

No. 1

THE DEPARTMENT OF EDUCATION, CULTURE AND SPORTS
THE REPUBLIC OF THE PHILIPPINES

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR
THE IMPROVEMENT OF EDUCATIONAL FACILITIES (PHASE IV)
IN
THE REPUBLIC OF THE PHILIPPINES

JULY 1996

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JAPAN INTERNATIONAL COOPERATION AGENCY
MOHRI, ARCHITECT & ASSOCIATES, INC.

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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of Educational Facilities (Phase IV) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team from February 5 to March 14, 1996.

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

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

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

July, 1996



Kimio Fujita
President

Japan International Cooperation Agency

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations. The records should be kept up-to-date and accessible to all relevant parties.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. This includes the use of surveys, interviews, and focus groups to gather qualitative information, as well as the use of statistical software and data visualization techniques to analyze quantitative data. The goal is to identify trends, patterns, and areas for improvement.

3. The third part of the document describes the process of identifying and addressing the root causes of problems. This involves conducting a thorough investigation into the underlying factors that contribute to the issues. Once the root causes are identified, the organization can develop targeted interventions and strategies to address them effectively.

4. The fourth part of the document discusses the importance of communication and collaboration in the implementation of the findings. It highlights the need for clear communication of the results to all stakeholders and the importance of working together to develop and implement solutions. Regular communication and collaboration are essential for ensuring that the organization is on track to achieve its goals.

5. The fifth part of the document outlines the process of monitoring and evaluating the progress of the implementation. This involves setting up a system of regular reporting and evaluation to track the progress of the interventions and to identify any challenges or areas for adjustment. The goal is to ensure that the organization is making steady progress towards its objectives and that the interventions are having the desired impact.

6. The sixth part of the document discusses the importance of learning from the experience and applying the lessons learned to future initiatives. This involves conducting a thorough review of the findings and the implementation process to identify what worked well and what could be improved. The organization should use this information to inform its future planning and to ensure that it is continuously improving its performance.

7. The seventh part of the document outlines the process of developing a long-term strategy for the organization. This involves identifying the organization's vision and mission, setting clear goals and objectives, and developing a plan of action to achieve them. The strategy should be based on a thorough understanding of the organization's strengths and weaknesses and the external environment. It should also be flexible and adaptable to changes in the environment.

8. The eighth part of the document discusses the importance of building a strong organizational culture that supports the achievement of the organization's goals. This involves creating a shared sense of purpose and values, promoting open communication and collaboration, and providing ongoing training and development opportunities for all employees. A strong organizational culture is essential for ensuring that the organization is able to attract and retain top talent and to achieve its long-term success.

9. The ninth part of the document outlines the process of implementing the strategy and monitoring progress. This involves developing a detailed plan of action, assigning responsibilities, and setting up a system of regular reporting and evaluation. The organization should also be prepared to make adjustments to the plan as needed based on the results of the monitoring and evaluation process.

10. The tenth part of the document discusses the importance of celebrating success and recognizing the contributions of all employees. This involves providing regular feedback and recognition to employees for their hard work and achievements. Celebrating success is essential for boosting morale and motivation and for ensuring that employees are committed to the organization's goals.

July, 1996

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Improvement of Educational Facilities (Phase IV) in the Republic of the Philippines.

This study was conducted by Mohri, Architect & Associates, Inc., under a contract to JICA, during the period from January 26, 1996 to July 19, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Philippines and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

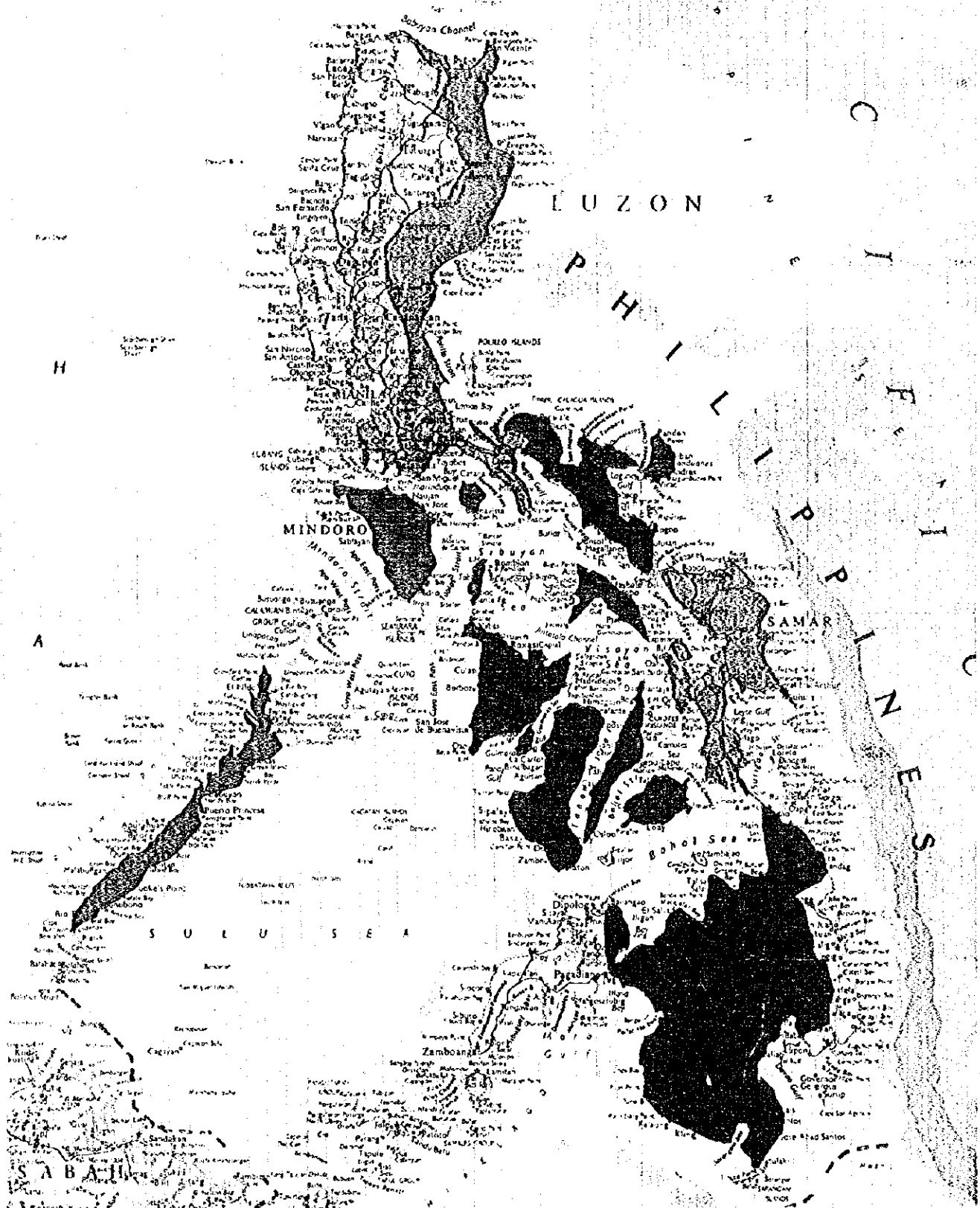
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,


Shiro Sasaki

Project manager
Basic design study team on
the Project for the Improvement of
Educational Facilities (Phase IV)
Mohri, Architect & Associates, Inc.

MAP OF THE PHILIPPINES







- EFIP I: Region 4 (Southern Tagalog)** : Mindoro, Palawan, Marinduque, Tablas

- EFIP II: Region 5 (Bicol)** : Luzon, Masbate, Catanduanes
Region 11 (Southern Mindanao) : Mindanao
Region 12 (Central Mindanao) : Mindanao
Autonomous Region in Muslim Mindanao : Mindanao

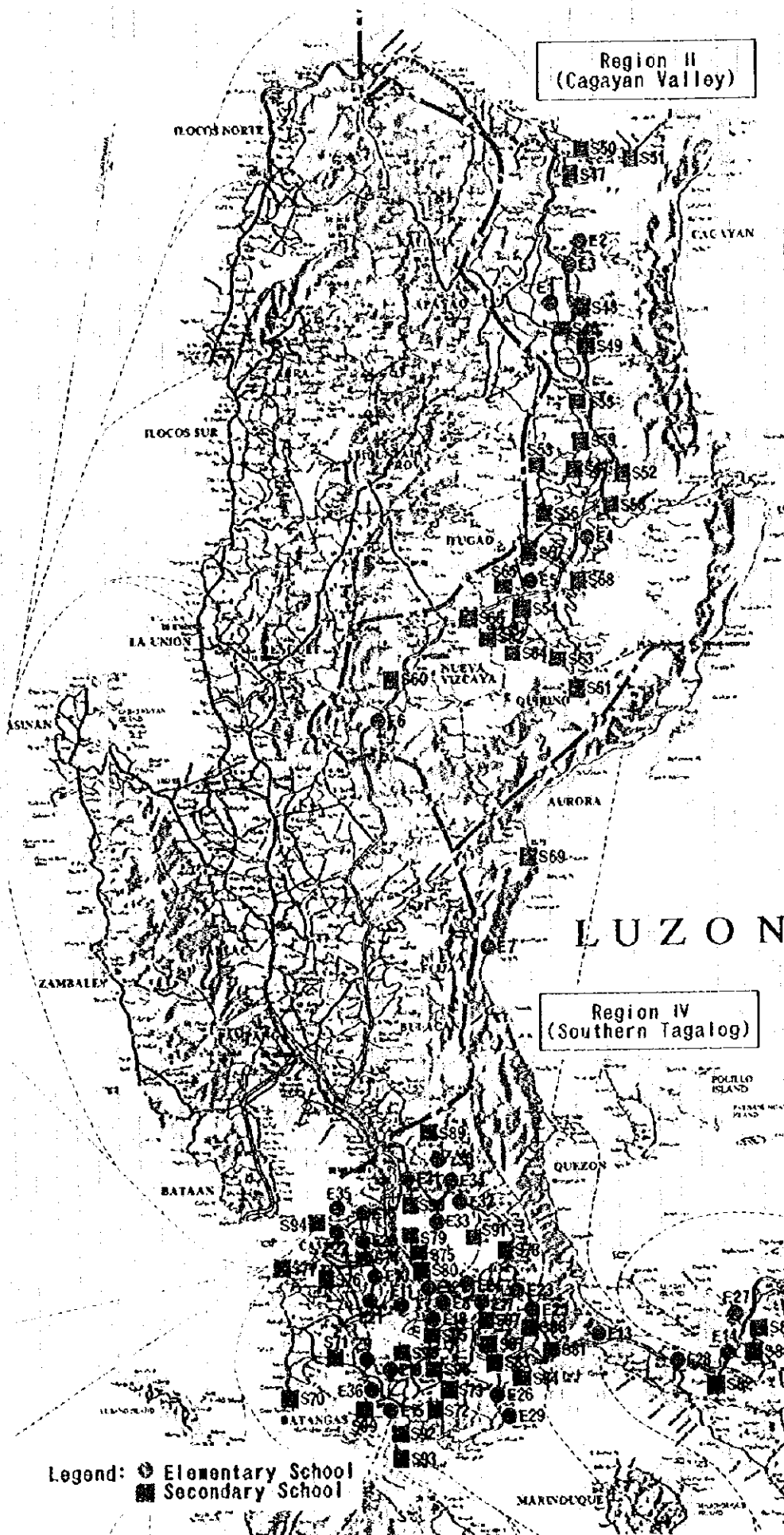
- EFIP III: Region 6 (Western Visayas)** : Panay, Negros Occidental
Region 7 (Central Visayas) : Cebu, Bohol, Negros Oriental
Region 10 (Northern Mindanao) : Mindanao

- EFIP IV: Region 2 (Cagayan Valley)** : Luzon
Region 4 (Southern Tagalog) : Luzon
Region 8 (Eastern Visayas) : Samar, Leyte



-  Region I
-  Region II
-  Region III
-  Region IV

PROJECT LOCATION MAP (1)



