 General Condition of Education and Society of Sri Lanka

Sri Lanka has been active for the establishment of its education system and the countrywise spread of various schools from the days of the British rule. During this period, the Colonial Government promoted the education in the English medium as well as the school education of its people by the mother tongue. The first attempt for the establishment of the compulsory education system was made in 1907, and the present free education system from the kindergardens to the universities was introduced in 1945 even before the country became independent from the English rule. The spread of the free education system and the adoption of the the mother tongue as the medium of instruction provided for greater equality of opportunity and social mobility. It broke down the exclusiveness of Assisted English schools and opened the doors of Secondary and Tertialy education to talented pupils from poor homes.

After the independence of Sri Lanka in 1948, its successive governments continued with the policy of democratizing educational provision. There was the progressive increase in the enrolement of the children in schools and a rise in litaracy rate. As a result, Sri Lanka has reached 86.5% of litaracy rate, one of the highest in Asian countries.

After the independence, Sri Lanka experienced frequent changes of its government, and the present Jayewardene administration of the United National Party emerged through the general election in 1977 is taking the open economy policy in order to promote the economic development of the country more actively through the economic cooperations with the western countries. For this purpose, the government is placing the emphases of its economy development policy on the developments of the industries and the resultant creation of the job opportunities for the people through the promotion of large public investment projects based on the aids from the industrially developed countries.

Thus, in order for the government to promote such economic policies, it is becoming increasingly important not only to elevate the education level of its people but also facilitate the education of the specialists in various fields of the society for the development of the useful manpower being able to meet various needs of the nation. For example, an education television system established through the grant aid assistance by the Government of Japan was started in 1983, and the programs for English and science are televised currently. On the other hand, the education system reform program mainly concerned with the reforms of the primary and secondary education systems aiming at the development of the manpower being able to meet the changing social needs is expected to be enforced from 1985. This reform program is primarily intended to elevate the substantial percentage of the school participation of the children by reducing the period of the compulsory education, which has been 11 years, to 8 years, and also to reinforce the vocational education system so that the children will be able to decide their courses either for higher education or vocational education earlier and more effectively than before.

Table 2-1-1 The percentage of literate in Sri Lanka

Census Year	Population 10 years and over ('000)			Literates ('000)			percent Literate		
	All Persons	Males	Females	All Persons	Males	Females	All Persons	Males	Females
1953 ..	5,803	3,110	2,693	4,006	2,510	1,496	69.0	80.7	55.5
1963 ..	7,523	3,952	3,571	5,789	3,385	2,404	77.0	85.7	67.3
1971 ..	9,354	4,839	4,515	7,344	4,143	3,201	78.5	85.6	70.9
1981(1) ..	11,301	5,761	5,540	9,776	5,212	4,563	86.5	90.5	82.4

Source : Department of Census and Statistic

(1) Estimates based on 10% Sample.

2-2 Education System

The education system in Sri Lanka can broadly be divided into the three parts namely: (1) General Education System, (2) Higher Education System and (3) Vocational/Technical Education System.

The general education as the compulsory education requiring 11 years consists of the primary education for 6 years and the secondary education (Junior secondary education for 5 years and senior secondary education for 2 years). The general education is under the jurisdiction of Ministry of Education.

The higher education comprising the professional colleges and the universities are under the jurisdiction of Ministry of Higher Education. The vocational education is under the jurisdiction of Ministry of Labor and Ministry of Youth Affairs, which share the responsibility for this field of education.

Table 2-2-1 School Structure

<table>
<tr><td rowspan="2"></td><td colspan="2">Primary</td><td colspan="2">Secondary</td><td>Exam</td><td>Pre-University</td><td>Exam</td></tr>
<tr><td>L. Kg.
1 Yr.</td><td>Grades
1 – 5
5 Years</td><td colspan="2">Grades 6 – 10
5 Years</td><td>End of Gr.10 GCE (O.L.) National level</td><td>Grades 11 – 12
2 Yrs.</td><td>End Gr.12 GCE (A.L.) National level</td></tr>
<tr><td rowspan="2">Proposed</td><td rowspan="2"></td><td>※
Grades
1 - 5</td><td>※
Junior Secondary
Grades 6 – 8</td><td>Senior Secondary Gr.
9 – 11</td><td>Exam</td><td rowspan="2">Collegiate level
Grades
12 – 13</td><td rowspan="2">End of Gr.13 University Entrance Exam National level</td></tr>
<tr><td>5
Years</td><td>3 Yrs.</td><td>3 Yrs.</td><td>End of Gr.11 GCE National level</td></tr>
</table>

* Compulsory education under new education system

2-2-1 General Education

1) Participation of the Population

Of the population of Sri Lanka totaling 14.85 million, about 3.4 million of children are enrolled in the primary and the secondary schools. The survey in 1981 indicates that about 84% of the children in the age group 5-14 were attending to the primary and the secondary schools, the marked increase from the 74% in 1971. However, nearly 70% of the pupils who enter the lowest grade of the primary cycle complete the cycle and the remaining 30% are the school leavers.

Table 2-2-2 Schools according to Grades, 1982

Cycle/Cycles	*No. of Schools*		
	Grades	*Total*	*Percentage*
Primary	LKG– 5	4007	42%
Primary+Junior Secondary	LKG–10	3750	39%
Primary+Junior Secondary+Senior Secondary . .	LKG–12	1415	15%
Junior Secondary+Senior Secondary	6–12	372	4%
	Total	9544	100

Table 2-2-3 Enrolement in Primary, Junior Secondary and Senior Secondary Cycles by Sex

Cycle	*Total Enrolment*			*Percentage*	
	Male	*Female*	*Total*	*Male*	*Female*
Primary	1093875	1019239	2113114	51.7	48.3
Junior Secondary	542377	562533	1104910	49.1	50.9
Senior Secondary	72647	107384	180031	40.3	59.7
Total	1708899	1689155	3398055	50.3	49.7

Of the 4,007 primary schools, more than 2,000 schools are having a pupil enrolment of less than 100, whereas the few schools located in the urban districts are attended by more than 3,000 pupils, and the differences in the schooling facilities and the education level between the small local schools and the large schools in the urban districts are said becoming larger year after year. Besides these public schools, there some private schools (about 1%) and the pirivenas, which are attended by about 15,000 Bhikku pupils (monks) and 15,000 lay pupils.

2) Primary school (Grades 0 - 5)

The education for this level continues for 6 years for the children at the ages of 5 to 10. The education programs for this period are designed for the development of the basic skills in literacy and numeracy and understanding social life and elements of culture. English is taught as Second Language from Grade 3 upwards.

For a small proportion of the children of pre-school ages (3 to 4 years of age), there are 2-year nursary facilities operated by either the Local Government Authorities or the private organizations.

3) Junior secondary school (Grades 6 - 10)

The junior secondary education is given for 5 years for the children at the ages of 11 to 15, and the curricula consist of the First Language (Sinhala or Tamil), Religion, English, Mathematics, Integrated Science, Social Studies, Health & Physical Education, Aesthetic Studies and Technical Subjects.

The compulsory education is for 11 years until grade 10, and the pupils who have completed the courses of the compulsory education are required to take the G.C.E.O/L (General Certification of Education, Ordinary Level) as a national examination. Admission to the Senior Secondary Level (Science Stream, and Commerce, Art Stream, Grades 10-12) as well as to some of the Vocational/Technical programmes depends on the performance at this examination.

4) Senior secondary school (Grades 11-12)

The senior secondary school, which corresponds to the senior high school in Japan, is divided into three courses namely the science course, commercial course and liberal arts course. The graduates of the senior secondary school (Grade 12) are required to take G.C.E.A/L (Advanced Level), and those who wish to receive higher educations are admitted to be enroled in the universities or technical colleges depending on the results of this examination.

5) Non-formal education

The Non-Formal Education Branch of Ministry of Education provides the non-formal education programs for the school leavers, those who have never had the opportunity of entering schools and the adults. The programs for the non-formal education comprise followings;

(1) Skills Development Programmes for school Leavers
(2) Literacy Programmes for Non-School goers and Primary School Drop-outs
(3) Adult Education/Community Education Programmes
(4) English Education for Adults

These programmes are provided in the after-school hours or weekend hours in school buildings, village temples or community centres. The Skills Development Programme is the most extensive involving 600 Centres throughout the country. Literacy classes are taught by the teachers of primary schools. By now, 85 of Literacy classes are provided in city of Colombo and in its suburban area. The children attending these classes are expected to re-enter into the formal system after a period of time and all attempts are made to direct for the re-entry.

6) New education system

The reform system to be enforced from 1985 was created as the education system that is more adaptable to the actual situation of the existing primary and secondary educations than the previous system. According to the white paper, the periods and the school ages of the

primary and secondary school pupils remain unchanged from the present 13 years and the ages of 5 to 18, but the following changes will be made:

(1) 6-year period of Grades 0-5 for the primary education will be reduced to 5-year period of Grades 1-5.

(2) 5-year period of Grades 6-10 for the Junior Secondary Education will be re-arranged for the new schooling period system to consist of 3-year period of Grades 6-8 for the Junior Secondary Education and another 3-year period of Grades 9-11 for the Senior Secondary Education by discontinuing the previous 5-year period, whereby the education of up to Grade 8 will be established substantially as the compulsory education.

(3) The Collegeate Level (Grade 12-13), the pupils who have finished Grade 11 are entitled to take the national qualification examination G.C.E O/L, and they are supposed to elect either the liberal arts course or the science course in the next segment of education, depending on the results of the examination. The Collegeate level courses will lead to the University Entrance Examination at the end of Grade 13.

The new education system aims at the reformation of the secondary education system by incorporating the studies of life skills and vocational skills in more practical form into the curricula. In other words, the new education system is designed not only for the further improvement and spread of secondary education but also for the further diversification of the courses of the studies so that the children will be able to be more flexible in determining their future courses.

Number

University of Colombo — Number of Students by Faculty	1979/80	1980/81	1981/82
All Faculties	3,290	3,286	3,110
Arts	1,328	1,400	1,381
Science	554	556	592
Education	380	207	45
Medicine and Dental	862	936	889
Law	166	187	203

University of Peradeniya	1979/80	1980/81	1981/82
All Faculties	4,829	4,979	5,159
Arts	2,098	2,201	2,256
Science	636	589	605
Veterinary Science	108	107	102
Engineering	789	888	993
Agriculture	445	458	466
Medicine and Dental	753	743	737

University of Kelaniya — Faculty	1979/80	1980/81	1981/82
All Faculties	2,788	2,715	2,665
Commerce	923	902	758
Arts	1,585	1,513	1,552
Science	280	300	355

University of Moratuwa — Faculty	1979/80	1980/81	1981/82
All Faculties	827	909	869
B. Sc. Engineering	657	756	731
B. Sc. Applied Science	62	42	21
B. Sc. Built Environment	108	111	117

University of Jaffna — Faculty	1979/80	1980/81	1981/82
All Faculties	1,279	1,641	1,725
Medicine	141	219	294
Arts	694	817	712
Science	444	513	510
Commerce	—	92	209

Ruhunu University College — Faculty	1979/80	1980/81	1981/82
All Faculties	421	624	802
Science	109	129	147
Medicine	—	79	166
Agriculture	39	64	84
Arts	273	352	235
Commerce	—	—	170

Batticaloa University College	1979/80	1980/81	1981/82
All Faculties	—	—	77
Agriculture	—	—	23
Science	—	—	54

Source : (Division of Planning and Research).
University Grants Commission.

2-2-2 Higher Education

The universities accepts only those who have passed the national examination G.C.E A/L. The university education in Sri Lanka dates back to the foundation of the then Ceylon University in 1924. After 1972, the number of universities and colleges in Sri Lanka has increased markedly, and today there are 7 full-fledged Universities, 1 University College, 1 University Campus, 1 Open University, 1 private Medical College and 7 Institutes (three of which are postgraduate institutes), numbering 18 in total.

The students attending these schools number nearly 20,000 in total, about 1.3% of the total population of the same ages numbering 1.5 million, which is quite small in share, and this means that the entrance to the universities and colleges is highly competitive.

The higher education is under the jurisdiction of Ministry of Higher Education that has been separated from Ministry of Education in 1978.

The faculties and and the numbers of the students belonging to the seven national universities are as follows:

Table 2-2-4 Institutions of Higher Learning by Number of Departments, Students, Teachers, Income and Expenditure – 1981/82 (Academic Year)

University	No. of Depart-ments	Number of Students			No. of Teachers	Income Rs.	Expenditure Rs.
		Males	Females	Total			
All Universities	204	10,038	7,618	17,656	1,609	120,371,851	126,203,636
Colombo	38	1,732	1,378	3,110	331	24,286,202	24,653,034
Peradeniya	50	3,248	1,911	5,159	470	46,777,183	47,762,933
Sri Jayawardenapura	16	1,769	1,480	3,249	149	10,145,224	10,374,180
Kelaniya	22	1,381	1,284	2,665	216	11,094,718	11,391,900
Moratuwa	13	−732	137	869	120	10,798,259	12,483,988
Jaffna	42	726	999	1,725	206	9,835,094	11,125,528
Ruhuna University College	13	391	411	802	97	5,917,222	7,467,145
Batticaloa University College ..	10	59	18	77	20	1,517,949	949,928

Source : (Division of Planning and Research,) University Grants Commission.

At present, the universities in Sri Lanka are active in increasing the numbers of the students majoring the Medical Science, Engineering, Agriculture, Science and Mathematics in order to cover the shortages of the specialists in these fields. However, especially in the field of Medical Science and Engineering, the talented academic staff are apt to stay aboard seeking the better environments for work, and this tendency makes it difficult to increase the number of students specializing the aforementioned sciences. On the other hand, the graduates of the universities who have specialized in the Liberal Arts are put to difficult position in seeking their jobs, since the job opportunities for the students of these courses are extremely limited in Sri Lanka.

The Open University established in 1980 as an academically autonomous institute is intended for the working students, and this University grants the Degrees of First or Post-graduate, or a Diploma and Certificate of various professional qualifications. As of 1983, the students learning at the 14 education centers located in various parts of the country number 1,466 in total, and the greater importance is attached to the Programme of Physical and Biological science. Besides, these education centers provide foundation courses for the benefit of those who do not possess adequate knowledge to pursue satisfactorily tertiary-level course of study, thereby meeting the social needs promptly and in practical ways.

2-2-3 Technical/Vocational Education

The educations in this category are carried out by the 23 Technical Institutes/Colleges under the jurisdiction of Ministry of Higher Education and by more than 200 vocational training schools located in various parts of the country and under the jurisdictions of Ministry of Labor and Ministry of Youth Affairs. The students learning at these vocational training schools number about 11,000 in total, and more than 150 categories of courses are provided to these students.

2-3 Present Situation of Teachers Education

2-3-1 Present Situation of Recruitment of Teachers

In Sri Lanka, the schoolteachers have not undergone any professional trainings and educations at the time of the appointment, and they are supposed to acquire their qualifications of schoolteachers after undergoing the post-graduate training institutes of the Universities or the Teachers' Colleges, and this is the established system in Sri Lanka. In general, the graduates of the Universities become the teachers of the Senior Secondary schools, while the graduates of the Teachers' Colleges become the teachers of the Primary and Secondary schools.

At present, the qualifications of schoolteachers, which are classified into five categories, and the numbers of the schoolteachers by their qualifications are as follows:

1.	Graduates of Universities teaching integrated science, mathematics, arts, commercial science.	21,715	16.8%
2.	Teachers with Diploma in integrated science or mathematics.	294	0.2%
3.	Other Categories of Certificated Teachers	6,016	4.6%
4.	Graduates of Teachers' Colleges	78,627	60.7%
5.	Graduates of secondary schools (Grade 12) teaching as Uncertificated Teachers.	22,828	17.7%
	Total	129,480	100%

Note: The above figures do not include the about 8,000 teachers currently undergoing the reeducation courses at the Teachers' Colleges.

Table 2-3-1 Number of teachers in schools, classified by Districts – 1981

District	Total No. of Teachers	Type of Schools			
		Govt(2) Schools	Private(5) Schools	Pirivenas	Estate(3) Schools
Colombo	14,268	12,791	1,347	130	—
Gampaha	12,421	11,995	261	165	—
Kalutara	7,906	7,636	71	199	—
Matale	3,807	3,740	31	30	06
Kandy	12,699	12,139	234	220	08
Nuwara Ellya(4)	3,040	3,031	—	08	01
Galle	8,421	8,231	—	190	—
Matara	7,197	6,957	49	181	—
Hambantota	3,710	3,673	—	37	—
Jaffna	6,787	6,561	226	—	—
Mannar	776	776	—	—	—
Vavuniya	707	707	—	—	—
Mullaitivu	413	413	—	—	—
Trincomalee	1,891	1,889	—	02	—
Batticaloa	1,989	1,989	—	—	—
Amparai	2,926	2,917	—	09	—
Puttalam	4,088	4,070	—	18	—
Kurunegala	13,195	12,943	—	252	—
Anuradhapura	5,399	5,361	—	38	—
Polonnaruwa	1,919	1,893	—	26	—
Moneragala	2,042	2,028	—	14	—
Badulla	6,358	6,161	81	97	19
Kegalle	7,515	7,367	—	136	12
Ratnapura	6,485	6,378	—	107	—
Total ..	135,869	131,656	2,300	1,867	46

Source : Ministry of Education.

(1) Total enrolment of teacher training colleges is 9235, out of this 2767 teacher trainees were attached to schools on field training and are included.

(2) Excluding teachers in teacher training Colleges.

(3) 324 Schools were vested during the year 1981.

(4) Two Educational districts namely Wellmada and Uva-Paranagama transferred from Nuwara-Ellya to Badulla.

(5) Includes fee levying and Non fee levying.

Deployment of teachers by the School

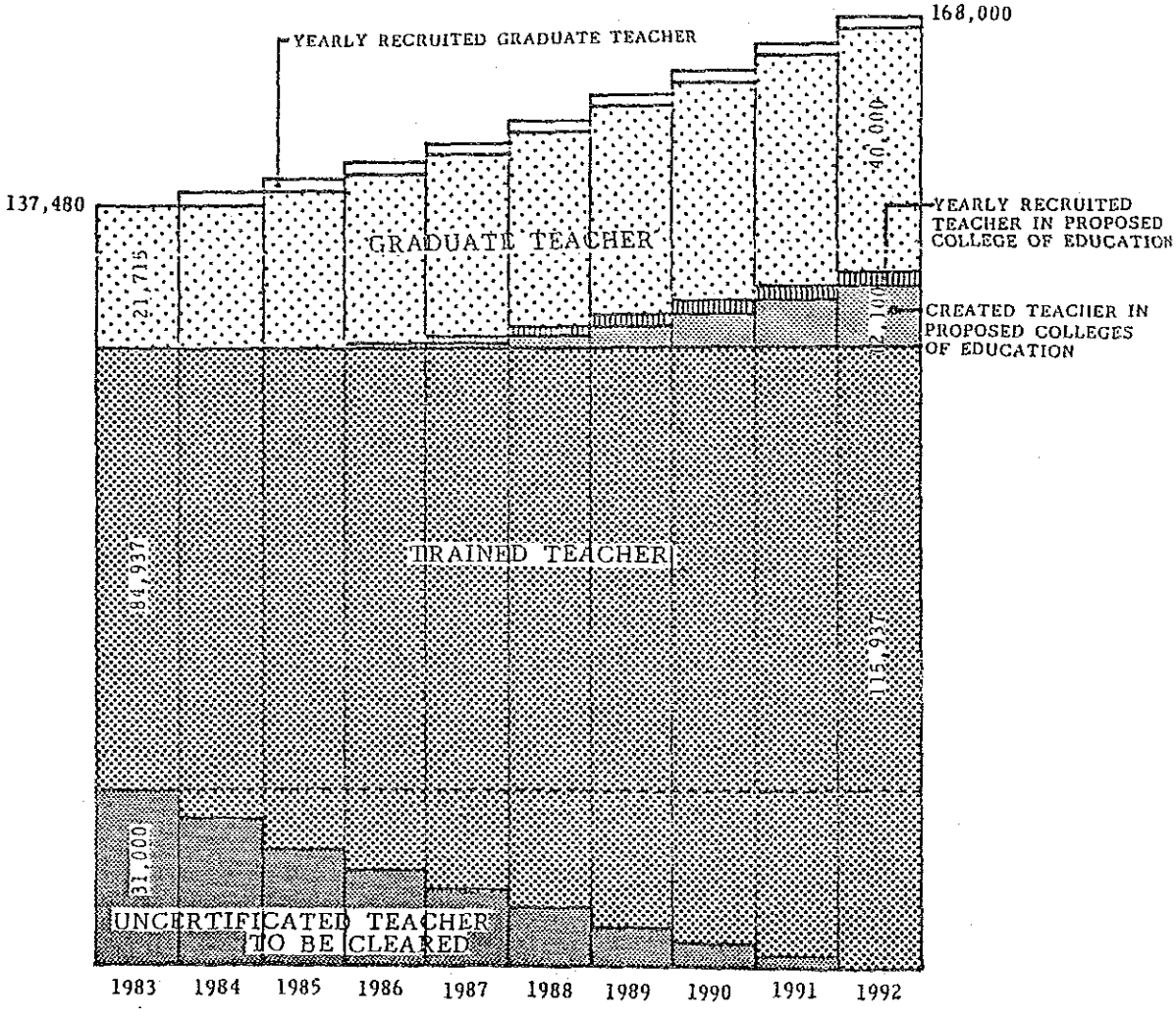
Grades 0 - 5	61,192
Grades 6 - 10	54,182
Grades 11 - 12	13,836
Total	129,210

Those who have become teachers after graduating the Secondary School (Grade 12) are generally assigned to the teaching of the children of up to grade 10 in the capacity of the Uncertificated Teachers. The statistics indicates that one out of five teachers of the Primary and Secondary Schools is the Uncertificated Teachers, though the total number of the teachers assigned to the teaching for the Primary and Secondary Schools is 115,000. As of September, 1983, the necessary numbers of the teachers by the teaching subjects were as follows:

Graduates of Universities	Integrated Science	2,472
	Arts	13,667
	Commercial science	1,712
Graduates of Teachers' Colleges and other schools	Integrated Science/Mathematics (Grades 6-10)	15,847
	English (Grades 6-12)	8,916
	Others (Grades 6-10)	25,410
	Primary Methods (Grades 0-5)	60,773
	English (Grades 3-5)	9,463
	Total	138,260

In Sri Lanka, Ministry of Education recruits 4,500 to 5,000 school-teachers annually, and the recruitment consists of about 2,000 from the University Graduates and 2,500 to 3,000 from the Secondary School Graduates (Grade 12).

Fig. 2-3-1 TEACHER DEVELOPMENT PROGRAM



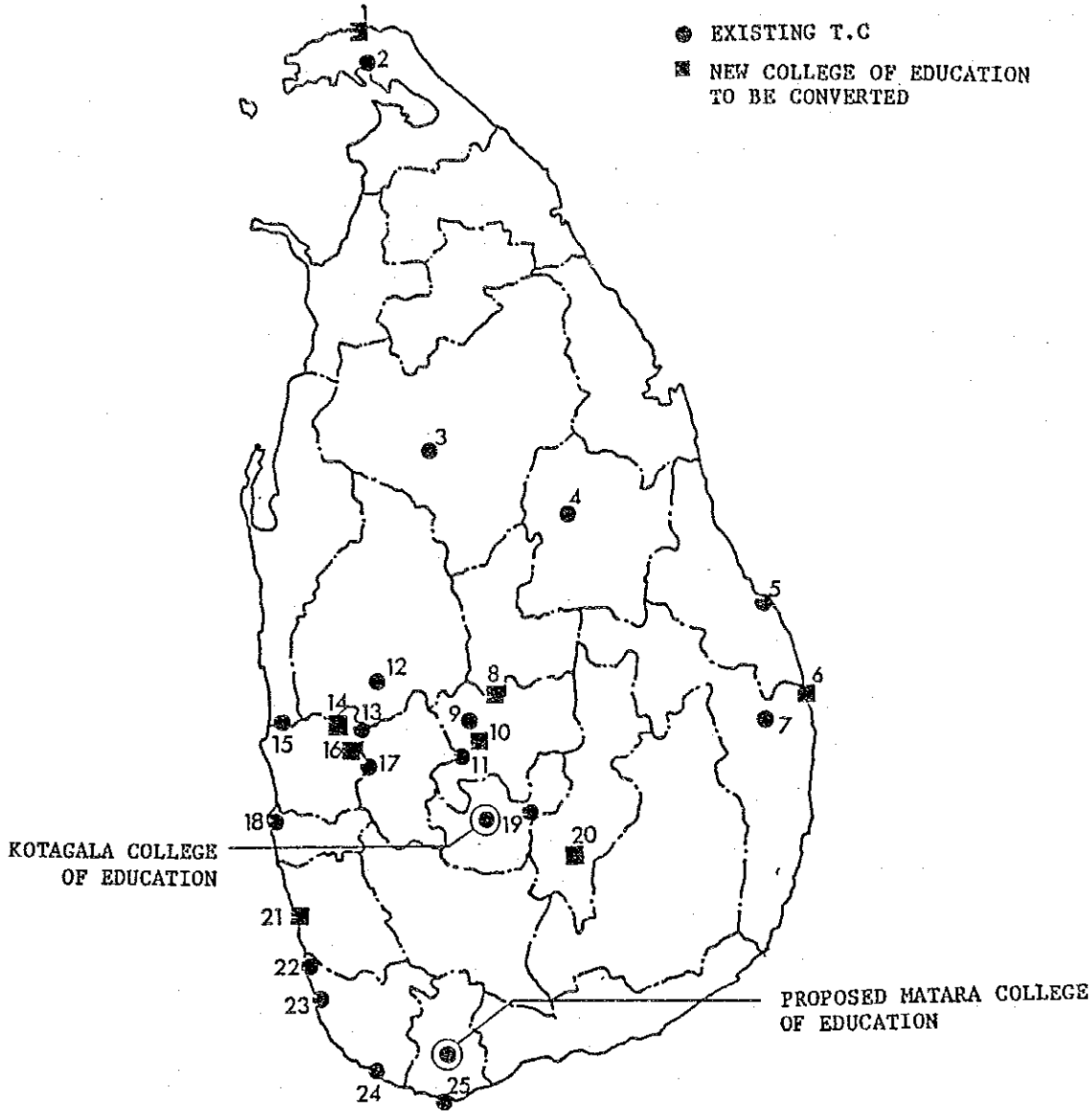
The recruitment to the teaching service in Sri Lanka is characterized by that the school teachers are qualified only by their academic qualification without any professional training, and that the recruitment of the schoolteachers as the Graduates of the Universities is made from those who have not had any professional training in teaching. Therefore, the Faculties of Education in the University does not conduct the programme to create the school teacher-to-be of Primary and Secondary School. As a result, even the schoolteachers recruited from the University Graduates have not given the chances of learning the Principles of Education, Education Psychology, Curriculum Development, Evaluation, Teaching Practice, which are the compulsory subjects of study for the schoolteachers-to-be, and thus the necessity of the Pre-Service Professional Training for the University Graduates has been pointed out.