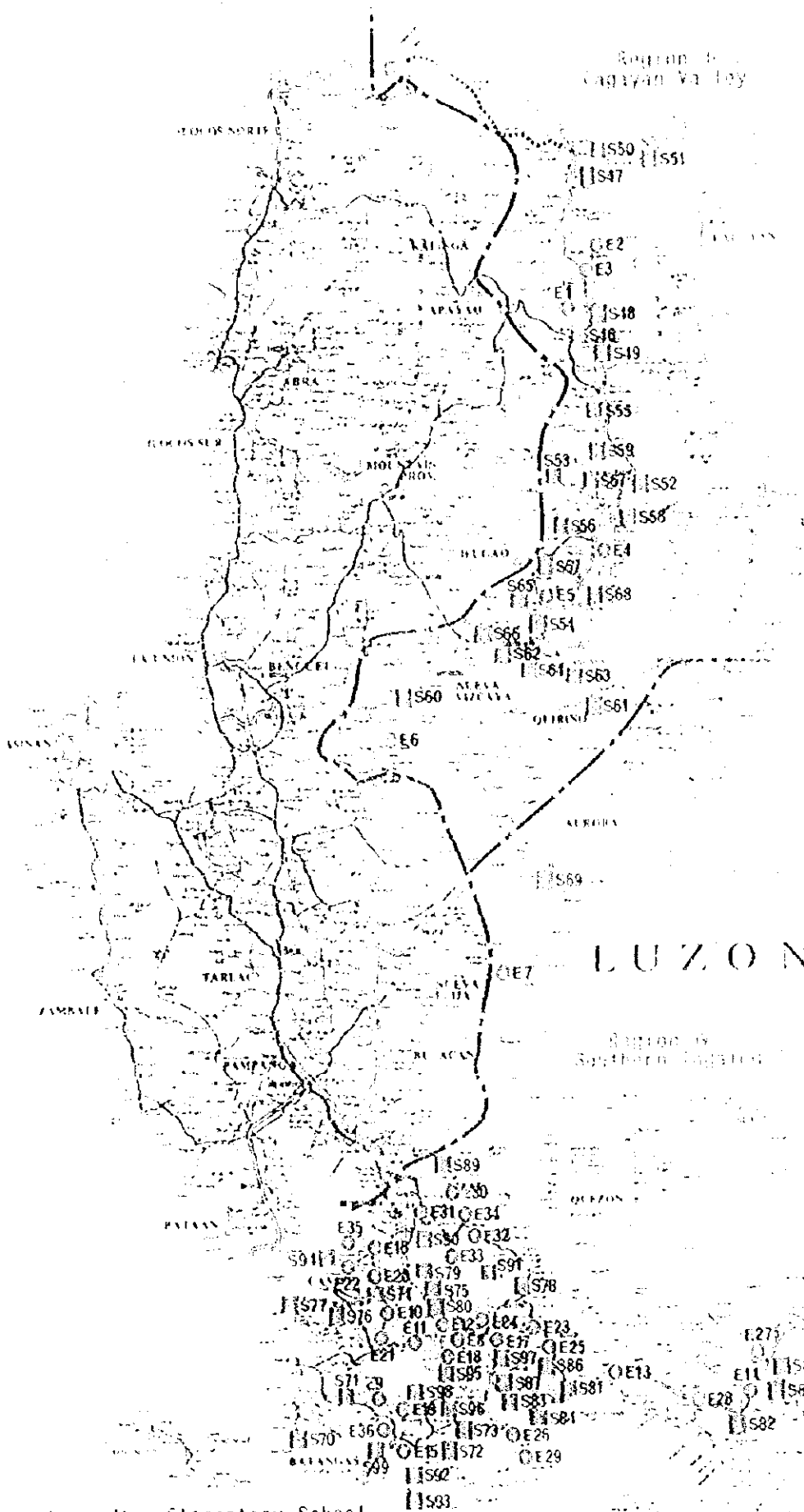
**Region II
(Cagayan Valley)**

**Region IV
(Southern Tagalog)**

Legend: ● Elementary School
■ Secondary School

- **ELEMENTARY SCHOOLS**
- REGION II - CAGAYAN VALLEY
 - E-1 TUGUEGARAO WEST CENTRAL SCHOOL
 - E-2 BAGGAS CENTRAL SCHOOL
 - E-3 MONTE ALEGRE ELEMENTARY SCHOOL
 - E-4 CAGAYAN SOUTH CENTRAL SCHOOL
 - E-5 SANTIAGO SOUTH CENTRAL SCHOOL
 - E-6 BOHE NORTH ELEMENTARY SCHOOL
- REGION IV - SOUTHERN TAGALOG
 - E-7 DIMCALAH ELEMENTARY SCHOOL
 - E-8 STG. TOMAS NORTH CENTRAL SCHOOL
 - E-9 LEMERY PILOT ELEMENTARY SCHOOL
 - E-10 SAN JOSE ELEMENTARY SCHOOL
 - E-11 E. BAREFIO SEMIHO ELEMENTARY SCHOOL
 - E-12 LOS BAÑOS ELEMENTARY SCHOOL
 - E-13 PASIGLAP CENTRAL SCHOOL
 - E-14 CALADAG CENTRAL SCHOOL
 - E-15 ALANGILANG CENTRAL SCHOOL
 - E-16 LADISLAW DINA ELEMENTARY SCHOOL
 - E-17 SAN PABLO CITY CENTRAL SCHOOL
 - E-18 TARIJAN NORTH CENTRAL SCHOOL
 - E-19 PADRE GARCIA ELEMENTARY SCHOOL
 - E-20 SALARANG ELEMENTARY SCHOOL
 - E-21 SIKANG ELEMENTARY SCHOOL
 - E-22 AGUINALDO ELEMENTARY SCHOOL
 - E-23 LULIN ELEMENTARY SCHOOL
 - E-24 CRISANTO GUYSAYO ELEMENTARY SCHOOL
 - E-25 BIGHAY ELEMENTARY SCHOOL
 - E-26 CLAUDIO M. RECTO MEMORIAL CENTRAL SCHOOL
 - E-27 STG. DOMINGO ELEMENTARY SCHOOL
 - E-28 GUMACA EAST CENTRAL SCHOOL
 - E-29 RURAL SUR ELEMENTARY SCHOOL
 - E-30 MAYAGOD ELEMENTARY SCHOOL
 - E-31 CAINTA ELEMENTARY SCHOOL
 - E-32 MARIANO C. SAN JUAN ELEMENTARY SCHOOL
 - E-33 BISMOKHAN ELEMENTARY SCHOOL
 - E-34 BAGONG HAYON IV ELEMENTARY SCHOOL
 - E-35 JULIAN FELIPE ELEMENTARY SCHOOL
 - E-36 BALETE RELOCATION ELEMENTARY SCHOOL
- **SECONDARY SCHOOLS**
- REGION II - CAGAYAN VALLEY
 - S-45 CAGAYAN NATIONAL HIGH SCHOOL
 - S-47 PATIADO NATIONAL HIGH SCHOOL (MAIN)
 - S-48 CAGAYAN NATIONAL HIGH SCHOOL (LINKA EXT.)
 - S-49 CAGAYAN NATIONAL HIGH SCHOOL (KATAGAMAN EXT.)
 - S-50 PATIADO NATIONAL HIGH SCHOOL
 - S-51 BAJA NATIONAL HIGH SCHOOL
 - S-52 ISABELA NATIONAL HIGH SCHOOL
 - S-53 ROSAS NATIONAL HIGH SCHOOL
 - S-54 RIZAL NATIONAL HIGH SCHOOL
 - S-55 DELFIN ACERANO NATIONAL HIGH SCHOOL
 - S-56 DONA AURORA NATIONAL HIGH SCHOOL
 - S-57 SALINGGAN NATIONAL HIGH SCHOOL
 - S-58 HAGULIYAN NATIONAL HIGH SCHOOL
 - S-59 TUNGKING NATIONAL HIGH SCHOOL
 - S-60 SALINAS NATIONAL HIGH SCHOOL
 - S-61 BRODLA AGRO-INDUSTRIAL HIGH SCHOOL
 - S-62 DIFEUN NATIONAL HIGH SCHOOL
 - S-63 PINARIPAD NATIONAL HIGH SCHOOL
 - S-64 DUPRINO GEN. HIGH SCHOOL
 - S-65 DIVISORIA NATIONAL HIGH SCHOOL
 - S-66 CACASAT NATIONAL HIGH SCHOOL
 - S-67 ERATEGUIAN NATIONAL HIGH SCHOOL
 - S-68 ANODAMAN NATIONAL HIGH SCHOOL
- REGION IV - SOUTHERN TAGALOG
 - S-69 BALETE NATIONAL HIGH SCHOOL
 - S-70 ILESANIN NATIONAL HIGH SCHOOL
 - S-71 CACANLAD AGONCILLO NATIONAL HIGH SCHOOL
 - S-72 BAYBAYIN NATIONAL HIGH SCHOOL
 - S-73 MAYAPO NATIONAL HIGH SCHOOL
 - S-74 CASMARIKAS NATIONAL HIGH SCHOOL (MAIN)
 - S-75 CATMONA NATIONAL HIGH SCHOOL
 - S-76 TRECE MARTIRES NATIONAL HIGH SCHOOL
 - S-77 MARGONDON NATIONAL HIGH SCHOOL
 - S-78 PEDRO GUEVARA MEMORIAL HIGH SCHOOL
 - S-79 SAN PEDRO RELOCATION NATIONAL HIGH SCHOOL
 - S-80 CAMP VICENTE LIM NATIONAL HIGH SCHOOL
 - S-81 LUTERAN NATIONAL HIGH SCHOOL
 - S-82 LOPEZ NATIONAL HIGH SCHOOL
 - S-83 CLAUDIO M. RECTO MEMORIAL HIGH SCHOOL
 - S-84 STA. CATALINA SUR HIGH SCHOOL
 - S-85 STG. DOMINGO NATIONAL HIGH SCHOOL
 - S-86 DASARAN NATIONAL HIGH SCHOOL
 - S-87 CABAY NATIONAL HIGH SCHOOL
 - S-88 BALARA NATIONAL HIGH SCHOOL
 - S-89 GEN. EICERIO GERONIMO MEM. L. HIGH SCHOOL
 - S-90 ANGO NATIONAL HIGH SCHOOL
 - S-91 BAYUGO NATIONAL HIGH SCHOOL
 - S-92 PINARILAN NATIONAL HIGH SCHOOL
 - S-93 BALETE NATIONAL HIGH SCHOOL
 - S-94 CAYITE NATIONAL HIGH SCHOOL
 - S-95 ENSOLOBAN NATIONAL HIGH SCHOOL
 - S-96 PINAGAWITAN NATIONAL HIGH SCHOOL
 - S-97 SAN PABLO CITY NATIONAL HIGH SCHOOL (AMPER)
 - S-98 SAN CELESTINO NATIONAL HIGH SCHOOL
 - S-99 PAHARANG NATIONAL HIGH SCHOOL

PROJECT LOCATION MAP (II)