On the other hand, the existing 25 Teachers' Colleges are now functioning as the schools to train the Uncertificated Teachers who have been recruited to the teaching service after finishing the Secondary Schools (Grade 12), and intend to acquire the qualification of the Trained Teachers certificate while in service.

Each Teachers' College provides two-year institutionalized training and one-year field training course, which constitutes the three-year schooling period as a whole. In 1983 the number admitted to the Teacher's Colleges was about 4,500. But the annual intake to the teaching service has tended to exceed the annual intake to the Teachers' Colleges due to the increasing population in schoolages. As a result, the number of the Uncertificated Teachers has been increasing rather than decreasing due to the inadequate capacities of the Teachers' Colleges. The shortage of the Certificated Teachers is most conspicuous in the categories of Integrated Science, Mathematics English and Primary Methods.

In order to improve the situation, Ministry of Education of Sri Lanka has provided the intensive short-term residential training courses for the Uncertificated Teachers who were recruited since 1983 using the weekends and the periods of vacations. But experience has shown, that, such a short-term course is handly adequate to develop specific teaching skills, and desirable personnal and professional traits.

Fig. 2-3-2 LOCATION OF EXISTING TEACHER'S COLLEGE (25 COLLEGE)



	COLLEGE NAME	DISTRICT
1.	PALALI T'C	JAFFNA
2.	KOPAI T'C	JAFFNA
3.	ANURADAPURA LADY'S T'C	ANURADAPURA
4.	HINGURAKGODA T'C	POLONNARUWA
5.	BATTICALOA T'C	BATTICALOA
6.	ATTALACHCHENA T'C	BATTICALOA
7.	AMPARA T'C	AMPARA (UHANA)
8.	UYANWATTA T'C	KANDY
9.	GIRAGAMA T'C	KANDY
10.	PERADENIYA T'C	KANDY
11.	CAMPOLA T'C	KANDY
12.	DAMBADENIYA T'C	KURUNEGALA

	COLLEGE NAME	DISTRICT
13.	MIRIGAMA ENGLISH T'C	GAMPAHA
14.	MIRIGAMA BUDDIST T'C	CAMPAHA
15.	BOLAWALANA T'C	GAMPAHA
16.	PATTALACEDARA T'C	GAMPAHA
17.	NITTAMBUWA T'C	GAMPAHA
18.	MAHARAGAMA T'C	COLOMBO
19.	TALAWAKELE T'C	NUWARA ELIYA
20.	BANDARAWELA T'C	BADULA
21.	MUSEAUS T'C	KALUTARA
22.	ALUTHGAMA T'C	KALUTARA
23.	BALAPITIYA T'C	GALLE
24.	UNAWATNA T'C	GALLE
25.	MATARA T'C	MATARA

2-3-2 Present Situation of Teachers' College

There are 25 Teachers' Colleges, which are under the jurisdiction of Ministry of Education, throughout the country. The average number of students entroled in each Colleges is about 300, the students study the specialized subjects for two years and one-year field training. The students who have completed this three-year course are qualified for the schoolteachers. As discussed in the previous section, the students of these Colleges are the teachers who have been in service for several years after graduating from their secondary schools. During the two-year reeducation period, these teachers receive their salaries as usual. The locations of existing 25 Teachers' Colleges are as shown in Fig. 2-3-2. Each College does not admitt only students on the located district base but from all over the country. 16 are conducting courses in Sinhala medium, 6 in Tamil medium and remaining three for training of Teachers to teach English as a second language.

The numbers of the students by the courses in each College are as shown in Table 2-3-2. This Table indicates that the emphasis is placed on the courses of the teachers of the integrated Science, Mathematics and English, and also on the teachers of Primary Schools.

The total operating budget for the 25 Teachers' Colleges in the fiscal year of 1983 was Rs37,641,000 which composes as follows:

(1) The personnel cost accounts for 94%
(2) Expenses for electricity and fuels 1.1%
(3) Equipments and educational material cost 0.5%
(4) Supplies cost 1.0%
(5) Others 3.4%

The annual operating cost per student is Rs 4,650 (RS 37,641,000/ 8,100 pupils).

In fiscal year of 1984 is Rs52,594,000 which excluded the total sum of Rs120,000,000 paid to teacher trainees as salaries.

(1) The personnel cost accountes for 86%
(2) Expenses for electricity and fuels 1.1%
(3) Equipment and educational material cost 5.2%

Table 2-3-2 Number of students by the courses in colleges

	SCIENCE	MATHEMATICS	ENGLISH	PRIMARY METHODS	HOME SCIENCE	LIFE SKILLS	SOCIAL STUDY	LANGUAGE (SINHALA, TAMIL, ARABIC	PHYSICAL EDUCATION	AETHETICS (MUSIC/DANCE)	RELIGION	SPECIAL EDUCATION	
PATTALAGEDARA T.C	257	248				104							609
UYANWATTA T.C	88	151			111		150						500
MIRIGAMA B.T.C			152				74				144		370
MUSEAUS T.C		32		213	81			s 90					416
BANDARAWELA T.C	15	78		119									212
ANURADAPURA T.C	34	72		77									183
KAL MUNAI T.C	42	43		56			37	t40 a66			21		305
PERADENIYA T.C			406										406
PALALY T.C	132	159	71			67			21		27		567
MIRIGAMA E.T.C.											273		273
NITTANBUNA T.C				76		90	s64						230
HINGRAGODA T.C		41		48									89
BATTICALOA T.C	49	44		64			42	t39					236
KOPAI T.C				60	140		65	t43		22	33		363
AMPARA T.C				46			57	s18					121
GIRAGAMA T.C										122		202	324
GAMPOLA T.C				154				s74					228
DAMBADENIYA T.C				123				s59	113				295
BOLAWALANA T.C				283							89		372
MAHARAGAMA T.C	229	278	138		128	68			99			42	972
TALAWAKELE T.C				34			16	t21					71
ALUTHGAMA(MUSLIM.L)T.C	42	48		66	55		23	t58			29		321
BALAPITIYA T.C		111		82			47	s58					298
LINANATUNA T.C	79	91		145									315
MATARA T.C		24											24
MATARA COE T.C	100	100		250		50							500
TOTAL	967	1420	767	1646	515	239	601	s36 t20 a 69	233	144	616	244	8100

(4) Supplies cost 1.0%

(5) Others 6.7%

The annual operating cost per student is Rs.6,493.

2-3-3 Teachers Education Programme

In Sri Lanka, the fall of the education levels of the Primary and Secondary Schools, which is attributed to the teachers qualification system peculiar to Sri Lanka, has been controversial in recent years. The annual intake to the teaching service has always exceeded the annual intake to the Teachers' Colleges, and the number of these Uncertificated Teachers tends to increase year after year, which cannot be cleared by institutionalized teacher education programme alone.

In order to accelate to clear these backlog of untrained teachers in service, Ministry of Education is conducting the short-term intensive training programs using the available facilities of schools and the existing Teachers' Colleges during the weekends and the vacations, namely; The distance teacher education programme. In order to liquidate the existing 30,000 Uncertificated Teachers (including 8,100 currently undergoing at the Teachers' Colleges) by 1990, the Ministry is planning to clear 10,000 Uncertificated Teachers at the Teachers' Colleges, and the rest of 20,000 by the aforementioned the distance teacher education programs from now on.

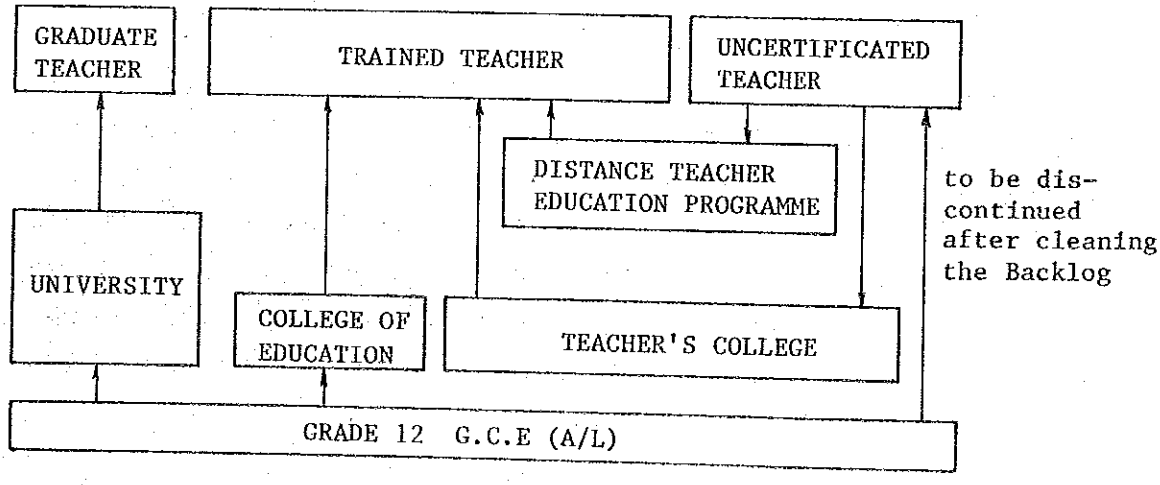
On the other hand, Ministry of Education intends not to increase the number of the Untrained Teachers from now on. In order to meet this requirement, the present practice of recruiting Untrained Teachers to the service will be replaced progressively by scheme under which only Trained Teachers will be absorbed into the service. For this purpose, the Ministry is planning to establish two new Colleges of Education (one to be established by 1986 under this project assisted by the Government of Japan, and the other is Kotagala College of Education), and also to establish 8 new Colleges of Education by reorganizing the existing Teachers' Colleges. These new institutes are expected to be started in succession within four years from October, 1984. The constructions of the dormitories for

the students for these new Colleges are currently in progress, since these new schools are intended to be operated as the resiential schools. When the all of these new Colleges are in operation, it will be possible to create 2,100 to 2,500 new teachers annually.

When the existing Uncertificated Teachers is liquidated within a decade, the existing Teachers' Colleges will be finishing their current functions, that is, the reeducation of the Uncertificated Teachers, and they will be able to perform their primary functions, the in-service training of the Certificated Teachers for the further elevation of their teaching professions as planned by Ministry of Education. On the other hand, the reorganization or abolition or amalgamation of the existing Teachers' Colleges will also be promoted so that some of these can be converted into the special Institute such as the Fine Arts Education (Ex. GIRAGAMA TC) and the special Institute for Physical Education (Ex. BANDARAWERA TC) and the the teachers of Buddhism (Ex. Nittanbuwa TC), and the works for the realizations of such plans are actually in progress.

Besides, Ministry of Education is also planning to establish the National Institute of Education as the center of the researches, investigations and planning of development projects concerning the education of the people in Sri Lanka, and this institute, when completed, is expected to contribute to the further elevation of the teaching abilities of the teachers in various specialized fields by providing the programs as the postgraduate training Centre. The National Institute of Education is expected to start from 1985.

TEACHER EDUCATION SYSTEMS



The existing eight Teachers' College to be converted into the College of Education, and the annual schedules are as follows:

New colleges to be started from October, 1984

o Pattaladedara Collage of Education	Science/Mathematics and Life Skills/ Technical Education	250 students/year
o Uyanwatta Collage of Education	Primary Methods, Science/Mathematics	200 students/year
o Mirigama Collage of Education	Humanities	250 students/year
o Museaus Collage of Education	English	250 students/year

New colleges to be started from 1985

o Bandarawela Collage of Education	Health and Physical education	250 students/year
o Attalachchenai Collage of Education	Science/Mathematics Humanities	250 students/year

New colleges to be started from October, 1986

o Matara Collage of Education	Science/Mathematics, Primary Method, Life Skills/Technical Education	250 students/year
o Palaly College of Education	Science/Mathematics Life Skills, Primary Method	250 students/year

New colleges to be started from October, 1987

o Peradniya College of Education	English	250 students/year
o Kotagala College of Education	Science/Mathematics Life Skills, Primary Method	250 students/year

2-3-4 Academic Staffs of Teacher Education

The Academic staffs of the Teachers' College are classified as Teachers, Lecturers, Training Masters, Instructors and Demonstrators. Teachers and Lecturers will be appointed from those with Master's degrees in Education, and they are classified into the special grade and grades I and II depending on their experiences in teaching. Traiing Masters are appointed from the graduates of the universities with the experience of over 5 years in teaching, and the graduates of the Teachers' College with the experience of over 7 years in teching.

The instructors are appointed from those who have obtained the required units of study at the Universities or from those who have the experience in teaching after graduating from the Teachers' College. At present, the existing 25 Teachers' Colleges have 408 Academic staffs in total, while the Administrative staffs number 122 and the Technical officers and Minor employees number 444 in total respectively. The Administrative staffs including the principals as Sri Lanka Education Services (SLES) are classified into the classes I, II and III depending on their experiences. The SLES's are the government officers belonging to Ministry of Education, and they will serve in the Department of Examinations and Publications and in the Division of the Education Ministry dealing with curriculum Development in CDC, besides the administrative jobs such as the administration and the operation of the schools.

CHAPTER 3. CONTENT OF THE PROJECT

3-1 Objective of the Project

This project is intended to overcome the shortcomming of the performance of school education in Sri Lanka which is attributed to the increase in the number of the Untrained Teachers resulting from the rapid increase in the number of school-age children in recent years. In order to solve this problem, Ministry of Education has decided to take the following two approaches: one is to accelate to liquidate the existing Untrained Teachers by letting them take professional study in the exising institutes, and the other is to establish the new Colleges of Education which provide the pre-service training required for those who wish to enter the teaching service so that no Untrained Teachers will be recruited in future.

In order to attain the above-mentioned objective, Ministry of Education of Sri Lanka has decided to establish two new Colleges of Education including one to be constructed under this project, and other 8 Colleges of Education to be established by converting out of the existing 25 Teachers' Colleges. Simultaneously, the Ministry has also decided to use rest of the Teachers' Colleges to accelate to clear the present hacklog of Uncertificated Teachers within a decade from now on. When the existing Uncertificated Teachers are liquidated further steps will be taken for the Certificated Teachers to elevate their teaching professions by converting Teachers' Colleges which will finish its original functions.

The project is expected to play the role of the model school leading the new teacher education system proposed by Ministry of Education.

3-2 Proposed Course of Study in the College of Education

The courses of study and the intake of students in the proposed College of Education are as follows:

Course of study	Intake of Students 1st year	2nd year	Total
1. Dept. of Primary method	125	125	250
2. Dept. of Science/Mathematics	100	100	200
3. Dept. of Technical Education/ Life skills	25	25	50
Total	250	250	500

Regardless of the courses of study, there are following compulsory subjects.

Special Subjects

(1) Principles of Education
(2) Educational Psychology

General Compulsory Subjects

(1) First Languages (Sinhala, Tamil)
(2) Religions (Buddhism, Hiduism, Christianity, Islam)
(3) English
(4) Health and Physical Education
(5) Aesthetics
(6) Mathematics

The studensts are required to complete the above 8 Coure-Unit within two school years consisting of six quarters of 18 months.

In addition to the above compulsory Subject, the students will select one of the following specialized courses of study, and complete it within two school years.

1.	Dept. of Primary Method	Primary Methods, Optional Subjects (one of Religion, Social studies, Language)
2.	Dept. of Science/ Mathematics	Mathematics and Integrated Science (Phisics, Chemistry, Biology) Optional subjects (Science or Mathematics)
3.	Dept. of Technical Education /Life Skills	Life skills (Masonry, Electricity, Plumbing) Optional subjects (one of Agriculture, Wood work, Metal work and Home Economics)

The students are required to complete the above subjects within two school years at the residential college of education. In educating the students, the importance is attached to the moral education as well as the study of specialized subjects. According to this principles, quarters of Staff has been also proposed to set up with in the campus together with the Dormitory of the students by Ministry of Education.

3-3 Facilities of the College of Education

The proposed College of Education is required to have the Academic facilities, Administrative facilities, Physical Education facilities, Welfare and library facilities, Domitory for students and Staffs Quarters.

1) Academic facilities

- Lecture room (1 Lecture theatre accomodating 125 students, 6 Lecture rooms each accommodating 50 students and 14 Lecture rooms each accommodatding 25 students) and 4 Seminar rooms.

  The 1st year students will be divided into 10 classes which basically consist of 25 students each. 20 classrooms are required so that 20 classes at the most can be held at a time for both the 1st and 2nd-year students. The lecture rooms will be used for the joint lecutre, teaching practices, examinations, self-teaching by groups of studnets and studying.

- Audio-visual equipments training room;
  The seating capacity of 25 will be used for the practice for the operation of the equipments and the training of the students.

- Workshops and laboratories;
  The Phisics, Chemistry and Biology laboratories/Technical Education and Life skills workshops (Woodwork, Metalwork, Weaving, Pottery) Home economics workshop (Food nutrition, Needle work, Child Care, First Aid & Home Nursing, Laundry).

  The science experiements are conducted by the unit of 25 students, though they are supposed to divided into smaller groups at the time of experiment. Thus, the experimental facilities will be designed for use by the groups of 5 to 10 students.

- Aesthetic education rooms comprise Music room and Art room.

2) Administrative facilities

The administrative facilities comprise Principals room, Deputy principal room, Office, Conference rooms, Stockrooms etc.

3) Physical Education facilities

Indoor Gymnagium will be designed for the uses for physical training, dancing, ball games, meetings and ceremonies. 400m track and field.

4) Welfare and library facilities

Students' Hall, Cooperative shop, Canteen and Medical room.
Library will house 10,000 books in open bookshelves and Copy-making.

5) Dormitory

Dormitory accommodataing 250 each of male and female students

6) Dining Hall

Dining Hall, kitchen, storage space and preparation space.

7) Staff Quarters

As the facilities affiliated with the above facilities, the Parking lots, Gatehouses, Workshops and other facilities will be required.

CHAPTER 4. GENERAL CONDITION OF THE PROJECT SITE

4-1 Location and Environmental Condition

The proposed site of construction is located 25km inland towards the north from the city of Matara, the southernmost city in Sri Lanka. Colombo, the capital of the country is 160km away from the city of Matara, and these two cities are connected with the railway running the southwestern coast of the island (the time required is 3 and half hours) and the long-distance bus line. The site of construction can be accessed by the regular bus service in about an hour from the city of Matara.

There are many seaside resort hotels along the coast between Colombo and Matara, but the southwestern area beyond the city of Matara is not developed well except the city of Hambantota located 80km east of Matara, and Yala Wild Animals Reserve lies in the east. The Matara district has a population of 644,231 and the population density of 180 persons/km^2 (Average population density of Sri Lanka: 230 persons/km^2, Population density in Colombo: 2,603 persons/km^2).

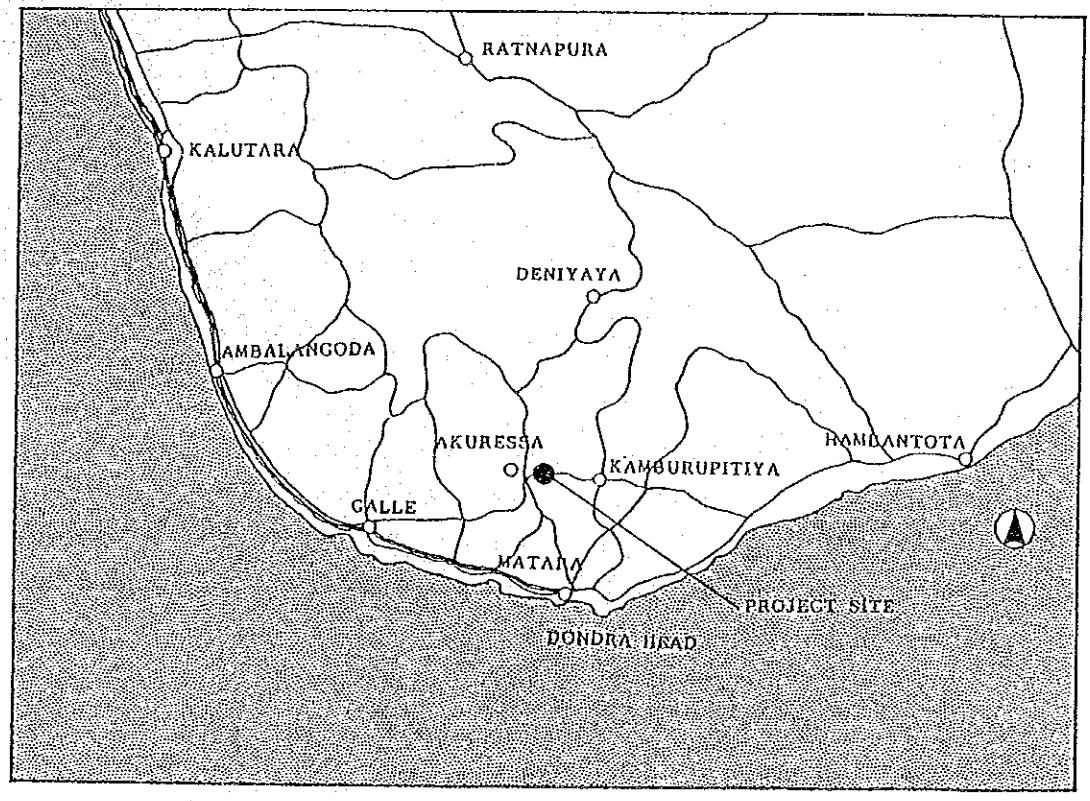
The proposed site of construction is located between two towns called Kamburupitiya and Akuressa. In Kamburupitiya accessible in about 15 minutes by car, the Faculty of Agriculture of University of Ruhunu is located, and a primary-and-secondary school attended by 1,300 pupils is located about a mile west of the site.

For the transportation of the materials to the construction site, there are the following three routes:

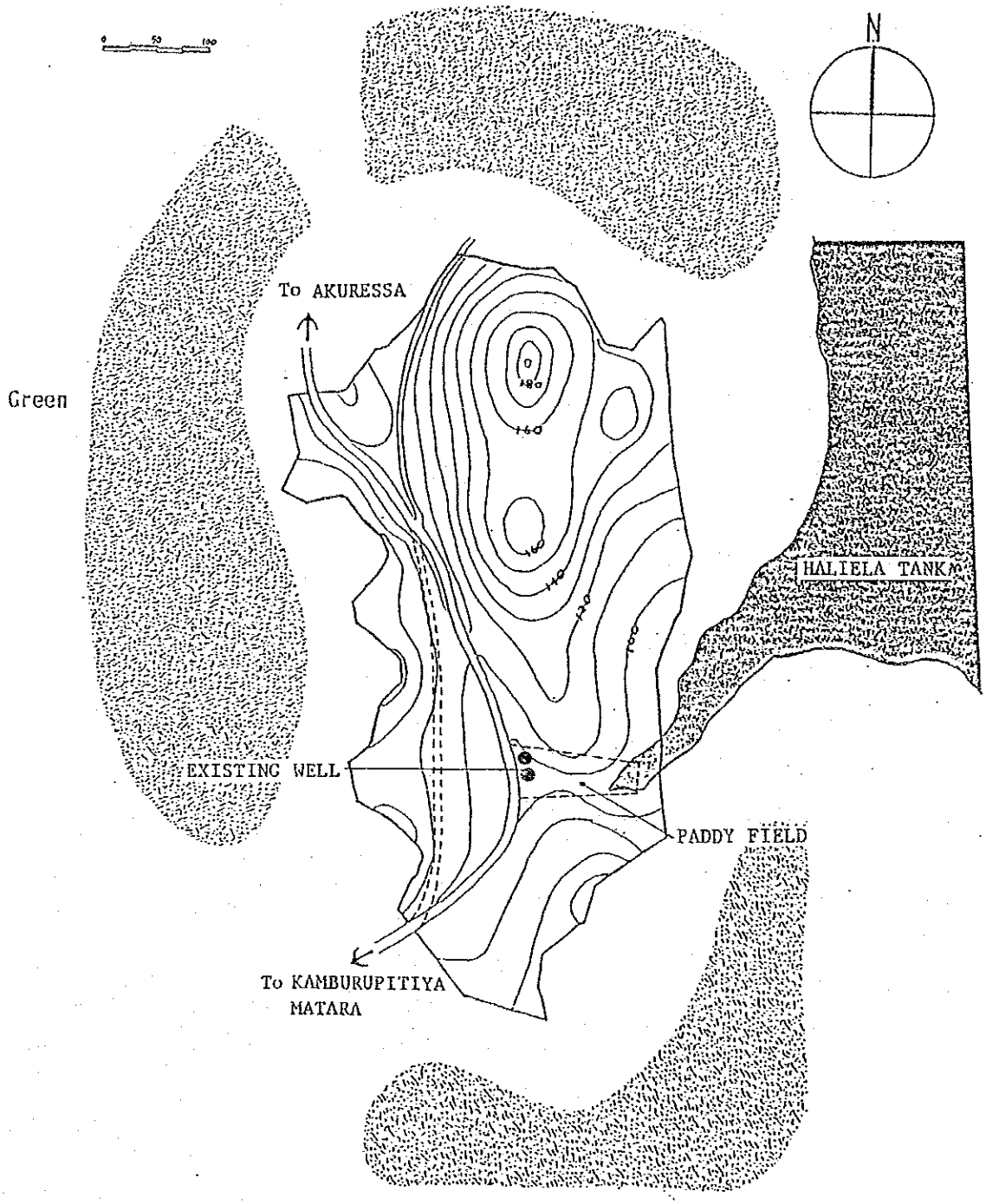
A. Gall-Akuressa route
B. Matara-Akuressa route
C. Matara-Kamburupitiya route

The routes A and B is not suited for the transportation by lorries due to the bad road conditions, and the route C is bettter than the

other two routes, though the transporation distance is the longest of all, and some parts of the roads constituting this route require the maintenance works to let them suit to the transportation. As far as the route (A2) between Colombo, Gall and Matara is concerned, there will be no problem for the transportation of the materials and equipment by the lorries.