Legend: Elementary School
 Secondary School

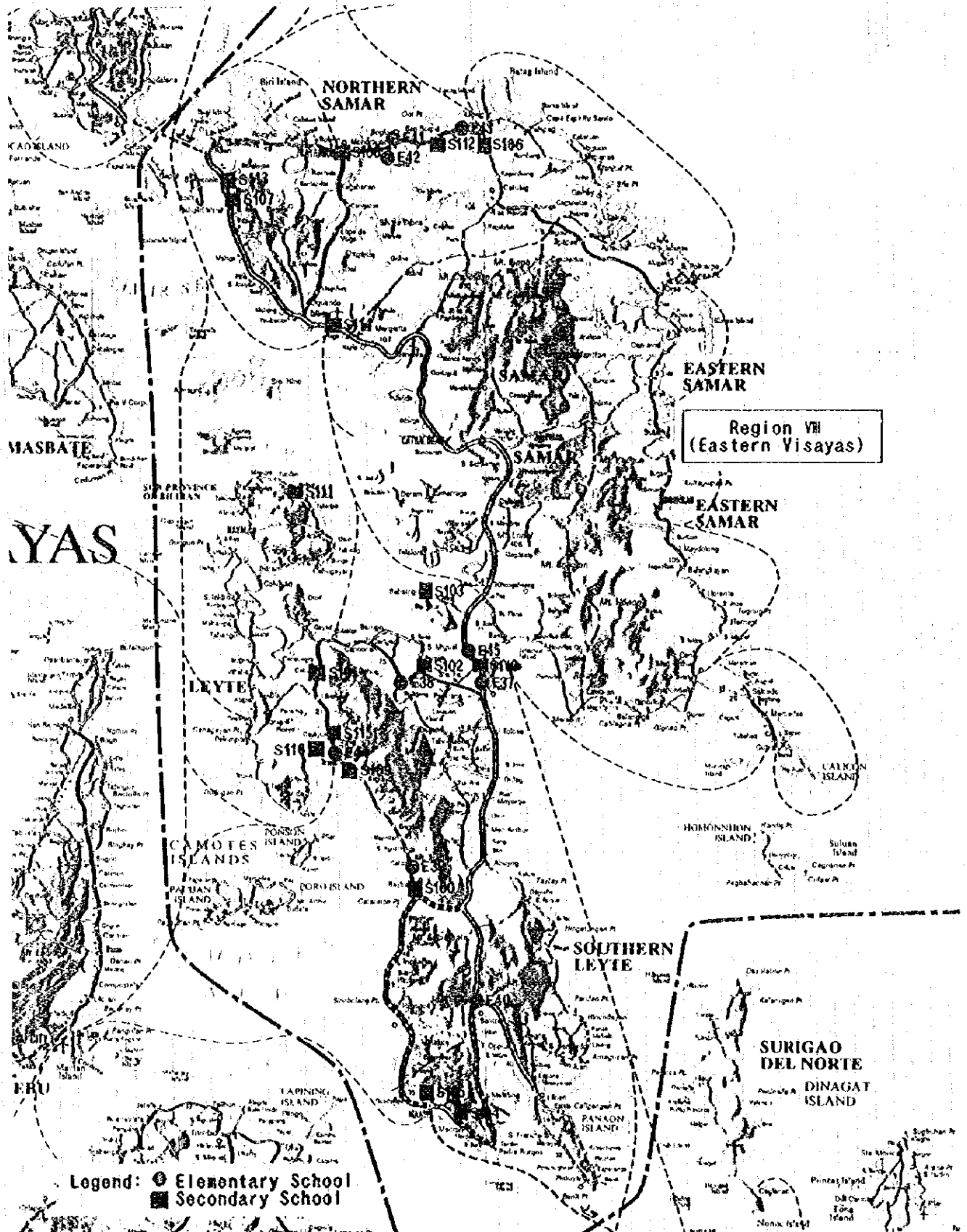
Region I
 Cagayan Valley

Region IV
 Southern Luzon

LUZON

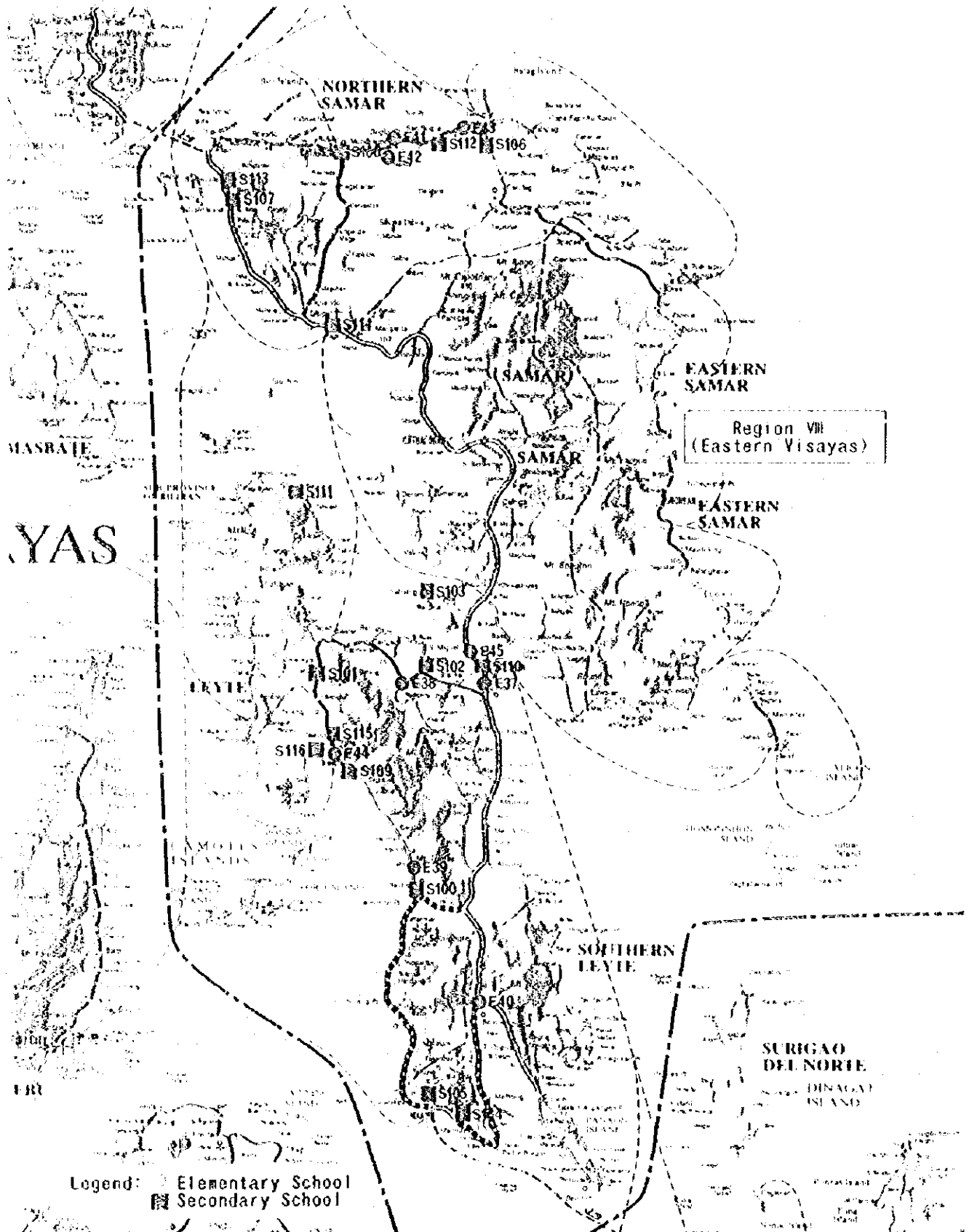
Map showing school locations in Luzon, Philippines, with various school codes and regional labels.

PROJECT LOCATION MAP (2)



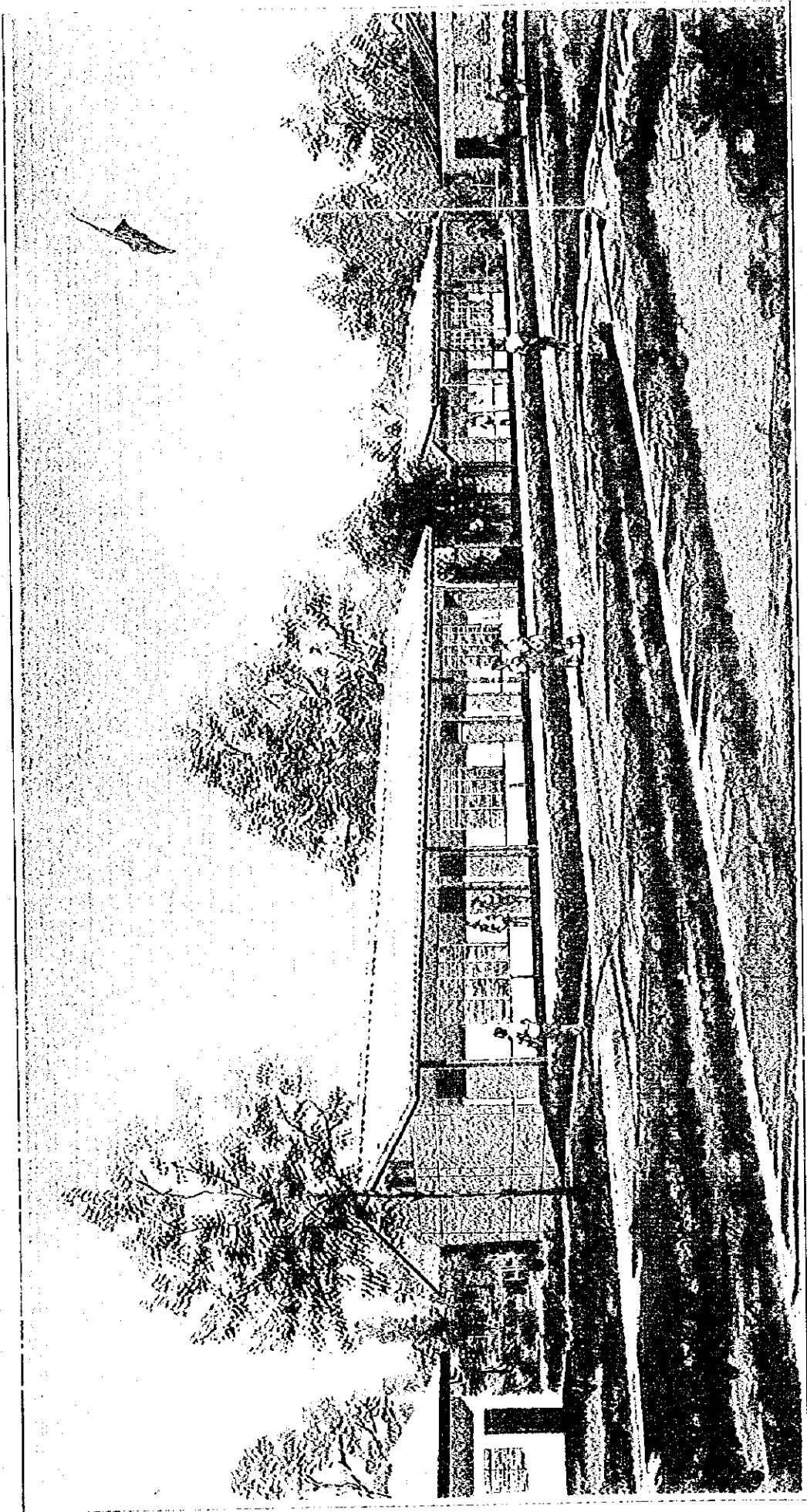
| | | | |
|--|---|--|---|
| <p>REGION VIII - EASTERN VISAYAS</p> <p>E-37 NAGA-NAGA ELEMENTARY SCHOOL</p> <p>E-38 JARO I CENTRAL ELEMENTARY SCHOOL</p> <p>E-39 GABAS ELEMENTARY SCHOOL</p> <p>E-40 SOGOD CENTRAL ELEMENTARY SCHOOL</p> <p>E-41 NARVALO ELEMENTARY SCHOOL</p> <p>E-42 MENDRAGON CENTRAL SCHOOL</p> | <p>E-43 PAMBUJAN CENTRAL SCHOOL</p> <p>E-44 TAMBULILID ELEMENTARY SCHOOL</p> <p>E-45 A.P. BANEZ MEMORIAL SCHOOL</p> <p>REGION VIII - EASTERN VISAYAS</p> <p>S-100 BAYBAY NATIONAL HIGH SCHOOL</p> <p>S-101 KARANGA NATIONAL HIGH SCHOOL</p> | <p>S-102 ALANG-ALANG NATIONAL HIGH SCHOOL</p> <p>S-103 BARATWON NATIONAL HIGH SCHOOL</p> <p>S-104 BENCH BARUNWAY HIGH SCHOOL</p> <p>S-105 DONOHON NATIONAL HIGH SCHOOL</p> <p>S-106 PAMBUJAN NATIONAL HIGH SCHOOL</p> <p>S-107 SAN ESTERON NATIONAL HIGH SCHOOL</p> <p>S-108 CATARMAN NATIONAL HIGH SCHOOL</p> <p>S-109 ORMOG NATIONAL HIGH SCHOOL</p> | <p>S-110 SACRAMAN NATIONAL HIGH SCHOOL</p> <p>S-111 BOON HIGH SCHOOL</p> <p>S-112 SAN ROGUE NATIONAL HIGH SCHOOL</p> <p>S-113 BANO NATIONAL HIGH SCHOOL</p> <p>S-114 SAN JOAQUIN NATIONAL HIGH SCHOOL</p> <p>S-115 SPIE NATIONAL HIGH SCHOOL</p> <p>S-116 VALENCIA NATIONAL HIGH SCHOOL</p> |
|--|---|--|---|

PROJECT LOCATION MAP (2)