Condition of The Construction Site



4-2 Condition of The Construction Site

The construction site is located in an undulating area of about 43 acres, about 700m long from north to south and about 300m long from west to east. At present the site is covered mostly with the shrubbery except the lowlands currently used as the paddy field. A large pond for irrigation (Haliela Tank) lies adjacent to the eastside of the construction site, and this pond collects the waters from the surrounding hills and other sources of water. In the rainy season, the water level of the point rises, and the lowlands within the construction site has been flooded.

The various facilities will be constructed utilizing the natural configuration of the ground as far as possible, but the ground-leveling and ground-creating works will also be required to a considerable extent. Besides, the construction site includes many sharp inclines which are not suited for the construction of the buildings. Thus, Ministry of Education is considering to acquire the land adjacent to Haliela Tank and the east side of the present site so that the better environment can be created for the cumpus.

A road starting from Matara and leading to Akuressa by way of Kamburupitiya passes the construction site, and the regular bus service by this road is available. At present, this is the only road for accessing the construction site, but it cuts the middle of the construction site from north to south, and this is considered to prevent the effective uses of the various facilities in the campus after they have been constructed. For this reason, Ministry of Education is planning to shift the existing road to the westside of the campus by the time of commencement of the construction work.

As for the geological survey, Ministry of Education is requested to conduct the survey by the boaring (to the depth of 15 to 20m) at four points in the construction site by the end of September, 1984.

4-3 Condition of Infrastructure

1) Power supply

At present, the construction site is not provided with the power line, but a 33kV high-voltage transmission line runs about 1km west of the construction site, and it should be planned to take the power of 11kV, 50Hz, 300kVA from this transmission line by installing a cable along the road.

2) Water supply

At present, no water supply main and drainage main are available in the area, so that the water is supplied from the well. The well water in the coastal area of Matara City is not suited for the drinking water because of the large salt content, but the well water in the project area is free from such problem. At present, there are two shallow wells, and it is expected that the necessary quantity of water will be made available by boring the deep wells, judging from the water levels of the existing wells that of the adjacent Haliela Tank, so that the deep well water is used for the water supply in the campus.

3) Drainage

It is possible to drain the waste water into the adjacent Haliela Tank, but, in consideration of the possible pollution of the water in the tank, it should be drained only the rainwater into the tank, and the sewer and other waste waters including those from the laboratories will be disposed by the natural evaporation method by the soil percolation tank after being processed properly.

4) Telephone facilities

The Government of Sri Lank is now promoting the national communications network construction project by introducing the yen-credit financing from the Government of Japan, and the time when the telephone service will be made available into the construction site is

dependent on the progress of this government project. Under the present circumstances, therefore, it should be planed to secure the communications service by the radiotelphone system through the telphone office of Matara City for the time being including the period of the construction work.

Mean air temperature at station level

Degrees Centigrade

Station and Month	Average 1931—1960	1977	1978	1979	1980	1981
Colombo						
Annual mean	26.9	27.3	27.5	27.6	27.8	27.5
January	26.2	26.3	27.4	27.4	27.4	26.2
February	26.4	26.8	27.8	27.8	27.5	26.6
March	27.2	27.4	28.0	28.2	28.2	28.3
April	27.7	28.2	28.4	28.6	28.2	28.5
May	28.0	27.4	27.8	28.8	29.0	28.5
June	27.4	28.0	27.6	28.1	28.2	27.8
July	27.1	27.4	27.2	27.6	28.2	28.2
August	27.2	27.4	27.2	27.4	27.9	28.0
September	27.2	27.9	28.0	26.8	28.0	27.4
October	26.6	26.6	27.1	27.1	27.2	27.0
November	26.2	26.8	26.6	26.8	27.0	27.2
December	26.1	27.0	27.1	27.2	26.7	26.4
Hambantota						
Annual mean	27.1	27.2	27.2	27.5	27.3	27.3
January	26.0	26.0	27.0	26.8	26.3	26.0
February	26.4	26.3	27.4	27.0	26.8	26.2
March	27.1	27.4	27.8	27.8	27.4	28.0
April	27.8	28.1	28.5	28.8	28.0	28.0
May	28.0	27.5	27.8	28.6	28.2	28.4
June	27.6	28.0	28.2	28.6	28.3	27.6
July	27.7	28.5	27.3	27.9	28.6	28.3
August	27.6	26.8	26.9	27.4	27.2	27.0
September	27.4	28.0	27.1	26.8	26.8	27.0
October	27.2	26.9	26.8	27.1	27.4	27.6
November	26.6	26.8	26.4	26.2	26.6	27.2
December	26.1	26.8	26.4	26.5	26.4	26.2

Mean Relative Humidity

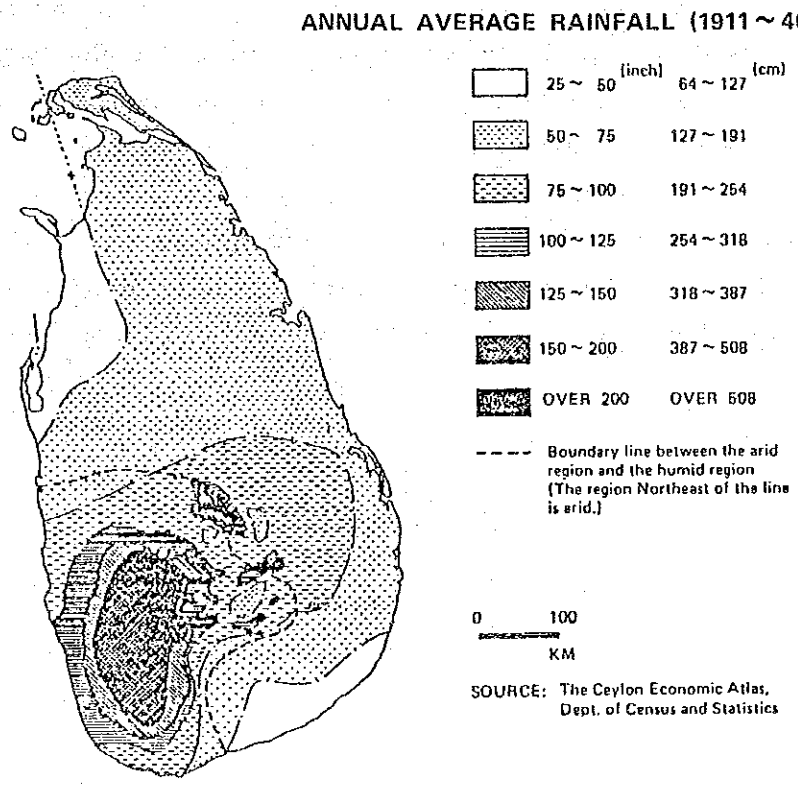
Per cent.

Station and Month	Average 1931–1960		1977		1978		1979		1980		1981	
	D	N	D	N	D	N	D	N	D	N	D	N
Colombo												
Means of relative humidity	76	89	76	90	74	89	75	90	74	88	75	89
January	71	89	64	84	65	83	69	86	62	80	70	90
February	72	91	71	87	67	86	70	88	66	85	70	89
March	72	92	75	94	71	90	68	89	65	88	70	90
April	75	91	75	93	76	92	73	90	78	92	77	91
May	78	88	82	91	62	91	78	85	79	89	81	90
June	79	86	80	87	78	88	80	89	80	84	79	87
July	78	86	80	88	81	88	81	87	78	85	77	85
August	78	86	79	91	79	88	77	88	78	86	76	86
September	77	87	78	87	75	84	83	92	76	84	80	88
October	79	90	83	95	80	93	79	94	80	91	77	92
November	77	92	78	94	76	91	81	95	77	94	74	87
December	74	90	73	89	74	91	74	92	74	92	70	88
Hambantota												
Means of relative humidity	77	89	76	87	76	87	75	87	75	86	75	86
January	76	89	66	80	68	83	75	87	68	81	71	83
February	75	89	74	84	74	87	72	85	69	81	70	84
March	75	90	74	88	72	86	69	82	70	83	76	87
April	77	90	74	85	75	86	74	86	78	88	78	88
May	80	89	81	89	82	91	78	87	82	89	80	88
June	79	88	77	89	79	90	73	86	75	88	76	88
July	76	87	70	86	76	89	72	87	68	85	70	84
August	76	87	81	91	76	88	74	86	78	88	80	88
September	78	88	76	88	76	87	78	89	78	88	79	88
October	78	89	80	90	78	89	76	89	77	87	72	81
November	78	91	77	89	77	92	81	91	80	90	74	86
December	77	90	76	88	78	89	78	89	78	89	73	86

4-4 Climatic Conditions

The southern part of Sri Lanka is located in the tropical monsoon zone where the high temperature and high humidity are predominant. The temperatures range from 25° to 30°C throughout the year, and the humidity from 70% to 82%. In the south-western part of the country, the monsoonary rainy season is from May to September, and the westerly wind is predominant during this period, while northeastern wind blows mainly during the period from October to April. In the area with such weather characteristics, the buildings need to be constructed in consideration of the necessity of the devices to protect them from the effects of the intense and direct sunlight and the squalls and the effective ventilation system.

The hilly area located in the southern part of the island has relatively stable ground, and the piling work is not required for the constdruction of low and small buildings; however, lowlands covered with the deposited soil around the irrigation pond (Haliela Tank) and the paddy field need to undergo the geological surveys.



CHAPTER 5. BASIC DESIGN

5-1 Basic Design Principle

The following are the basic design principles:

1) From the standpoint that similar Institutes existing in Sri Lanka are very simple and economy, the school building should be basically equal in grade to those buildings.

2) The facilities should be designed to minimize operation and maintenance costs, basically using natural cross ventilation and natural light without machines and power devices.

3) The building should be characterized in its form by the following:
Deep roof eaves against the strong tropical sunlight, and rain in the rainy season accompanied by strong seasonal winds.
Open type external wall structure including one-sided passages and corridors to permit easy ventilation.
Fittings and sashes should be restricted only to locations required for security.

4) The building and environments should be arranged for 500 students and school personnel to continue teaching, learning, and living for two years.

5) The site is undulated overall without plain areas. The palnning should be made to make the best use of the present undulation and minimize the creation work.

5-2 Layout Planning

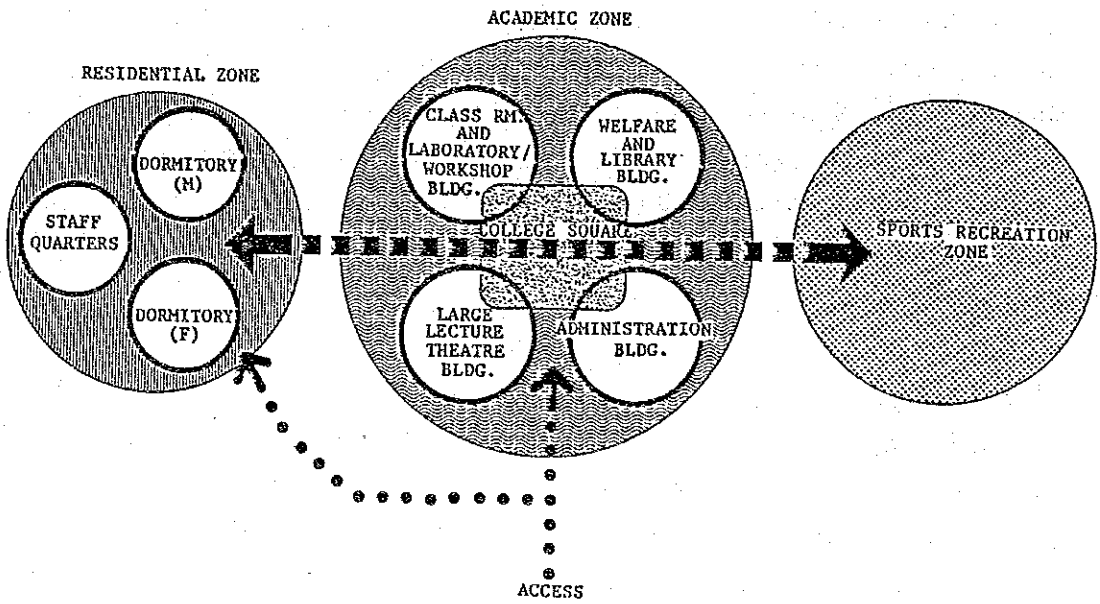
The Building Blocks are broadly divided into three groups; Academic Block including teaching and learning, welfare, and administrative buildings, Residential Blocks for student and school personnel quarters, and Sport and Recreation facility zone.

The Academic Block, a central one of the entire facilities, should be built in the relatively flat and central area, and the Dormitory should be located along the inclined area behind the Academic Block to secure a residential environment and good view. The Gymnasium and a 400m track composing to the sport and recreation zone should be located on the opposite side to the Dormitory over the Academic Block to provide an activity zone in the daytime and after school.

The buildigns should be made low in height as a whole along the lay of th site, such as the Welfare and Administrative buildings are one-storied and the others are two-storied. Each building are connected with the Covered Walk Way, which prevent rains and the strong sunlight for moving.

This College have been desigend for all the 500 students and senior school personnel to reside in the site, so it is important to provide a well-arranged living environment. For the purpose, it will be necessary to rearrange around the irrigation pond in the low, swampy area in the site, construct walking roads, or plan gardening. The layout planning should be a master planning to direct future installations satisfactory and should have possibilities of installation expansion such as a minor staff quarters to be constructed by Sri Lankan side.

LINKAGE–DIAGRAM OF FACILITY



5-3 Facilities Planning and Scale of Element

1) ACADEMIC BLOCK

A. CLASSROOM AND LABORATORY BUILDING

General classrooms for teaching and learning, laboratories and workshops are located in the two two-storied buildings without independently deviding into three Departments from the standpoint of the curriculum contents to make the subjects use the common facilities more effectively.

The general classrooms consist of 6 50-student rooms, 14 normal 25-student rooms, and 4 15-student seminar rooms.

The special rooms consist of 3 Science laboratories, Art and Music rooms, and 2 Workshops for Life skills and Home Economics , and the related-staff rooms are also provided.

B. LARGE LECTURE THEATRE

This theatre basically admits 125 students in the Department of Primary method, a largest course, and should have a room for 250 students when positioned closely.

C. WELFARE AND LIBRARY BUILDING

This building, one-storied, should consist of a student hall, canteen, shop, medical office, and library (10,000 books). This is a central facility of this College from the standpoint of use time zone and users. Hence, it should be located in an area with safficient spaces, where many people can gather easily.

D. ADMINISTRATIVE BUILDING

This building, one-storied, should consist of an administratives' office rooms, general office room, conference room, and record storehouse. It should be located in a place which may be assumed to be a front entrance of the college facilities in order to operate and maintain all the facilities and also contact the outside.

Building Area Tabulation

	Building	Story	Area (m^2)
1.	Classroom and Laboratory/Workshop Bldg.	2 storeis	5,131
2.	Large Lecture Theatre Bldg.	1 story	341
3.	Welfare and Library Bldg.	1 story	1,599
4.	Administrative Bldg.	1 story	616
5.	Covered Walkway	1 & 2 stories	502
		Sub-Total	8,189 m^2
6.	Gymnasium	1 & 2 stories	1,170
7.	Dormitory for Male Students	2 storreis	3,113
8.	Dormitory for Femal Students	2 stories	3,113
9.	Dining hole	1 story	2,013
10.	Staff Quarters (15 Flats)	2 storeis	1,498
		Sub-Total	10,907 m^2
		Grand-Total	19,096 m^2

E. COVERED WALK WAY

Covered walk way should be used to connect the above buildings, enclosing courtyards, which are protected from rains and the sun-light. When the school is full-residential, passageways and sufficient common spaces besides necessary rooms are very essential to enhance educational results for both study and life.

2) GYMNASIUM

The indoor Gymnasium should be large enough to meet one basket ball court, and be suitable for multi-purpose use such as student meetings, ceremonies, events including visitors. It should have a dressing room, locker room, movable stage, simple music and projection facilities, and lighting equipment. The Gymnasium constitutes the sport and recreation group together with the 400m track, so it should be built beyond the pond, on the south side of the site and connected to the central Acedemic block with the bridge.

3) DORMITORY

A. MALE STUDENT DORMITORY (250 students)

Each room of the dormitory admits 6 students. Three two-storied buildings should be built, each containing 14 rooms. Each building should be provided with two common study rooms, matron's flat, counselor room, toilet, shower bath, and laundry room.

B. FEMALE STUDENT DORMITORY (250 students)

The dormitory configuration should be similar to that of the male dormitory.

C. STUDENT DINING HALL

The dining hall should be located beween the male and female dormitories. The dining hall should have 500 seats because of a policty that the students should have a meal at the same time. A simple partition separates into two parts for 250 students each in correspondence to the separate use by the male and female students or by the year students. The kitchen should have a common

prepartion room and two service rooms. Common toilets, pumping machines, and an water reservoir are constructed in the building.

D. STAFF QUARTER

Quarters for 15 senior academic staffs has been requested by the Sri Lankan side to be built for the following reason:

The site is located far from Matara City, and there is no housing accommodation around it.

It is the basic policy that the college personnel should reside in the same site to guide and help character building through life and study.

Such a staff Quarters are required for this college standing in the southenmost part of the country to acquire excellent academic staffs.

Scale of Facility Elements

1) Classroom and Laboratory/Workshop Building

Room Name	Designed Area	Remarks
Class Rm	1,220m^2	50persons x 1.5m^2 x 6rms = 450m^2 25persons x 1.8m^2 x 14rms = 630m^2 15persons x 2.0m^2 x 4 rms = 120m^2
Physics Lab.	122m^2	25persons x 3.0m^2 = 75m^2 Storage + Preparation Rm: 40m^2
Chemistry Lab.	122m^2	25persons x 3.0m^2 = 75m^2 Storage + Prep. Rm: 40m^2
Biology Lab.	97m^2	25persons x 3.0m^2 = 75m^2
Art Rm	147m^2	Preparation Rm: 25m^2 25persons x 4.5m^2 = 112m^2
Music Rm	97m^2	Preparation Rm: 40m^2 25persons x 2.5m^2 = 50m^2
Home Economics Work Shop	97m^2	Instruments Storage: 25m^2 25persons x 3.0m^2 = 75m^2 Preparation Rm: 25m^2
Technical Education Life Skills Work Shop	147m^2	25persons x 2.0m^2 = 112m^2 Working Table x 5 Preparation Rm: 40m^2
Audio Visual Training Rm.	97m^2	25persons x 2.0m^2 = 50m^2 Storage: 25m^2
Academic Staff Rms	585m^2	Tutorial: 2persons x 12m^2 x 12rms = 288m^2 Common Rm: 53persons x 4.5m^2 = 238m^2
Corridor & Common Space	2,400m^2	35 - 40%
Total	5,131m^2	

2) Large Lecture Theatre Building

Room Name	Designed Area	Remarks
Lecture Theatre	$292m^2$	125persons x $1.5m^2$ (Normal Lecture) = $188m^2$
Corridor & Common Space	$49m^2$	

Total $341m^2$

3) Welfare and Library Building

Room Name	Designed Area	Remarks
Library	$260m^2$	Open Book Shelf: 10,000 books 10,000/100books/m^2 = $100m^2$ Reading Space (40 seats) 40 seats x $1.8m^2$ = $72m^2$ Lecturers' Cubicle: 10seats x $2.5m^2$ = $25m^2$ Print, Copy, Dark Rm = $40m^2$ Office: 3persons x $4.5m^2$ = $15m^2$
Medical Rm	$97m^2$	Clinic Rm: $50m^2$ Sick Rm (4 beds): $30m^2$
Canteen	$260m^2$	100seats x $1.5m^2$ = $150m^2$ Kitchen: $50m^2$
Student Hall	$325m^2$	Including Shop & Subpost Office
Corridor & Common Space	$657m^2$	35 - 40%

Total $1,599m^2$

4) Administrative Building

Room Name	Designed Area	Remarks
General Office	$105m^2$	16persons x $4.5m^2$ = $72m^2$ Telephone Exchange, Locker Space: $30m^2$
Administrative Staff Office	$96m^2$	Principal, Deputy Principal x 2 Registers' Office: $30m^2$ x 4rooms
Conference Rm	$32m^2$	25persons x $2.0m^2$
Storage	$81m^2$	Storage: $50m^2$ Record Rm: $30m^2$
Corridor & Common Space	$302m^2$	35 - 40%
Total	$616m^2$	

5) Covered Walk Way

Total $502m^2$

6) Gymnasium

Room Name	Designed Area	Remarks
Arena	$780m^2$	Basket Ball Court (1 court) 36m x 24m
Stage, Ante Rm	$130m^2$	Stage: $70m^2$ Ante Rm: $30m^2$, Green Rm: $30m^2$
Attached Establishment	$260m^2$	Storage: $50m^2$ W.C, Locker: $100m^2$ Stand(Upper Part)
Total	$1,170m^2$	

7) Dormitory for Male Students

Room Name	Designed Area	Remarks
Dormitory Rm	1,617m^2	6persons x 6.5m^2 x 42rooms = 1638m^2
Study Rm	192m^2 (32m^{2}x6rooms)	One Room for each Block 65m^2 x 3rooms: 250persons x 1/2 x 1.5m^2 = 190m^2
Administration	468m^2	Matron's Flat/Each Block Councelor's Unit/Each Block
Corridor & Common Space	836m^2	25 - 30%

Total 3,113m^2

8) Dormitory for Female Students

Same as the Item 7). Total 3,113m^2

9) Dining Hall

Room Name	Designed Area	Remarks
Dining Hall	932m^2	250persons x 1.5m^2 = 300m^2 x 2 rooms Kitchen, Storage: 250m^2
Machinery	292m^2	Pump, Transformer Rm
Corridor & Common Space	789	

Total 2,013m^2

10) Staff Quarters

Room Name	Designed Area	Remarks
Principals Quarter	1,348	3 Bed Rms 150m^2
Academic Staff Quarters	150	3 Bed Rms 100m^2 x 14flats
Total	1,498m^2	

5-4 Materials Planning

Since this planned facility is an educational one where hundreds of people will meet, materials suitable to create a functional and solid space and for the climate and natural features of the region must be selected.

We are to pursue the policy to select preferentially local materials familar to the native craftmen if only there is no problem of material quality or supply, because a considerable cost reduction would be expected by making the most of the geographical advantage that the new College is to be located 25km north of Matala City, which is 160km distant from Colombo.

1) MATERIALS PLANNING

(1) Structural materials

Columns, beams, floor slabs,and stair:	Reinforced concrete (structure steel for part of Gymnasium)
Walls:	Concrete block and brick

(2) Exterior finish materials

Roofs:	Clay Tile-roofing
Exterior wall finishing:	Mortar trowel paint finish
Fittings:	Wooden sash

(3) Interior finishing materials (for major rooms only)

a. Lecture room

Floors:	Terrazzo tile, Cement tile
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on roof board and mortar trowel

b. Workshop

Floors:	Terrazzo tile
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on mortar trowel

c. Laboratory

Floors:	Terrazzo tile
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on mortar trowel

d. Conference room

Floors:	Terrazzo tile
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on Roof board

e. Hall and covered way

Floors:	Clay tile, mortar, cement tile etc.
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on Roof board

f. Office room

Floors:	Terrazzo tile
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on Roof board

g. Gymnasium

Floors:	Wood
Walls:	Paint finish (mortar trowel, hollow brick)
Ceilings:	Exposed roof structure paint finish

h. Dormitory & Staff Quarters

Floors:	Colour Mortal
Walls:	Paint finish on mortar trowel
Ceilings:	Paint finish on mortar or roof board

i. Dinning Hall

Floors:	Clay Tile, cement tile
Walls:	Paint finish on mortar trowel
Ceilings:	Exposed roof structure paint finish

2) COLORING PLAN

Make a coloring plan in due consideratin of matching with the environment and the climate and natural features of the region:

Climate and natural features:	Select a paint immune to discoloring or fading due to strong sunlight and high temperature and humidity.
Matching with environment:	Select a tone harmonious with the environment and free from incompatibility.
Suitablity to educational facility:	Select a quiet toned paint showing no dust.

5-5 Structure Planning

Since the Republic of Sri Lanka is located away from the major earthquake zones of the globe, no seismic energy need not be taken into account in designing the structure of this facility.

As far as wind pressure is concerned, presuppose a wind speed of 75 miles/hour (33.5 m/sec) in confermity with the BS codes, because Sri Lanka is within a monsoom zone.

The super structure of the facility shall be made of reinforced concrete the roof of the Gymnasium be of structural steelwork. Other attached facilities and small buildings shall be made of concrete block.

1) STRUCTURE DESIGN

Since the Republic of Sri Lanka has not yet any systematic applicable laws and regulations regarding construction, conform tentatively to the BS codes as supplemented by the Japanese standards in designing the structure.

A geological survey is under way by the Ministry of Education. This survey suggests a sedentary soil known as laterite whose soil bearing capacity would fall within 10 to 20 t/m^2. Accordingly, this facility should be reasonably of independent footing.