Legend: Elementary School
 Secondary School

| | | |
|---|---|---|
| REGION VIII - EASTERN VISAYAS S 101 ANA NGA ELEMENTARY SCHOOL S 102 ALANG ALANG NATIONAL HIGH SCHOOL S 103 BARATWISAN NATIONAL HIGH SCHOOL S 104 LEON BARRERA HIGH SCHOOL S 105 DENZON NATIONAL HIGH SCHOOL S 106 PAMPULAN NATIONAL HIGH SCHOOL S 107 SAN ESTEBAN NATIONAL HIGH SCHOOL S 108 CATAWAN NATIONAL HIGH SCHOOL S 109 DEMEC NATIONAL HIGH SCHOOL S 110 SAKURAIN NATIONAL HIGH SCHOOL S 111 ROSA HIGH SCHOOL S 112 SAN RODRIGUE NATIONAL HIGH SCHOOL S 113 BANG NATIONAL HIGH SCHOOL S 114 SAN JOAQUIN NATIONAL HIGH SCHOOL S 115 SPIRIT NATIONAL HIGH SCHOOL S 116 VALENTE NATIONAL HIGH SCHOOL | REGION VIII - EASTERN VISAYAS S 100 BAYBAY NATIONAL HIGH SCHOOL S 101 MANAYAN NATIONAL HIGH SCHOOL S 102 ALANG ALANG NATIONAL HIGH SCHOOL S 103 BARATWISAN NATIONAL HIGH SCHOOL S 104 LEON BARRERA HIGH SCHOOL S 105 DENZON NATIONAL HIGH SCHOOL S 106 PAMPULAN NATIONAL HIGH SCHOOL S 107 SAN ESTEBAN NATIONAL HIGH SCHOOL S 108 CATAWAN NATIONAL HIGH SCHOOL S 109 DEMEC NATIONAL HIGH SCHOOL S 110 SAKURAIN NATIONAL HIGH SCHOOL S 111 ROSA HIGH SCHOOL S 112 SAN RODRIGUE NATIONAL HIGH SCHOOL S 113 BANG NATIONAL HIGH SCHOOL S 114 SAN JOAQUIN NATIONAL HIGH SCHOOL S 115 SPIRIT NATIONAL HIGH SCHOOL S 116 VALENTE NATIONAL HIGH SCHOOL | REGION VIII - EASTERN VISAYAS S 100 BAYBAY NATIONAL HIGH SCHOOL S 101 MANAYAN NATIONAL HIGH SCHOOL S 102 ALANG ALANG NATIONAL HIGH SCHOOL S 103 BARATWISAN NATIONAL HIGH SCHOOL S 104 LEON BARRERA HIGH SCHOOL S 105 DENZON NATIONAL HIGH SCHOOL S 106 PAMPULAN NATIONAL HIGH SCHOOL S 107 SAN ESTEBAN NATIONAL HIGH SCHOOL S 108 CATAWAN NATIONAL HIGH SCHOOL S 109 DEMEC NATIONAL HIGH SCHOOL S 110 SAKURAIN NATIONAL HIGH SCHOOL S 111 ROSA HIGH SCHOOL S 112 SAN RODRIGUE NATIONAL HIGH SCHOOL S 113 BANG NATIONAL HIGH SCHOOL S 114 SAN JOAQUIN NATIONAL HIGH SCHOOL S 115 SPIRIT NATIONAL HIGH SCHOOL S 116 VALENTE NATIONAL HIGH SCHOOL |
|---|---|---|



PERSPECTIVE

ABBREVIATIONS

| | |
|---------|--|
| DECS | : Department of Education, Culture and Sports |
| DECSRO | : Department of Education, Culture and Sports Regional Office |
| EDPITAF | : Educational Development Projects Implementation Task Force |
| CHEDA | : |
| NEDA | : National Economic and Development Authority |
| DPWH | : Department of Public Works and Highway |
| DBM | : Department of Budget and Management |
| PAGASA | : Philippine Atmospheric, Geophysical & Astronomical Service Administration |
| GSIS | : Government Service Insurance System |
| ARMM | : Autonomous Region in Muslim Mindanao |
| FCCC | : Federation of Filipino Chinese Chambers of Commerce and Industry, Inc. |
| ADB | : Asian Development Bank |
| USAID | : United States Assistance for International Development |
| OISCA | : Organization for International, Spiritual and Cultural Advancement |
| SEDP | : Secondary Education Development Plan |
| OP | : Oil Paint |
| SOP | : Synthetic Oil Paint |
| EP | : Emulsion Paint |
| OS | : Oil Stain |
| TTL | : Total |
| SCH | : School |
| E/N | : Exchange of Notes |

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Map of the Philippines

Location Map

Perspective

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CHAPTER 1. BACKGROUND OF THE PROJECT

CHAPTER 1 BACKGROUND OF THE PROJECT

The Republic of the Philippines established the Medium-term Philippines Development Plan (1987-1992) and the Updates of the Philippines Development Plan (1990-92) and has been making every effort to improve the country's educational situation by strengthening educational management and improving educational facilities. As a result, the total number of students attending elementary and secondary schools throughout the Philippines increased from 13.10 million in the 1987 school year to 15.66 million in the 1995 school year.

As part of the Development Plan, the Japanese Government extended grant aid cooperation to the Philippines for "the Projects for Constructing Primary and Secondary School buildings (Phases 1 to 5)" from 1988 to 1993 in order to urgently repair the elementary and secondary schools damaged by typhoons. The Japanese government viewed the situation urgent and hence adopted the prefabricated construction method which reduces overall construction time. As a result, 1,391 general classrooms, 219 science laboratories, 4 workshops, 22 teachers rooms and 356 toilets were constructed at 360 elementary and secondary school sites, which provided educational opportunities to 57,356 students and significantly contributed to the improvement of basic education in the Philippines.

The Medium-term National Development Plan (1993-1998) aimed to train human resources. However, due to natural disasters such as typhoons and combined with a 2% annual increase in the number of eligible school children, there is a severe lack of elementary and secondary school facilities. In 1995, the construction of about 42,700 classrooms, 26,200 for elementary schools and 16,500 for secondary schools, was necessary. Natural disasters such as strong typhoons, large earthquakes, and volcanic eruptions, combined with unstable social conditions brought on by the attempted coup d'etat and the Gulf War in the Middle East have led to a difficult economic situation in the Philippines. Thus promoting the construction of school facilities within the budget of the Government of the Philippines is quite difficult. Nevertheless, it remains an urgent issue. For these reasons, the Government of the Philippines established the project for the improvement of educational facilities with the construction of about 630 school buildings using the conventional on-site construction method within six years. The Phase I project for Region IV was completed in September 1994 and the Phase II project for 117 schools in Region V, XI, XII

and ARMM was completed in November 1995. The Phase III project for 69 schools in Region VI, VII and X which will be completed in December 1996. The Government of the Philippines has selected Region II, IV and VIII for Phase IV of the project and requested grant aid cooperation from the Government of Japan for the improvement of these school facilities.

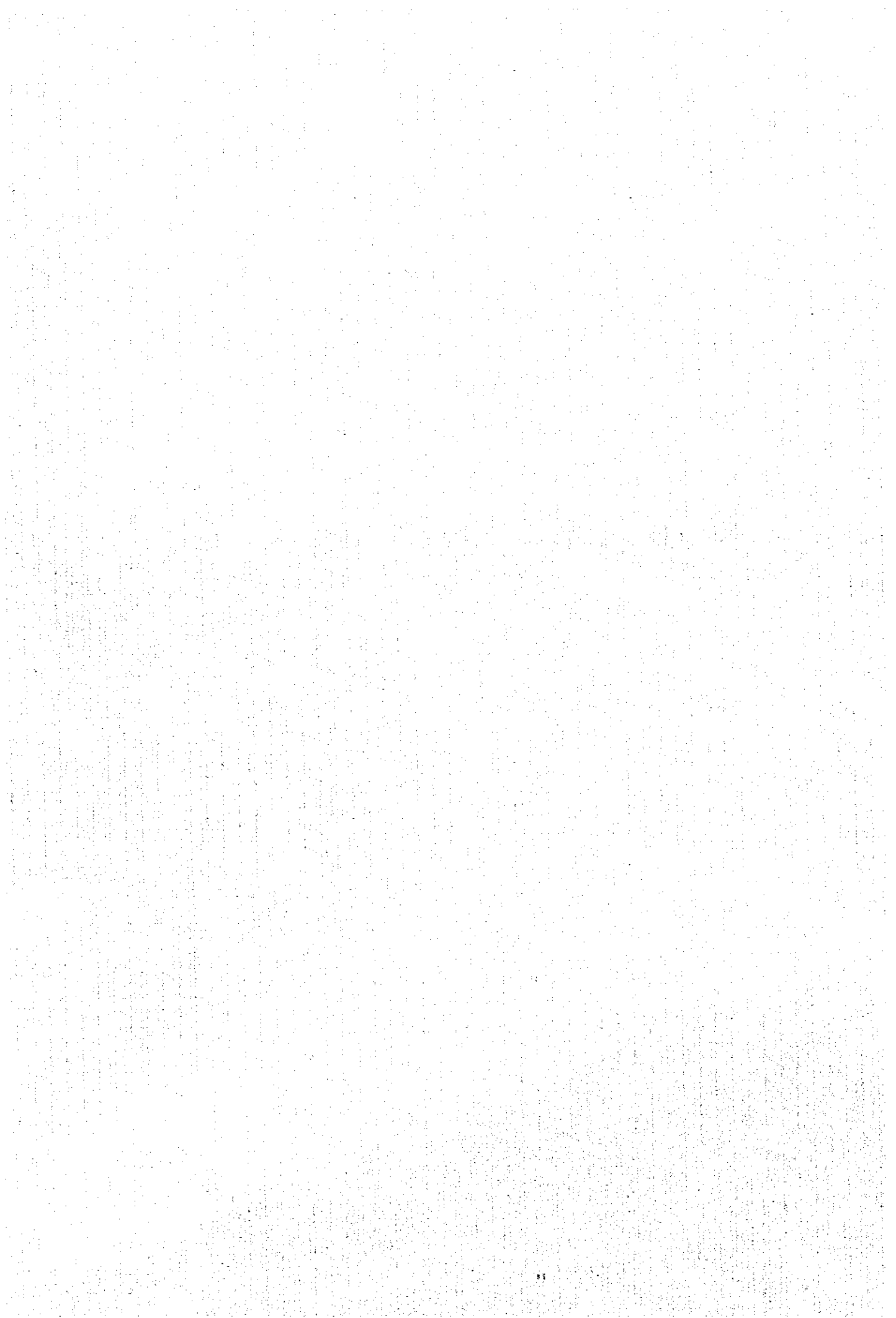
The objective of the request is to construct school facilities for the elementary and the secondary schools in order to redress chronic lack of classrooms in regions II, IV and VIII. In this project, school buildings in the premises of existing schools will be constructed on site using the conventional construction method. There are 120 candidate schools.

The project is to be implemented by the Department of Education, Culture, and Sports (DECS). The contents of the request include facilities for elementary and secondary schools, basic educational equipment such as desks, chairs, blackboards, shelves, and science educational instruments for the secondary schools. The contents of the request are listed below.

Table 1-1 The Contents of the Request

| Items | Elementary School | Secondary School |
|-----------------|--|--|
| School Facility | 3 Classrooms + Toilet | 3 Classrooms + Science Laboratory + Toilet |
| Equipment | Basic educational equipment such as furniture and science laboratory instruments | |

CHAPTER 2. CONTENTS OF THE PROJECT



CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Objectives of the Project

The Government of the Philippines has emphasized the development of human resources and has been striving to improve the quality of education as well as upgrading and increasing educational facilities. The Government of Japan has already implemented grant aid cooperation in the Philippines by constructing typhoon-resistant prefabricated school buildings for 360 schools in the areas frequently affected by typhoons. Due to financial restrictions of the Philippine Government, frequent natural disasters and the increase of the number of eligible school children by 2% a year, many educational facilities are still lacking. To improve this situation, the Government of the Philippines established the project to construct additional school buildings in about 630 existing elementary and secondary school sites in six years using the conventional on-site construction method and requested the Government of Japan to provide grant aid to implement the project.

The objective of the Phase IV project is to alleviate the shortage of educational facilities and as a result, to improve the environment and quality of education by means of constructing about 120 elementary and secondary school buildings composed of classrooms, science laboratories and toilets with necessary basic educational equipment in Regions II, IV and VIII.

2-2 Basic Concept of the Project

(1) Basic Concept

As a result of the site surveys of the 140 schools in Regions II, IV and IIIV that were requested by DECS, 24 schools either did not face classroom shortages, did not have sufficient space for building new school buildings, did not present land ownership certificates, would require extensive land development work, or had access road problems were eliminated from the list, and 116 primary and secondary schools were selected as being appropriate for the Project. The purpose of the Project is to build school facilities for these selected schools by adopting improved Philippines standard specifications and provide fundamental educational equipment to alleviate classroom shortages and provide a comfortable educational environment and, as a result, improve the quality of science education.