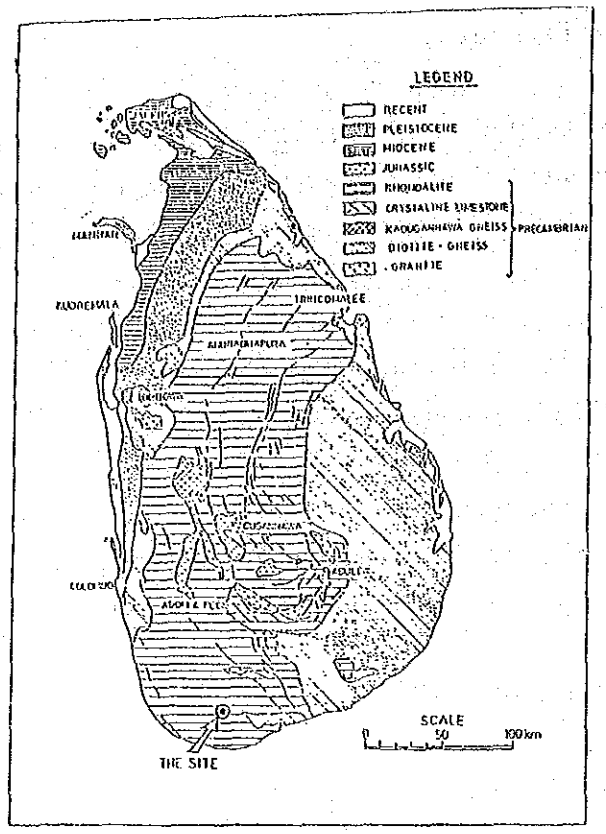
Nevertheless, some careful consideratin to reduce the soil bearing capacity would be necessary in designing the foundation of inclined areas, allowing for accidented topography.

Live loads

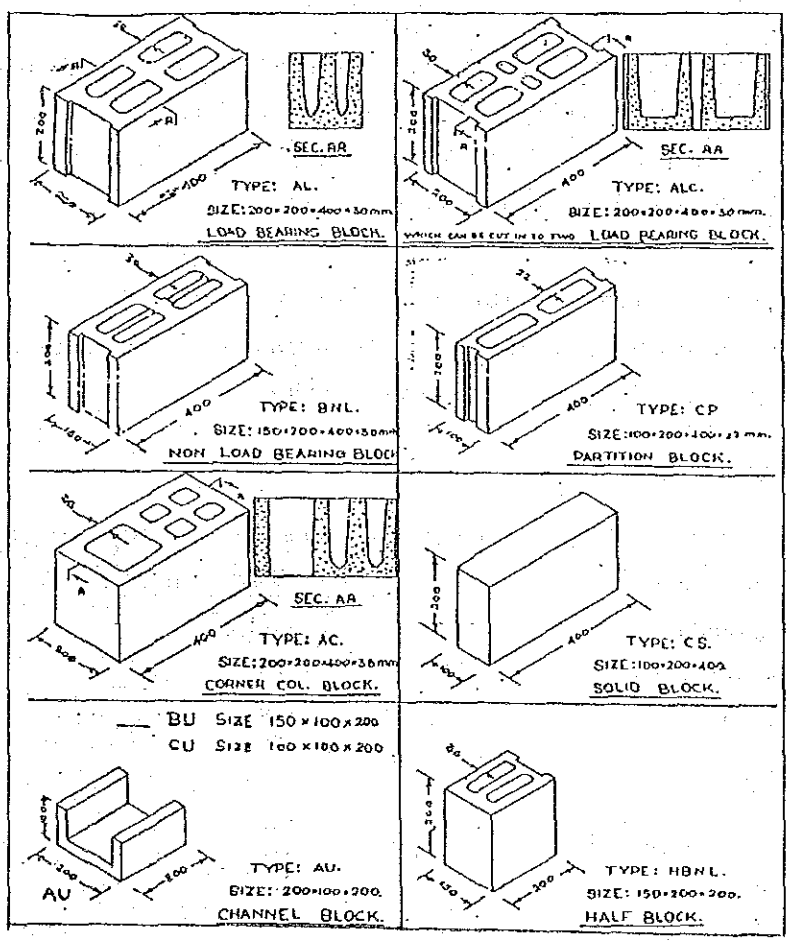
Confirm the live loads on the major rooms to the following:

Room name	Live load (kg/m^2)
Classroom	306
Office room	255
Dormitory	153

Geologial map of Sri Lanka (After J.W. Herath, 1973)



Example of local block



Gymnasium	510
Laboratory	306

2) Structural materials and method of construction

Select structural materials in due consideration of the scale of the building, transportation conditions, purposes, on-site proceurement capabilities, material qualities, methods of construction, importing conditions, prices, etc.

As far as methods of construction are concerned, positively adopt techniques prevalent in Japan through technical assistances.

Since cement procurement on site is rather problematic in respect of narrow supply capacity or initial strength, use of cements of Japanese made are recommended. On the other hand, aggregates should be procured locally. An on-site concrete plant is to be installed for mixing control. On this occasion, take suitable measures to select, proportion, mix, transport, place, and cure materials.

Reinforcement

Use Japanese-made reinforcing bars. As for deformed bars, use SD30 or SD40. As far as round steel is concerned, use SR24.

Steel structure work

Produce steel fabrication in Japan in due consideration of the steel fabricating technological levels and the term of work. Then, erection of them be on the site. On this occasion, make allowance about length of structure steel for the road conditions between Matara and the site.

Block

Proceure local blocks.

5-6 Mechanical Planning

Pursue the following policies in making mechanical planning of this facility:

- o Maintain close cooperation with the architectural concept.
- o Make an installation plan suitable to the given natural conditinos and the users' conditions of lives.
- o Select a system and model easy to operate and maintain.
- o Pursue the reduction of running costs and energy saving.

5-6-1 Ventilation System

Although the whole island of Sri Lanka, except its central highland and mountainous districts, is in tropical-climatic environments high in temperature and humidity, ventilation should be based on spontaneous one as much as possible in order to reduce running costs in harmony with the architectural plan; however, forced ventilation would be necessary depending on the purposes of some rooms.

5-6-2 Plumbing System

Since no water supply main nor drainage main has yet been laid. Fortunately, there are two 4 to 5m deep shallow wells supplying a spouting of about 100 l/min within the prearranged construction site. A site survey suggests that wells in the construction site would suffice for water consumption of the proposed college. If only the well is deepened, a good quality of water can be caught from the nearby, since the Haliela tank is an irrigation pond.
Af far as sewage water and laboratory drain water are concerned, adopt the vaporization system after an in-plant treatment.

1) Well-sinking equipment

Sink a deep well (100 m^3/day in consumption per day; 200 m^3/day in maximum pumping rate) at a lower spot within the site. Then, filter the pumped-up water through a sand filter and store it in an

FRP-made well water reservoir tank accommodating $100m^3$ water for the average consumption per day. The reservoir tank is to be set above the ground suitable for sanitation and easy to maintain.

Pumping rate:	Maximum of 100 to 200 m^3/day (max)
Well diameter:	300ϕ
Depth:	100m
Submersible pump:	80ϕ x 300 l/min x 60m x 7.5kW 1 unit

2) Water supply plan

Each building will be supplied with water through the following supply system:

- o Pump up the water from the water reservoir tank into the elevated water tank set on the top of the hill using the pump.
- o Supply each building with the water from the elevated water tank in the gravity mode.

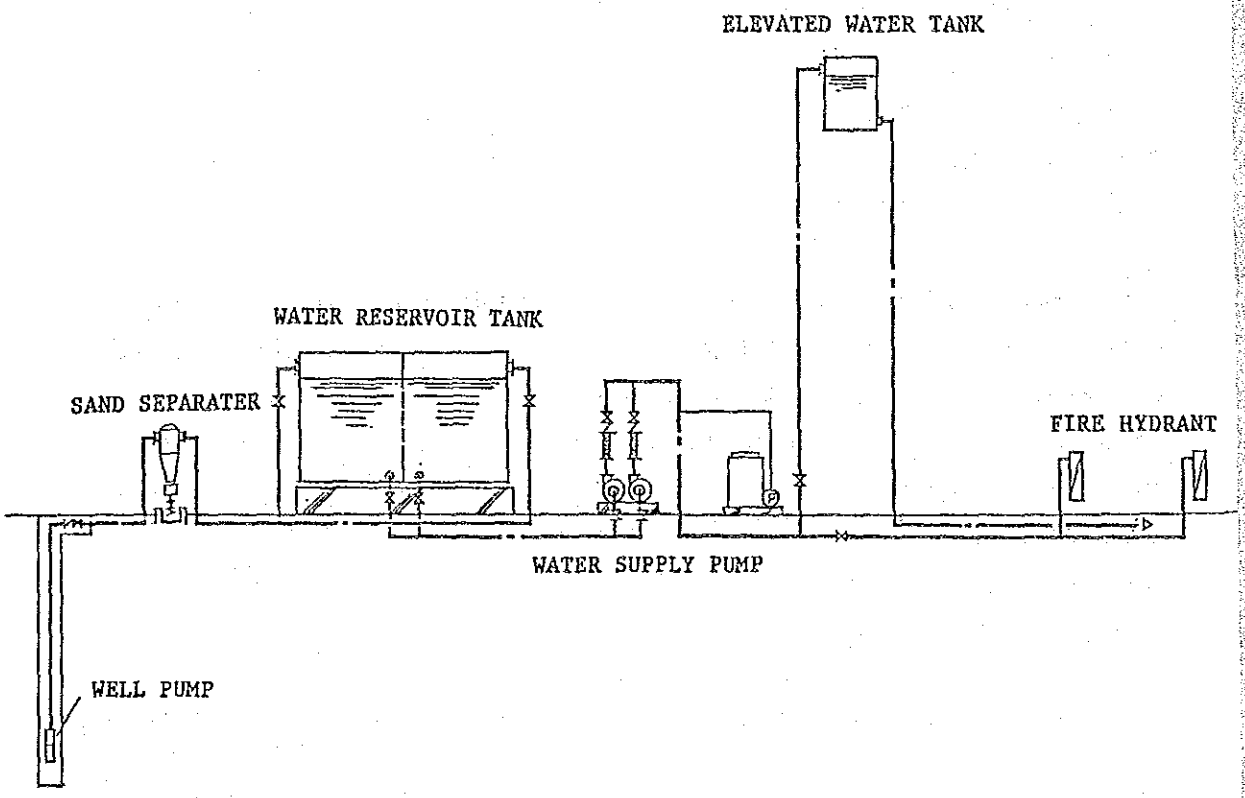
The water supply main is to be of loop piping so that water supply can suffice the on-peak water consumption by each buidling. Install the water reservoir tank containing $100m^3$ water for the average consumption a day. The elevated water tank is to store $15m^3$ water for the service consumption an hour. Keep the head at a level satisfying the pressure requirement of the hydrant.

The pump specifications are to be as follows:

100ϕ x 650 l/min x 55m x 11kW x 2 units

Install the chlorine disinfector interlocked with the above pump. Install another pump for automatic alternate operation. Use vinyl choloride lining steel pipes for water supply pipes.

WATER SUPPLY SYSTEM



Estimation of water consumption

Number of students:	500 persons
Number of college staff:	147 persons
Number of college staff quarters:	27 houses
Number of visitors:	20 persons

Water consumption per day

647 men x 120 l/man.day = 77,640 l/day 1

20 men x 10 l/man.day = 200 l/day 2

27 (houses) x 1,000 l/day.house - 27 persons x 120 l/man.day = 23,760 l/day 3

1 ~ 3 Total 101,600 l/day ≒ 100 m^3/day

Water reservoir tank capacity

Estimate the capacity of the water reservoir tank at 100m^3 accounting for the average consumption a day, making allowance for on-peak consumption, power outage, and sedimentation time. Provide two tanks each of capacity 50m^3 for maintenance purposes, such as cleanup. Adopt a FRP-made/nonelevated tankage, in joint use with a fire-fighting tank.

Elevated water tank capacity

Estamite the capacity of the elevated water tank at a volume equivalent to one-eighth of the average consumption a day, as in the following example:

100,000 l/day x 1/8 = 12,500 l/h ≒ 15 m^3/h

Average hourly consumption = 12,500 l/h x 2 = 25,000 l/h

Maximum instantaneous consumption = 12,500 l/h x 3 = 37,500 l/h

Water Lifting Pump capacity

Estiamte from the above maximum instantaneous consumption:

37,500 l/h = 625 l/min ≒ 650 l/min

Let the lift be 50m.

The pump specifications are to be as follows:

100ϕ x 650 l/min x 55 m x 11kW x 2 units

3) Drainage system

The drainage from the premise falls into three types:

- o Sewage/general drain
- o Laboratory drain
- o Rainwater

The sewage/general drain flows separately through indoors and is combined together outdoors.
On the other hand, the laboratory drain flows together with the sewage/general drain after neutralization. Install a septic tank in a position suitable for water catchment by taking advantage of the natural gradient from each building. Otherwise, discharge the sewage water into the septic tank by pumping-up and then vaporize the drain water spontaneously through a soaked type septic tank. Use drainpipes made of hard vinyl chloride to drain the sewage/general water both indoors and outdoors.

4) Rainwater drainage system

Rainwater from the roofs, roads, and premise is to be drained through a nearby sideditch or open ditch and finally into the pond.

5) Laboratory drainage plan

Laboratory drain water including acid or alkali is to be introduced into the neutralization tank and then make it run together with the sewage/general water.

Estimation of drainage volume

Number of students:	500 persons
Number of college staff:	147 persons
Accommodation of college staff quarters:	90 persons
Number of visitors:	20 persons
	757 persons *

* Estimated figures for total clarifying tank volume conforming to JIS A3302

Designed drainage volume

College staff	147(persons) x 120 l/man.day =	17,640 l/day
Students	500(persons) x 120 l/man.day =	60,000 l/day
Visitors	20(persons) x 10 l/man.day =	200 l/day
Staff quarter	90(persons) x 200 l/man.day =	18,000 l/day
	Total	95,840 l/day

Let the disposed rated be 100 m^3/day, including 3 to 5 m^3/day for laboratory drainage.