1 Scope of Facility Plan:

To meet each school's site condition, facility size, and the level of classroom shortage, more than ten different facility types were set up for the past Project (for Phase I and II construction) and the optimal type was selected for each school based on their conditions.

For the Phase III Project, it was planned to construct as many school buildings as possible in rural areas by avoiding concentration of construction of school buildings at large schools in city areas where demands for classrooms are high, and distributing more school buildings in economically disadvantaged rural areas, by limiting the maximum size of a school buildings to three classrooms. This policy is also adopted for this Project.

2 Project Facility Plan:

The contents of the Project facility plan were decided upon by referencing DECS' standard specifications and modifying their contents. By taking into consideration the semitropical monsoon climate in the Philippines, improvement of the facility insulation capability was made to the standard specifications in order to provide a better educational environment for students. By respecting the Philippines Laws for Handicapped People, a Project facility shall be easily used by handicapped students. School facilities are also used as places of refuge during natural calamities and as meeting places by communities. Thus, a Project facility shall be designed for multiple purpose use. As all Project schools have very poor sanitary facilities, toilets with water supply and drainage facilities shall be provided to rectify this condition.

3 Structure Plan:

The reinforced concrete frame structure built by the local construction method that is commonly applied in the Philippines shall be adopted for the Project. By taking into account severe typhoon damage to school facilities, the strictest wind force given in the Philippine building design code shall be used for designing Project facility structures. In particular, roofs and openings shall be designed with more structural strength so that a Project facility would be able to withstand strong winds and maintain its durability.

4 Equipment Plan:

Fundamental educational equipment shall be provided for Project schools. Science laboratories and fundamental science instruments shall be provided for the Project's secondary schools that do not have science laboratories and instruments in order to improve the educational environment. However, the Project will not provide science laboratories for the 42 Project secondary schools and science experimental instruments for the 40 Project secondary schools that were already provided with them under other foreign aid projects.

(2) Selection Criteria of Schools to be Included in the Project

Following discussions with DECS, the criteria, as listed below, was used to select those schools eligible for the Project.

- 1 To have a sufficient number of students and teachers to utilize new facilities and to be in severe shortage of classrooms

Confirmation of the existing conditions of each school such as the number of staff, budget allocation & expenditure, number of existing usable classrooms, classes & students (in past three years and forecasts for the next year) and population under school age in the school district, etc. Schools with a shortage of less than 3 classrooms will be disqualified.

- 2 To have enough space for the construction of new facilities and to be in possession of site ownership documents

Available construction space will be confirmed by tape measuring.

Failure to submit the site ownership documents during the period of field study will result in disqualification.

- 3 To have sufficient space for the construction of new facilities after the demolition of unusable facilities should there be unavailable space at the time of site survey

Certification of building condemnation as issued by the office of audit, demolition plans and budget allocations should be submitted. Ocular inspection of the structural condition will be conducted by the site study teams. Temporary classrooms will be secured until Project completion.

- 4 To have sufficient access for the transportation of construction material by vehicle

Schools which are not accessible by the study team's vehicles or inaccessible during rainy season will be disqualified.

- 5 Configuration of school sites and their surrounding area should be suitable for the construction of new facilities

School sites adjacent to cliffs or valleys will be disqualified due to the risks of land slides or sudden floods after heavy rain.

School sites with slopes which require extensive land preparations shall be disqualified.

School sites adjacent to river which has risks of land erosion shall be disqualified.

- 6 Soil conditions of school sites should be appropriate for the construction of new facilities

School sites built on reclaimed sea or swamp will be disqualified due to the unstable soil conditions.

- 7 Schools with other similar projects financed by foreign assistance either under implementation or planned for the future will be disqualified

Confirmation of involvement with other such projects will be undertaken by referral to the project listings, by the interviews with representatives of each school and actual inspection of each school site during site survey.

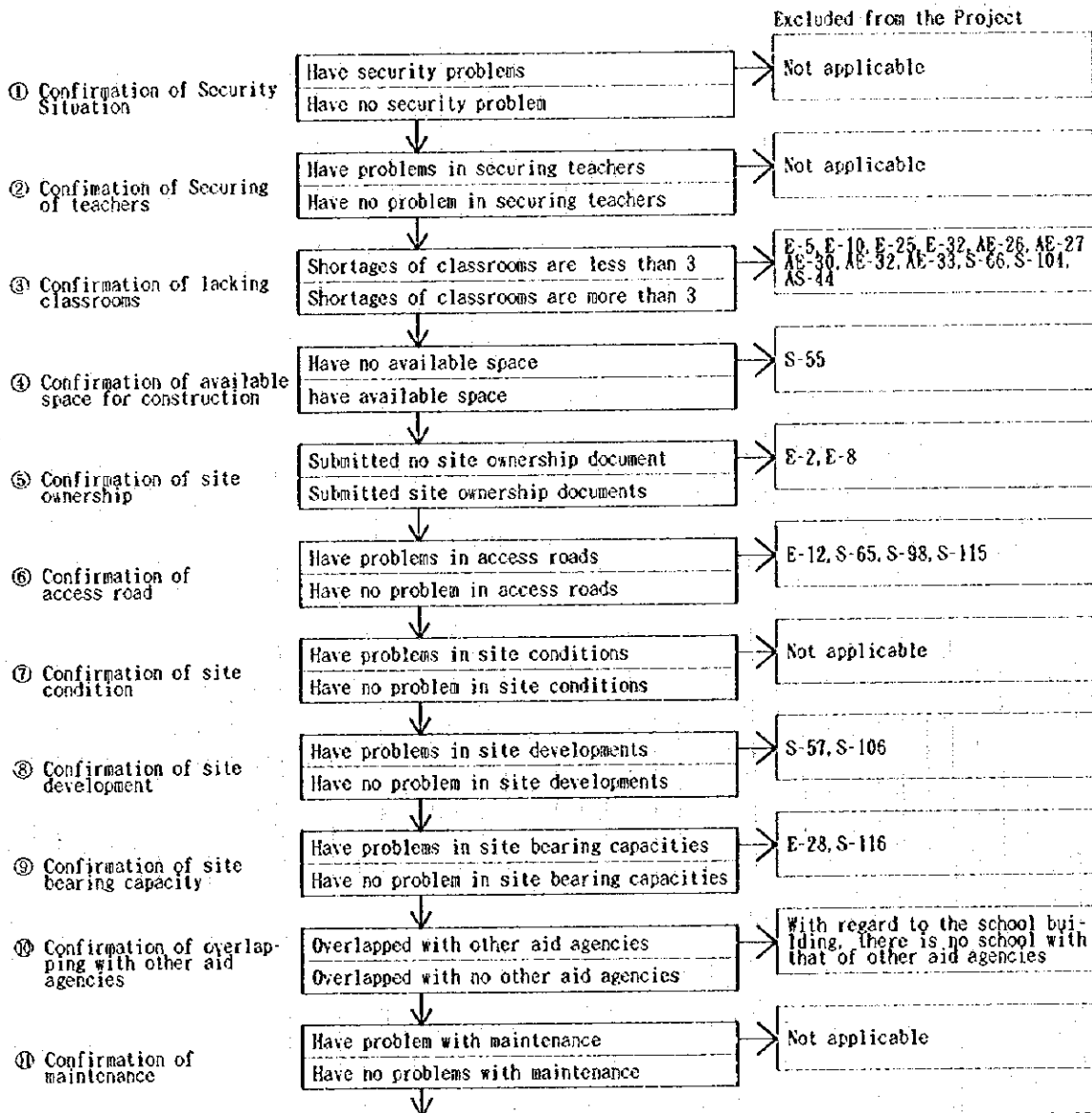
- 8 Existing facilities to be well operated and maintained

Confirmation of the number of staff, budget allocation and actual expenditures for the operation and maintenance of the school facilities over the past three years and for the following year. Actual conditions of operation and maintenance of existing facilities will be inspected by the site study teams.

Site studies of the 140 candidate schools were conducted by 4 study teams from February 5 to February 28, 1996. As a result of site survey, 24 schools

were determined not to be included in the Project and are listed in table 2-1. Figure 2-1 shows the evaluation process of the schools. Table 2-2 shows the schools included in the project according to their location, and Table 2-3 lists the remaining 116 schools selected for the Project.

Figure 2-1 Evaluation Process of the Schools Included in the Project



| To be analyzed and evaluated as the Project schools | | |
|---|------------|--|
| Elementary Schools | Region II | E-1, E-3, E-4, E-6, E-7, E-9 |
| | Region IV | E-11, E-13, E-14, E-15, E-16, E-17, E-18, E-19, E-22, E-23, E-26, AE-1, AE-2, AE-3, AE-4, AE-5, AE-7, AE-8, AE-11, AE-12, AE-13, AE-14, AE-15, AE-17, AE-18, AE-20, AE-21, AE-22, AE-28, AE-29 |
| | Region VII | E-27, E-29, E-30, E-31, E-34, E-35, E-36, AE-37, E-38 |
| Secondary Schools | Region II | S-39, S-41, S-42, S-43, S-44, S-45, S-46, S-47, S-48, S-49, S-50, S-51S-53, S-54, S-58, S-59, S-60, S-61, S-63, AS-34, AS-36, AS-37, AS-39 |
| | Region IV | S-64, S-67, S-68, S-69, S-70, S-71, S-72, S-73, S-74, S-75, S-76, S-77, S-79, S-80, S-81, S-82, S-83, S-84, S-86, S-87, S-89, S-90, S-91, S-92, S-93, S-94, S-95, S-96, S-97, AS-47, AS-48 |
| | Region VII | S-99, S-100, S-101, S-102, S-107, S-108, S-111, S-112, S-114, S-119, S-120, AS-49, AS-56, AS-57, AS-63, AS-64, AS-65 |

Table 2-1 List of Schools to be Excluded from the Project

| SCHOOL No. | SCHOOL NAME | PROBLEM |
|------------|---------------------------------------|--|
| E - 2 | CAGGAY-TANZA ELEMENTARY SCHOOL | -No land ownership or legitimate land lease certificate. |
| E - 5 | APARRI EAST CENTRAL SCHOOL | -No classroom shortage. |
| E - 8 | STA. FE CENTRAL SCHOOL | -No land ownership or legitimate land lease certificate. |
| E - 10 | NAGTIIPUNAN CENTRAL SCHOOL | -No classroom shortage. |
| E - 12 | UMIRAY ELEMENTARY SCHOOL | -Access road to the site is poor and it would be problematic during rainy season. |
| E - 25 | LUCENA WEST I ELEMENTARY SCHOOL | -No classroom shortage. |
| E - 28 | CAMPORPOK CENTRAL ELEMENTARY SCHOOL | -Proposed building site is rice paddy. Bearing capacity is weak. |
| E - 32 | TOMAS OPPUS PILOT SCHOOL | -No classroom shortage. |
| AE- 26 | BAGUMBONG ELEMENTARY SCHOOL | -No classroom shortage. |
| AE- 27 | NAGA-NAGA ELEMENTARY SCHOOL | -No classroom shortage. |
| AE- 30 | LINGAYON ELEMENTARY SCHOOL | -No classroom shortage. |
| AE- 32 | MACROHON CENTRAL ELEMENTARY SCHOOL | -No classroom shortage. |
| AE- 33 | ENRIQUETA ELEMENTARY SCHOOL | -No classroom shortage. |
| S - 55 | NUEVA VIZCAYA GEN. COMP. HIGH SCHOOL | -Not enough space for constructing a new building. |
| S - 57 | ARITAL NATIONAL HIGH SCHOOL | -Proposed building site is located at sloping area. Extensive land reclamation work would be required. |
| S - 65 | JUAN C. ANGARA MEMORIAL HIGH SCHOOL | -Access road to the site is poor and it would be problematic during rainy season. |
| S - 66 | PUANGI NATIONAL HIGH SCHOOL | -No classroom shortage. |
| S - 88 | VICENTE MADRIGAL MEMORIAL HIGH SCHOOL | -Proposed building site is located adjacent to steep cliff. |
| S - 98 | NAVAL HIGH SCHOOL | -Access road to the site is poor and it would be problematic during rainy season. |
| S -104 | PALO NATIONAL HIGH SCHOOL | -No classroom shortage. |
| S -106 | TOMAS OPPUS NATIONAL HIGH SCHOOL | -Proposed building site is located at sloping area. Extensive land reclamation work would be required. |
| S -115 | CALBIGA NATIONAL HIGH SCHOOL | -No alternate access to school site except through hanging footbridge. |
| S -116 | GANDARA NATIONAL HIGH SCHOOL | -Proposed building site is rice paddy. Bearing capacity is weak. |
| AS- 44 | MALUSAK NATIONAL HIGH SCHOOL | -No classroom shortage. |

Table 2-2 Number of Schools Selected for the Project by Regions

| | Region II | Region IV | Region VIII | Total |
|-------------------|-----------|-----------|-------------|-------|
| Elementary School | 6 | 30 | 9 | 45 |
| Secondary School | 23 | 31 | 17 | 71 |
| Total | 29 | 61 | 26 | 116 |

Table 2-3 List of Schools Selected for the Project

| ELEMENTARY SCHOOLS | |
|---|---|
| REGION II - CAGAYAN VALLEY | |
| E- 1 (E- 1) TUGUEGARAO WEST CENTRAL SCHOOL. | E- 2 (E- 3) BAGGAO CENTRAL SCHOOL. |
| E- 3 (E- 4) NONIE ALEGRE ELEMENTARY SCHOOL. | E- 4 (E- 6) CAUAYAN SOUTH CENTRAL SCHOOL |
| E- 5 (E- 7) SANTIAGO SOUTH CENTRAL SCHOOL. | E- 6 (E- 9) BONE NORTH ELEMENTARY SCHOOL |
| REGION VI - SOUTHERN TAGALOG | |
| E- 7 (E-11) DINGALAN ELEMENTARY SCHOOL. | E- 8 (E-13) STO. TOMAS NORTH CENTRAL SCHOOL. |
| E- 9 (E-14) LEMERY PILOT ELEMENTARY SCHOOL. | E-10 (E-15) SAN JOSE ELEMENTARY SCHOOL. |
| E-11 (E-16) E. BARETTO SENIOR ELEMENTARY SCHOOL. | E-12 (E-17) LOS BANOS ELEMENTARY SCHOOL. |
| E-13 (E-18) PAGBILAO CENTRAL SCHOOL. | E-14 (E-19) CALAUAG CENTRAL SCHOOL. |
| E-15 (E-22) ALANGILANG CENTRAL SCHOOL. | E-16 (E-23) LADISLAO DIWA ELEMENTARY SCHOOL. |
| E-17 (E-26) SAN PABLO CITY CENTRAL SCHOOL. | E-18 (AE- 1) TANAUAN NORTH CENTRAL SCHOOL. |
| E-19 (AE- 2) PADRE GARCIA ELEMENTARY SCHOOL. | E-20 (AE- 3) SALAWAG ELEMENTARY SCHOOL. |
| E-21 (AE- 4) SILANG ELEMENTARY SCHOOL. | E-22 (AE- 5) AGUINALDO ELEMENTARY SCHOOL. |
| E-23 (AE- 7) LILIW ELEMENTARY SCHOOL. | E-24 (AE- 8) CRISANTO GUYSAYKO ELEMENTARY SCHOOL. |
| E-25 (AE-11) BIGNAY ELEMENTARY SCHOOL. | E-26 (AE-12) CLARO M. RECTO MEMORIAL CENTRAL SCHOOL. |
| E-27 (AE-13) STO. DOMINGO ELEMENTARY SCHOOL. | E-28 (AE-14) GUMACA EAST CENTRAL SCHOOL. |
| E-29 (AE-15) BUXAL SUR ELEMENTARY SCHOOL. | E-30 (AE-17) MAYANOT ELEMENTARY SCHOOL. |
| E-31 (AE-18) CAINTA ELEMENTARY SCHOOL. | E-32 (AE-20) MARIANO C. SAN JUAN ELEMENTARY SCHOOL. |
| E-33 (AE-21) BINANCONAN ELEMENTARY SCHOOL. | E-34 (AE-22) BAGONG RAYON IV ELEMENTARY SCHOOL. |
| E-35 (AE-28) JULIAN FELIPE ELEMENTARY SCHOOL. | E-36 (AE-29) BALETE RELOCATION ELEMENTARY SCHOOL. |
| REGION VIII - EASTERN VISAYAS | |
| E-37 (E-27) NAGA-NAGA ELEMENTARY SCHOOL. | E-38 (E-29) JARO I CENTRAL ELEMENTARY SCHOOL. |
| E-39 (E-30) GABAS ELEMENTARY SCHOOL. | E-40 (E-31) SOCOD CENTRAL ELEMENTARY SCHOOL. |
| E-41 (E-34) MAKIWALO ELEMENTARY SCHOOL. | E-42 (E-35) MONDRAGON CENTRAL SCHOOL. |
| E-43 (E-36) PAMBUJAN CENTRAL SCHOOL. | E-44 (E-37) TAMBULIID ELEMENTARY SCHOOL. |
| E-45 (E-38) A. P. BANEZ MEMORIAL SCHOOL. | |
| SECONDARY SCHOOLS | |
| REGION II - CAGAYAN VALLEY | |
| S- 46 (S-39) CAGAYAN NATIONAL HIGH SCHOOL (MAIN) | S-47 (S-41) PATTAO NATIONAL HIGH SCHOOL (MAIN) |
| S-48 (S-42) CAGAYAN NATIONAL HIGH SCHOOL (LINAO EXT.) | S-49 (S-43) CAGAYAN NATIONAL HIGH SCHOOL (CATAGGAMAN EXT.) |
| S-50 (S-44) PATTAO NATIONAL HIGH SCHOOL (EXT.) | S-51 (S-45) BAWA NATIONAL HIGH SCHOOL. |
| S-52 (S-46) ISABELA NATIONAL HIGH SCHOOL. | S-53 (S-47) ROXAS NATIONAL HIGH SCHOOL. |
| S-54 (S-48) RIZAL NATIONAL HIGH SCHOOL. | S-55 (S-49) DELFIN ALBANO NATIONAL HIGH SCHOOL. |
| S-56 (S-50) DONA AURORA NATIONAL HIGH SCHOOL. | S-57 (S-51) SALINUNGAN NATIONAL HIGH SCHOOL. |
| S-58 (S-53) NAGUILIAN NATIONAL HIGH SCHOOL. | S-59 (S-54) TUKAWINI NATIONAL HIGH SCHOOL. |
| S-60 (S-58) SALINAS NATIONAL HIGH SCHOOL. | S-61 (S-59) MADDELA AGRO-INDUSTRIAL HIGH SCHOOL. |
| S-62 (S-60) DIFUN NATIONAL HIGH SCHOOL. | S-63 (S-61) PINARIPAD NATIONAL HIGH SCHOOL. |
| S-64 (S-63) QUIRINO GENERAL HIGH SCHOOL. | S-65 (AS-34) DIVISORIA NATIONAL HIGH SCHOOL. |
| S-66 (AS-36) CAGASAT NATIONAL HIGH SCHOOL. | S-67 (AS-37) CALIGUIAN NATIONAL HIGH SCHOOL. |
| S-68 (AS-39) ANGADANAN NATIONAL HIGH SCHOOL. | |
| REGION IV - SOUTHERN TAGALOG | |
| S-69 (S-64) BAUER NATIONAL HIGH SCHOOL. | S-70 (S-67) LECSUWIN NATIONAL HIGH SCHOOL. |
| S-71 (S-68) DACANLAO AGONCILLO NATIONAL HIGH SCHOOL. | S-72 (S-69) BAYBAYIN NATIONAL HIGH SCHOOL. |
| S-73 (S-70) MAYURO NATIONAL HIGH SCHOOL. | S-74 (S-71) DASMARINAS NATIONAL HIGH SCHOOL (MAIN) |
| S-75 (S-72) CARRONA NATIONAL HIGH SCHOOL. | S-76 (S-73) TRECE MARTIREZ NATIONAL HIGH SCHOOL. |
| S-77 (S-74) MARAGONDON NATIONAL HIGH SCHOOL. | S-78 (S-75) PEDRO GUEVARA MEMORIAL HIGH SCHOOL. |
| S-79 (S-76) SAN PEDRO RELOCATION NATIONAL HIGH SCHOOL. | S-80 (S-77) CAMP VICENTE LIM NATIONAL HIGH SCHOOL. |
| S-81 (S-79) LUTUKAN NATIONAL HIGH SCHOOL. | S-82 (S-80) LOPEZ NATIONAL HIGH SCHOOL. |
| S-83 (S-81) CLARO M. RECTO MEMORIAL HIGH SCHOOL. | S-84 (S-82) STA. CATALINA SUR HIGH SCHOOL. |
| S-85 (S-83) STO. DOMINGO NATIONAL HIGH SCHOOL. | S-86 (S-84) DAGATAN NATIONAL HIGH SCHOOL. |
| S-87 (S-86) CARAY NATIONAL HIGH SCHOOL. | S-88 (S-87) CALAUAG NATIONAL HIGH SCHOOL. |
| S-89 (S-89) GEN. LICERIO GERONIMO WEM L. HIGH SCHOOL. | S-90 (S-90) ANGONO NATIONAL HIGH SCHOOL. |
| S-91 (S-91) BAYUGO NATIONAL HIGH SCHOOL. | S-92 (S-92) PINAUKAN NATIONAL HIGH SCHOOL. |
| S-93 (S-93) BALETE NATIONAL HIGH SCHOOL. | S-94 (S-94) CAVITE NATIONAL HIGH SCHOOL. |
| S-95 (S-95) INOSLOBAN NATIONAL HIGH SCHOOL. | S-96 (S-96) PINAGKATITAN NATIONAL HIGH SCHOOL. |
| S-97 (S-97) SAN PABLO CITY N.H.S. (DEL REMEDIO ANNEX) | S-98 (AS-47) SAN CELESTINO NATIONAL HIGH SCHOOL. |
| S-99 (AS-48) PAHARANG NATIONAL HIGH SCHOOL. | |
| REGION VIII - EASTERN VISAYAS | |
| S-100 (S- 99) BAYBAY NATIONAL HIGH SCHOOL. | S-101 (S-100) KANANGA NATIONAL HIGH SCHOOL. |
| S-102 (S-101) ALANG-ALANG NATIONAL HIGH SCHOOL. | S-103 (S-102) BABATNGON NATIONAL HIGH SCHOOL. |
| S-104 (S-107) ICHON BARANGAY HIGH SCHOOL. | S-105 (S-108) DONGON NATIONAL HIGH SCHOOL. |
| S-106 (S-111) PAMBUJAN NATIONAL HIGH SCHOOL. | S-107 (S-112) SAN ISIDRO NATIONAL HIGH SCHOOL. |
| S-108 (S-114) CATARMAN NATIONAL HIGH SCHOOL. | S-109 (S-119) ORMOC NATIONAL HIGH SCHOOL. |
| S-110 (S-120) SAGKAHAN NATIONAL HIGH SCHOOL. | S-111 (AS- 49) BOOL HIGH SCHOOL. |
| S-112 (AS- 56) SAN ROQUE NATIONAL HIGH SCHOOL. | S-113 (AS- 57) MAYO NATIONAL HIGH SCHOOL. |
| S-114 (AS- 63) SAN JOAQUIN NATIONAL HIGH SCHOOL. | S-115 (AS- 64) IPIL NATIONAL HIGH SCHOOL. |
| S-116 (AS- 65) VALENCIA NATIONAL HIGH SCHOOL. | |

Note: New school numbers are applied for selected schools. Numbers in parentheses indicate original numbers.

2-3 Basic Design

2-3-1 Design Concept

The purpose of the Project is to construct school buildings and provide basic educational equipment to alleviate classroom shortages of the existing elementary and secondary schools that are scattered throughout Region II, IV and VIII. Based on the request of the Government of the Philippines and the results of discussions held with DECS during the site survey period, the Basic Design of the Project was prepared along with the following policies:

(1) Policy for Natural Conditions

The Project Area is located in the hot, high humidity tropical zone. To provide a comfortable environment for educational activities, the design of facilities should be prepared by taking into account natural ventilation and heat insulation capabilities.

Project facilities will be used as places for evacuation areas for residents during natural calamities as well as for educational purposes. The facilities should be designed to be strong enough to withstand such natural calamities. In particular, the roofs of buildings are subject to typhoon damage and should be designed to withstand strong winds thereby minimizing building damage.