Quality of water disposed

Incoming water quality

BOD.	200ppm
S S	250ppm
pH	5.8 - 8.6

Outgoing water quality

BOD	60ppm *
S S	90ppm
pH	5.8 - 8.6

(* Based on Septic Tank Standard of Ministry of Construction in Japan)

6) Fire-hydrant equipment

Install an indoor or outdoor hydrant in each building or block within the site. Supply the water for initial fire-fighting from the elevated water tank. Use vinyl chloride lining steel pipes as the piping material.

7) Sanitary fixture

Install a set of sanitary fixture at each necessary spot in accordance with the architectural plan. Provide the laboratory with experiment tools.

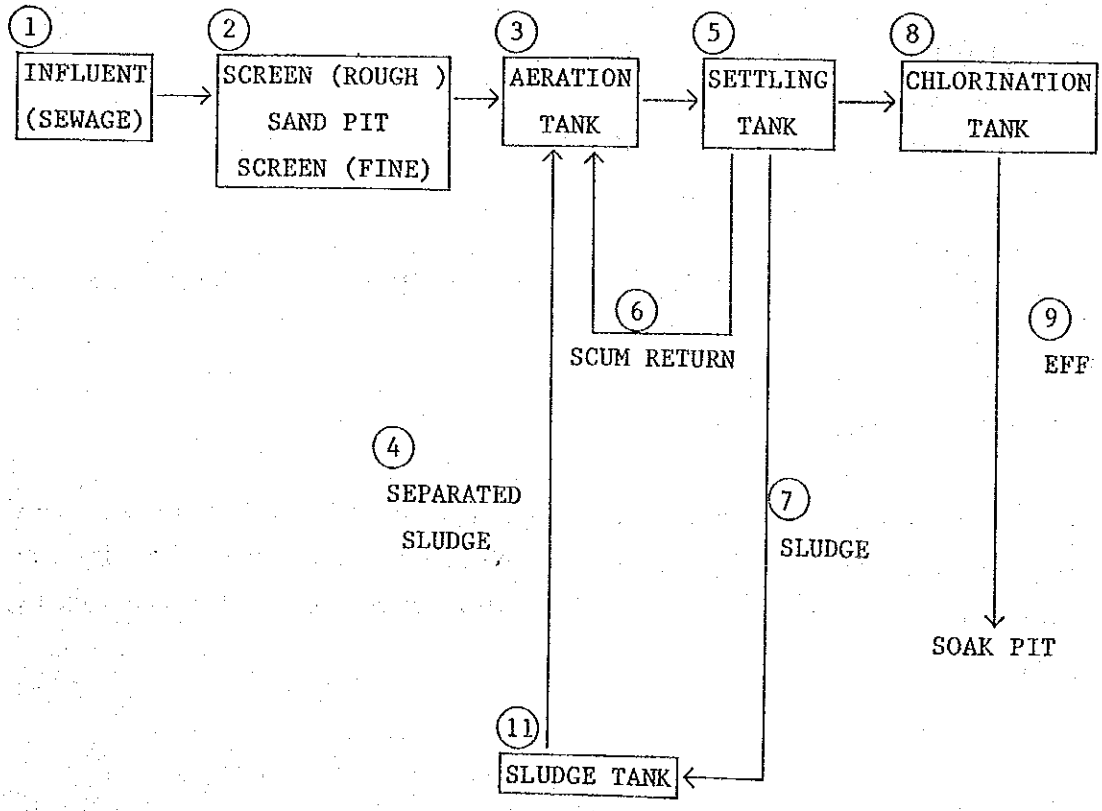
8) Gas supply plan

Supply the kitchen and the laboratory with the LPG gas by installing a gas cylinder at each block. Use steel pipe (white) for the piping material.

9) Sewarage System

Introduce the sewage/general drain and laboratory drain from each building into the setic tank and dispose of them at a rate of 100 m^3/day so as to realize a BOD of 60ppm. The sewage plant is to consists of a sand bed, aeration tank, precipitator, disinfection tank, and sludge digestion tank. Effluents are to be disinfected and then vaporized.

SEPTIC TANK FLOWCHART



10) Kitchen equipment plan

Install kitchen equipment for kitchen of students' dining hall and smaller units for canteen.

5-7 Electrical System

1) Power Receiving System

a) Voltage and frequency

The high-voltage service line 3-phase 3-wire 33kV 50Hz of C.E.B. is installed approx. 1km west of the project site. The power after step down to 11kV from 33kV is led in overhead to the planned plot from the distribution line and connected to the primary terminal of the high voltage switch by Sri Lankan side.

b) Power Receiving and Transformation

The transformation installation consisting of the high-voltage switches, transformers, measuring instruments will be installed in the building. The high voltage 11kV power led into the planned plat is transfermed down to the low voltage 400/230V, then supplied to each equipment. The transformer's capacity should be approx. 500kVA, (work to be done by the Japanese side).

2) Power Circuit System

The power lead down by the transformer is distributed to the distribution panel and power control panel of each building. The main line and the load are as follows.

(1) Lighting and power main line: 3-phase 4-wire 400/230V
(2) Lighting and outlets: 1-phase 2-wire 230V
(3) Power supply to fan, pumps, etc.: 3-phase 3-wire 400V

3) Lighting System

a) Lighting fixture

In view of the reduction of the running cost, the main light source should be the flueresent lamps. The incandescent lamps should be set by the requirements of the places. The one-tube type ballasts shall be used, for the two-tube type ballasts so that only one tube can independently turn on. In view of the running cost, set the

switch so that each switch turns ON/OFF as less number of lights as possible. The thinned-out lighting shall be possible in the corridor and the like. The illuminace shall be as follows in principle.

(1)	Offices, Class rooms, Laboratories and Conference rooms	350 - 400 lux.
(2)	Gymnasium and Dining hall	300 - 350 lux.
(3)	Hall	150 - 200 lux.
(4)	Corridor and warehouses	50 - 100 lux.

b) Outlets

Proper outlets shall be prepared for the rooms where electric appliances are to be used, such as Laboratories and Kitchen in addition to the general-purpose outlets for Offices and Class rooms, etc. Earthing work shall be given to the equipments which need it.

c) Ceiling fan

Ceiling fan shall be set mainly to relatively small room such as Administration offices, Conference room, Tutorial rooms, etc.

4) Power control panel

The power control panel shall be installed in any of machine rooms for the control of the motors of fans, pumps, etc. The abnormality of the power load and the alarm of the water level shall be indicated on the alarm panel of the administrative section.

5) Telephone system

a) Extention of telephone lines

The telephone line has not yet been installed in the project area. In addition, the number of lines that the exchanges of Matara station can handle is insufficient. Therefore, the telephone line can not be led in at present. However the nationwide communication network plan are now being planned on the yen-credit financing assisted by the government of Japan. So the telephone line will be able to be led in to the building after the completion of the plan. Therefore, the wireless telephone is to be used for the time being, and the internal

telephone lead-in channel shall be prepared for the future need. (The wireless telephone facilities shall be installed by the Sri Lanka side.)

b) Telephone piping

Internal telephone system such as telephone exchanges, main distribution frame, relay terminal panels and the telephone outlets in the primary rooms shall be installed, so that this system will fully function after having the city line connected in future. For the time being, the communication with the outsiders shall be performed using the wireless telephones.

c) Telephone exchanges

The telephone exchanges of the push-button system shall be designed for installation of about 20 extention telephones in the Academic Block.

6) Public Address System

Speakers shall be installed in the primary rooms and the amplifiers and microphones shall be installed in the administration office for the information, call, chime, etc. The paging shall be independently performed in each of buildings. An independent broadcastding facilities shall be installed in the gymnasium. In the audio-visual training equipment room, there shall be separate devices and audio-visual training equipments installed..

7) Interphones System

Interphone network for communication linking the administration office and the electricity room, machine room and security spot shall be built for the maintenance use.

8) Fire alarm system

Emergency alarm bells and push switches shall be built so that it alarms people as quickly as possible in case of emergencies such as

the fire. The display panel shall be installed in the administration office to indicate the whereabouts of accidents for quick preparation of the fire pump.

9) TV outlets for the simultaneous

Since the electric wave is weak in the project area, the color program can not be watches at present. However, the TV outlets for the simultaneous watching shall be installed in the audio-visual training equipment room and conference rooms, etc. for the new future.

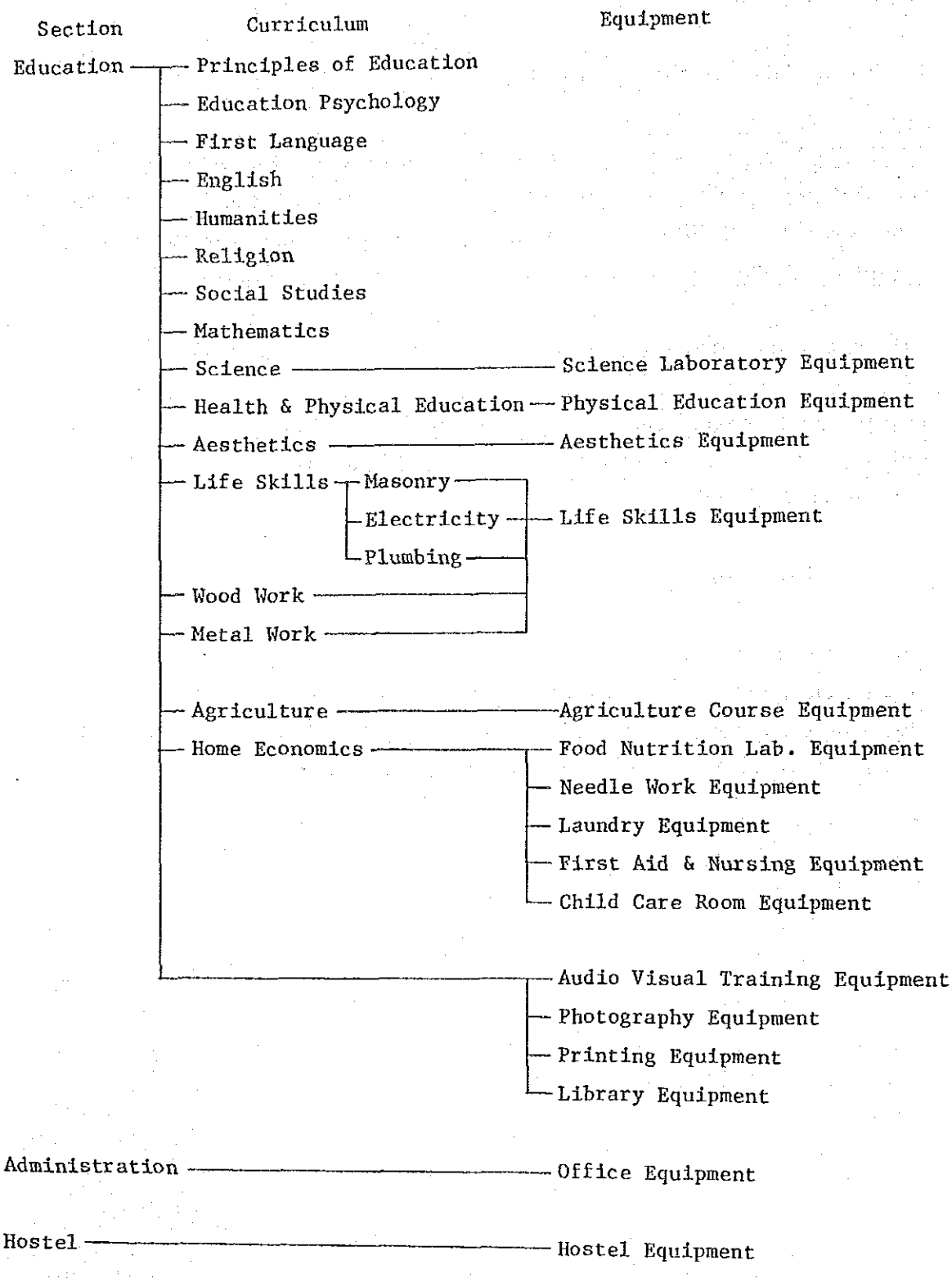
10) Lightning protection system

Lightning strikes places very frequently in the area. Therefore, the lighting protection system shall be installed in the planned buildings for the safety's sake.

11) Outdoor lighting system

The outdoor lights shall be provided on the premises for the the maintenance of peace in the night time. The light source shall be the fluoresent mercury lamp. The lights shall be able to be turned on and off both automatically (by the timer) and manually.

List of Required Teaching Equipment



5-8 Equipment

The equipments required in this college are shown in the List on Appendix. The attention shall be given to the following points.

1) The selection level shall be the same as that of the equipments that the primary schools and junior secondary schools in Sri Lanka hold.

2) The equipments to be used for the training practice should help improve the speciality of the future teachers, meet the curriculums and make the practice very effective.

3) The equipments that allow easy operation, low running cost and easy maintenance shall be selected.

4) The number of the equipments and layout of them shall be determined under considerations of the curriculums, class room utilization efficiency, etc. so that the equipments can be used mostly effectively.