(2) Design Policies for Social Conditions

In designing the facility, the school building standards of the Philippines and the living mode of the people must be respected. As the school facilities may be used as places to evacuate during natural calamities, and to accommodate double-shift classes or night classes for non-formal education, the design should be such as to accommodate these conditions. Furthermore, in compliance with the Accessibility Law of the Philippines (BATAS PAMBANSA BILANG 344), the facilities must be able to accommodate physically handicapped students.

(3) Design Policies for Local Construction Conditions

There is a National Building Code of the Philippines that corresponds to the Building Design Standards in Japan. As in Japan, it is mandatory to

submit formal applications to obtain the various permits needed to start construction. As for the domestic construction contractors and consultants concerned, their engineering skills are generally high. Thus they will be employed for this Project.

(4) Policies for Using Local Firms, Equipment and Materials

There are no problems with regard to the local construction contractors and local consultant firms. Thus, they may work under the guidance of Japanese engineers and receive the transfer of technology. The quality of local products and the level of engineering are thought to be satisfactory. However, for those materials, such as concrete, where the strength is affected by the accuracy of the construction, a durability test will be conducted.

(5) Design Policies for the Project Implementing Agency's Maintenance and Management Capabilities

By taking into consideration the financial difficulties being experienced by the Government of the Philippines, school facilities shall be planned by placing top priority on easy, minimum cost maintenance and management work once facility construction has been completed. In addition, consideration shall be given to the use of domestic materials for effecting simple repairs to damaged or deteriorated facilities.

(6) Design Policies for the Scope and Level of Project Facilities and the Equipment to be provided

The contents of the Project include the construction of classrooms and toilets for elementary schools, and classrooms, science laboratories, and toilets for secondary schools, and for the furnishing of associated basic education equipment. The facilities and equipment will provide the basic necessities for education and they should be planned so as to allow comfortable daily classroom activities.

For facility design, emphasis shall be placed not only on classroom use for study purposes but also for multipurpose use, such as places of refuge during natural calamities.

The equipment plan will make provision for the supply of the necessary basic classroom equipment, such as blackboards and furniture. In view of maintenance and management, these units shall be procured locally. Science laboratory instruments will be obtained in the Philippines, except items of poor quality and insufficient quantity, which will be procured in Japan.

(7) Policy on the Period of Construction

In this project, the school buildings of elementary and secondary schools are scattered over a vast area stretching 920 km from north to south and 460 km from east to west and consisting of three islands including Ruzon, Layte and Samar islands. Because a large number of school buildings must be constructed simultaneously in a short period of time, construction bases will be established in each region. Construction work will be supervised by each construction bases so that the construction plan can be followed closely to complete the project on time. A Japanese consultant will be stationed in Metro Manila throughout the duration of the Project to supervise the work, since Metro Manila is centrally located to the areas included in this project and convenient for access to the cities where construction bases will be established.

(8) Policy to Use the Participation of Residents

The maintenance of educational facilities is funded by donations from local residents, as DECS is unable to provide sufficient funds for such work. Local residents will be encouraged to participate in the work to be undertaken by the Philippines side, such as site preparation, and work such as gardening and fencing, etc. so as to motivate them to be involved in the maintenance of educational facilities even after the completion of the Project.

2-3-2 Examination of Design Conditions

The size of a Project facility was decided based on DECS standard school facility design. Thus, the classroom size was set up as 8m x 7m (56 m²) and the science laboratory size as 8m x 10.5m (84 m²) to accommodate 40 primary school students and 42 secondary school students per classroom. These figures are slightly smaller than those adopted into Japanese schools. But, these

figures are thought to be appropriate for accommodating students by carefully arranging furniture units in the classrooms. By taking into account the fact that students from adjacent facilities will use the Project's toilet, the sizes of the toilets to be built by the Project were decided upon as being larger than required sizes for the Project facilities. The ceiling height of Project classrooms was set up as being 3.47 m by taking into consideration summer heat in the Philippines.

The contents of Project facilities and the comparison of the Project facility size with Philippine standards are as listed below:

Table 2-4 Contents of Project Facilities

| Name of the Block | Contents |
|---|--|
| 1. Classroom Building Block | 3 Classrooms: Single Story w/ Reinforced Concrete Structure, 205.80m ² /116 Blocks |
| 2. Toilet Building Block | Toilet for Male, Female & Handicapped: Single Story w/ Reinforced Concrete Structure, 38.36m ² /74 Blocks |
| 3. Science Laboratory & Toilet Building Block | Science Laboratory Room & Toilet for Male, Female & Handicapped: Single Story w/ Reinforced Concrete Structure 151.62m ² /42 Blocks |

Table 2-5 Comparison between Philippine Construction Standards and the Adopted Sizes

| | | Philippines Design Standard | Project Facilities | |
|----------------|--------------------|--------------------------------|---|---|
| Floor Area | Classroom | 8m × 7m (56m ²) | 8m × 7m (56m ²) | |
| | Science Laboratory | 8m × 10.5m (84m ²) | 8m × 10.5m (84m ²) | |
| | Toilet | Male & Female | 1 Booth / 50 Students 1 Urinal / 50 Students | 1 Booth / 25 Students 1 Urinal / 21 Students |
| | | Handicapped | 1 Booth | 1 Booth |
| Capacity | Elementary School | 40 Students / Classroom | 40 Students / Classroom | |
| | Secondary School | 42 Students / Classroom | 42 Students / Classroom | |
| Ceiling Height | | More than 2.7m | 3.47m | |

40 schools have already been provided with science laboratories by other agencies and programs. Thus under an agreement between DECS and the Japanese team, science laboratories will not be provided to these schools. Table 2-6 indicates the project schools already provided with a science laboratory, tables 2-7 and 2-8 show the facility size and the scale of the entire size of the Project.

Table 2-6 Project Schools with Science Laboratory Constructed by Other Financial Assistance

| School No. | Name of School | SEDP | PASWFP | ESEP | ESF |
|--------------------------------------|---|------|--------|------|-----|
| REGION II - CAGAYAN VALLEY | | | | | |
| S- 46 | CAGAYAN NATIONAL HIGH SCHOOL | | | ○ | ○ |
| S- 51 | BAUA NATIONAL HIGH SCHOOL | ○ | | | |
| S- 52 | ISABELA NATIONAL HIGH SCHOOL | | ○ | ○ | ○ |
| S- 53 | ROXAS NATIONAL HIGH SCHOOL | ○ | | | |
| S- 56 | DONA AURORA NATIONAL HIGH SCHOOL | | | ○ | |
| S- 59 | TUMAUINI NATIONAL HIGH SCHOOL | ○ | | | |
| S- 64 | QUIRINO GENERAL HIGH SCHOOL | | | ○ | ○ |
| S- 65 | DIVISORIA NATIONAL HIGH SCHOOL | ○ | | | |
| S- 66 | CACASAT NATIONAL HIGH SCHOOL | ○ | | | |
| REGION IV - SOUTHERN TAGALOG | | | | | |
| S- 71 | DACANLAO AGONCILLO NATIONAL HIGH SCHOOL | ○ | | | |
| S- 79 | PEDRO GUEVARA MEMORIAL HIGH SCHOOL | ○ | | ○ | |
| S- 82 | LOPEZ NATIONAL HIGH SCHOOL | ○ | | | |
| S- 83 | CLARO M. RECTO MEMORIAL HIGH SCHOOL | ○ | | | |
| S- 85 | STO. DOMINGO NATIONAL HIGH SCHOOL | ○ | | | |
| S- 90 | ANGONO NATIONAL HIGH SCHOOL | ○ | | | |
| S- 93 | SAN CELESTINO NATIONAL HIGH SCHOOL | ○ | | | |
| S- 99 | PAHARANG NATIONAL HIGH SCHOOL | ○ | | | |
| REGION VIII - EASTERN VISAYAS | | | | | |
| S-100 | BAYBAY NATIONAL HIGH SCHOOL | ○ | | | |
| S-101 | KANANGA NATIONAL HIGH SCHOOL | ○ | | | |
| S-104 | ICHON BARANGAY HIGH SCHOOL | ○ | | | |
| S-106 | PAMBUJAN NATIONAL HIGH SCHOOL | ○ | | | |
| S-107 | SAN ISIDRO NATIONAL HIGH SCHOOL | ○ | | | |
| S-109 | ORWOC NATIONAL HIGH SCHOOL | ○ | | | |
| S-110 | SAOKAHAN NATIONAL HIGH SCHOOL | ○ | | | |
| S-112 | SAN ROQUE NATIONAL HIGH SCHOOL | ○ | | | |
| S-113 | MAVO NATIONAL HIGH SCHOOL | ○ | | | |
| S-114 | SAN JOAQUIN NATIONAL HIGH SCHOOL | ○ | | | |
| S-115 | IPIIL NATIONAL HIGH SCHOOL | ○ | | | |
| S-116 | VALENCIA NATIONAL HIGH SCHOOL | ○ | | | |

Table 2-7 Facility Size

| Building Type | No. of Stories | No. of Classrooms | Room Area (nr) | Corridor (nr) | Area (nr) | Number of Students | |
|---------------------------|----------------------------|-------------------|----------------|---------------|-----------|--------------------|-----|
| Elementary Schools | | | | | | | |
| ① | Classroom | 1 | 3 | 168.00 | 37.80 | 205.80 | 120 |
| | Toilet | 1 | -- | 26.03 | 12.33 | 38.36 | -- |
| | Total | -- | -- | 194.03 | 50.13 | 244.16 | 120 |
| Secondary Schools | | | | | | | |
| ② | Classroom | 1 | 3 | 168.00 | 37.80 | 205.80 | 126 |
| | Science Laboratory, Toilet | 1 | 1 | 84.00+30.96 | 36.66 | 151.62 | -- |
| | Total | -- | -- | 282.96 | 74.46 | 357.42 | 126 |
| ③ | Classroom | 1 | 3 | 168.00 | 37.80 | 205.80 | 126 |
| | Toilet | 1 | -- | 26.03 | 12.33 | 38.36 | -- |
| | Total | -- | -- | 194.03 | 50.13 | 244.16 | 126 |

Table 2-8 Scale of Entire Project

| Region | Building Type | | No. of Schools | No. of Classrooms | No. of Science Laboratory Rooms | No. of Students | Floor Area (m ²) |
|-------------|-------------------|---|----------------|-------------------|---------------------------------|-----------------|------------------------------|
| Region II | Elementary School | ① | 6 | 18 | 0 | 720 | 1,461.96 |
| | Secondary School | ② | 14 | 42 | 14 | 1,764 | 5,003.88 |
| | | ③ | 9 | 27 | 0 | 1,134 | 2,197.44 |
| | Sub total | | | 29 | 87 | 14 | 3,618 |
| Region IV | Elementary School | ① | 30 | 90 | 0 | 3,600 | 7,324.80 |
| | Secondary School | ② | 23 | 69 | 23 | 2,898 | 8,220.66 |
| | | ③ | 8 | 24 | 0 | 1,008 | 1,953.28 |
| | Sub total | | | 61 | 183 | 23 | 7,506 |
| Region VIII | Elementary School | ① | 9 | 27 | 0 | 1,080 | 2,197.44 |
| | Secondary School | ② | 5 | 15 | 5 | 630 | 1,787.10 |
| | | ③ | 12 | 36 | 0 | 1,512 | 2,929.92 |
| | Sub total | | | 26 | 78 | 5 | 3,222 |
| Total | | | 116 | 348 | 42 | 14,346 | 33,079.48 |

Note) 1. No. of Students are calculated based on the DECS standards (40 students/classroom for elementary schools, 42 students/classroom for secondary schools)
 2. Area include Area of Open Corridor

The purpose of the Project is to alleviate the shortage of classrooms in Regions II, IV and VIII. Comparison between the scale of existing facilities and project facilities is shown in table 2-9 and the recipient schools building types is shown in table 2-10.

Table 2-9 Comparison between the Scale of Existing Facilities and Project Facilities

| Region | Building Type | Existing Facilities | | | Project Facilities | | Improvement Ratio |
|-------------|-------------------|---------------------|-----------------|------------------------|--------------------|-----------------|-------------------|
| | | No. of Classrooms | No. of Students | Shortage of Classrooms | No. of Classrooms | No. of Students | |
| Region II | Elementary School | 174 | 9,103 | 54 | 18 | 720 | 33.3% |
| | Secondary School | 378 | 33,097 | 410 | 69 | 2,898 | 16.8% |
| | Sub total | 552 | 42,200 | 464 | 87 | 3,618 | 18.8% |
| Region IV | Elementary School | 879 | 51,897 | 419 | 90 | 3,600 | 21.5% |
| | Secondary School | 582 | 60,127 | 850 | 93 | 3,906 | 10.9% |
| | Sub total | 1,461 | 112,252 | 1,270 | 183 | 7,506 | 14.4% |
| Region VIII | Elementary School | 192 | 9,495 | 46 | 27 | 1,080 | 58.7% |
| | Secondary School | 266 | 20,126 | 214 | 51 | 2,142 | 23.8% |
| | Sub total | 458 | 29,621 | 260 | 78 | 3,222 | 30.0% |
| Total | | 2,471 | 183,845 | 1,994 | 348 | 14,346 | 17.5% |

Table 2-10 List of Recipient Schools Building Types

| NAME OF SCHOOL | TYPE | NAME OF SCHOOL | TYPE |
|--|------|---|------|
| ELEMENTARY SCHOOLS | | | |
| REGION II - CAGAYAN VALLEY | | | |
| E- 1. TUGUEGARAO WEST CENTRAL SCHOOL | ① | E- 2. BAGCAG CENTRAL SCHOOL | ① |
| E- 3. MONTE ALEGRE ELEMENTARY SCHOOL | ① | E- 4. CAUAYAN SOUTH CENTRAL SCHOOL | ① |
| E- 5. SANTIAGO SOUTH CENTRAL SCHOOL | ① | E- 6. BONE NORTH ELEMENTARY SCHOOL | ① |
| REGION VI - SOUTHERN TAGALOG | | | |
| E- 7. DINGALAN ELEMENTARY SCHOOL | ① | E- 8. STO. TOMAS NORTH CENTRAL SCHOOL | ① |
| E- 9. LEMERY PILOT ELEMENTARY SCHOOL | ① | E-10. SAN JOSE ELEMENTARY SCHOOL | ① |
| E-11. E. BARETTO SENIOR ELEMENTARY SCHOOL | ① | E-12. LOS BANOS ELEMENTARY SCHOOL | ① |
| E-13. PAGBILAO CENTRAL SCHOOL | ① | E-14. CALAUAG CENTRAL SCHOOL | ① |
| E-15. ALANGILANG CENTRAL SCHOOL | ① | E-16. LADISLAO DIWA ELEMENTARY SCHOOL | ① |
| E-17. SAN PABLO CITY CENTRAL SCHOOL | ① | E-18. TANAUAN NORTH CENTRAL SCHOOL | ① |
| E-19. PADRE GARCIA ELEMENTARY SCHOOL | ① | E-20. SALATAO ELEMENTARY SCHOOL | ① |
| E-21. SILANG ELEMENTARY SCHOOL | ① | E-22. AGUINALDO ELEMENTARY SCHOOL | ① |
| E-23. LILIW ELEMENTARY SCHOOL | ① | E-24. CRISANTO GUYSAYKO ELEMENTARY SCHOOL | ① |
| E-25. BIGNAY ELEMENTARY SCHOOL | ① | E-26. CLARO M. RECTO MEMORIAL CENTRAL SCHOOL | ① |
| E-27. STO. DOMINGO ELEMENTARY SCHOOL | ① | E-28. CUMACA EAST CENTRAL SCHOOL | ① |
| E-29. BUKAL SUR ELEMENTARY SCHOOL | ① | E-30. MAYAOT ELEMENTARY SCHOOL | ① |
| E-31. CAINTA ELEMENTARY SCHOOL | ① | E-32. MARIANO C. SAN JUAN ELEMENTARY SCHOOL | ① |
| E-33. BINANGONAN ELEMENTARY SCHOOL | ① | E-34. BAGONG NATON IV ELEMENTARY SCHOOL | ① |
| E-35. JULIAN FELIPE ELEMENTARY SCHOOL | ① | E-36. BALETE RELOCATION ELEMENTARY SCHOOL | ① |
| REGION VIII - EASTERN VISAYAS | | | |
| E-37. NAGA-NAGA ELEMENTARY SCHOOL | ① | E-38. JARO I CENTRAL ELEMENTARY SCHOOL | ① |
| E-39. GABAS ELEMENTARY SCHOOL | ① | E-40. SOGOD CENTRAL ELEMENTARY SCHOOL | ① |
| E-41. MAKIHALO ELEMENTARY SCHOOL | ① | E-42. MONDRAGON CENTRAL SCHOOL | ① |
| E-43. PANBUJAN CENTRAL SCHOOL | ① | E-44. TANBULID ELEMENTARY SCHOOL | ① |
| E-45. A. P. BANEZ MEMORIAL SCHOOL | ① | | |
| SECONDARY SCHOOLS | | | |
| REGION II - CAGAYAN VALLEY | | | |
| S-46. CAGAYAN NAT'L HIGH SCHOOL | ② | S-47. PATAO NAT'L HIGH SCHOOL (MAIN) | ② |
| S-48. CAGAYAN NAT'L HIGH SCHOOL (LINAO EXT.) | ② | S-49. CAGAYAN NAT'L HIGH SCHOOL (CATAGCAMAN EXT.) | ② |
| S-50. PATAO NAT'L HIGH SCHOOL | ② | S-51. BAWA NAT'L HIGH SCHOOL | ② |
| S-52. ISABELA NAT'L HIGH SCHOOL | ② | S-53. ROYAS NAT'L HIGH SCHOOL | ② |
| S-54. RIZAL NAT'L HIGH SCHOOL | ② | S-55. DELFIN ALBANO NAT'L HIGH SCHOOL | ② |
| S-56. DOÑA AURORA NAT'L HIGH SCHOOL | ② | S-57. SALINUNGAN NAT'L HIGH SCHOOL | ② |
| S-58. MAGUIJAN NAT'L HIGH SCHOOL | ② | S-59. TENAUNINI NAT'L HIGH SCHOOL | ② |
| S-60. SALINAS NAT'L HIGH SCHOOL | ② | S-61. MADDELA AGRO-INDUSTRIAL HIGH SCHOOL | ② |
| S-62. DIFFUN NAT'L HIGH SCHOOL | ② | S-63. PINARIPAD NAT'L HIGH SCHOOL | ② |
| S-64. QUIRINO GEN. HIGH SCHOOL | ② | S-65. DIVISORIA NAT'L HIGH SCHOOL | ② |
| S-66. CAGASAT NAT'L HIGH SCHOOL | ② | S-67. CALIGUIAN NAT'L HIGH SCHOOL | ② |
| S-68. ANGADANAN NAT'L HIGH SCHOOL | ② | | |
| REGION IV - SOUTHERN TAGALOG | | | |
| S-69. BALER NAT'L HIGH SCHOOL | ② | S-70. LUCSUHN NAT'L HIGH SCHOOL | ② |
| S-71. DACANLAO AGONCILLO NAT'L HIGH SCHOOL | ② | S-72. BAYBAYIN NAT'L HIGH SCHOOL | ② |
| S-73. MAYURO NAT'L HIGH SCHOOL | ② | S-74. DASMARINAS NAT'L HIGH SCHOOL (MAIN) | ② |
| S-75. CARVONA NAT'L HIGH SCHOOL | ② | S-76. TRECE MARTIREZ NAT'L HIGH SCHOOL | ② |
| S-77. KARAGONDON NAT'L HIGH SCHOOL | ② | S-78. PEDRO GUEVARA MEMORIAL HIGH SCHOOL | ② |
| S-79. SAN PEDRO RELOCATION NAT'L HIGH SCHOOL | ② | S-80. CAMP VICENTE LIM NAT'L HIGH SCHOOL | ② |
| S-81. LUTUKAN NAT'L HIGH SCHOOL | ② | S-82. LOPEZ NAT'L HIGH SCHOOL | ② |
| S-83. CLARO M. RECTO MEMORIAL HIGH SCHOOL | ③ | S-84. STA. CATALINA SUR HIGH SCHOOL | ② |
| S-85. STO. DOMINGO NAT'L HIGH SCHOOL | ③ | S-86. DAGATAN NAT'L HIGH SCHOOL | ② |
| S-87. CABAY NAT'L HIGH SCHOOL | ② | S-88. CALAUAG NAT'L HIGH SCHOOL | ② |
| S-89. GEN. LICERIO GERONIMO NEW L. HIGH SCHOOL | ② | S-90. ANGONO NAT'L HIGH SCHOOL | ② |
| S-91. BAYUGO NAT'L HIGH SCHOOL | ② | S-92. PINAVEKAN NAT'L HIGH SCHOOL | ② |
| S-93. BALETE NAT'L HIGH SCHOOL | ② | S-94. CAVITE NAT'L HIGH SCHOOL | ② |
| S-95. INOSLOBAN NAT'L HIGH SCHOOL | ② | S-96. PINACKAWITAN NAT'L HIGH SCHOOL | ② |
| S-97. SAN PABLO CITY NAT'L HIGH SCHOOL (ANNEX) | ② | S-98. SAN CELESTINO NAT'L HIGH SCHOOL | ③ |
| S-99. PAHARANG NAT'L HIGH SCHOOL | ③ | | |
| REGION VIII - EASTERN VISAYAS | | | |
| S-100. BAYRAY NAT'L HIGH SCHOOL | ③ | S-101. KANANGA NAT'L HIGH SCHOOL | ③ |
| S-102. ALANG-ALANG NAT'L HIGH SCHOOL | ② | S-103. BABATNCON NAT'L HIGH SCHOOL | ② |
| S-104. ICHON BARANGAY HIGH SCHOOL | ③ | S-105. DONCON NAT'L HIGH SCHOOL | ② |
| S-106. PANBUJAN NAT'L HIGH SCHOOL | ③ | S-107. SAN ISIDRO NAT'L HIGH SCHOOL | ② |
| S-108. CATARMAN NAT'L HIGH SCHOOL | ② | S-109. ORMOG NAT'L HIGH SCHOOL | ③ |
| S-110. SAGKAHAN NAT'L HIGH SCHOOL | ③ | S-111. BOOL HIGH SCHOOL | ③ |
| S-112. SAN ROQUE NAT'L HIGH SCHOOL | ③ | S-113. MAHO NAT'L HIGH SCHOOL | ③ |
| S-114. SAN JOAQUIN NAT'L HIGH SCHOOL | ③ | S-115. IPIL NAT'L HIGH SCHOOL | ③ |
| S-116. VALENCIA NAT'L HIGH SCHOOL | ③ | | |

2-3-3 Basic Design

The contents of the Project shall be designed based on those applied in the Phase I, II & III Projects. However, based upon the results of discussions with DECS, the following modifications provide improvements to those plans:

1. Connections of roofs and open areas such as windows and doors, should be enforced to withstand the strong typhoons recently experienced in the Philippines.
2. Science laboratory instruments shall be selected by taking into consideration the contents of the educational curriculums and teachers' opinions. In addition, items that can be procured in the Philippines with quality and quantity shall be adopted in order to make maintenance easier and to economize the Project costs.

Through the Phase I to III Projects, various improvements were also made to Project facilities. The major improvements were as follows:

- 1) Phase II Project's improvements made to the Phase I Project facility:
 1. Adopted a low pressure water supply system having an elevated water tank of 2m vice 4m height. It became possible to put well water by hands and rain water by gravity flow into the tank when water supply is suspended.
 2. The science laboratory and toilet that were in separate buildings in Phase I Project were combined into one building in order to provide more convenient and economical water supply and drainage systems.
 3. An air vent opening was provided at the upper part of the concrete block wall of the toilet.
- 2) Phase III Project's improvements made to the Phase II Project facility:
 1. The Phase II Project had 9 different types of classroom buildings having 3 to 9 classrooms. But, in the Phase III Project, only one building type having 3 classrooms was adopted to avoid concentration of schools in city areas where classroom demand is high, and to allocate as many schools as possible in economically disadvantaged rural areas.

2. In view of environmental preservation in the Philippines, wooden back boards of furniture unites were replaced with plastic boards.

(1) Site and Layout Plan

As the site conditions vary from school to school, the most adequate layout plan for each Project school shall be prepared after examining the school site configuration, infrastructure development conditions and the existing building arrangement. The main layout plan policies are as follows:

- 1) The arrangement of existing school facilities must be taken into consideration and the new buildings shall be arranged to match them.
- 2) A new building shall be constructed on flat area and sloping area shall be avoided to secure the solid soil bearing capacity.
- 3) By taking into account the prevailing wind directions and thereby utilizing natural ventilation to its maximum extent, new buildings will be constructed at sufficient distance from existing ones to allow wind gusts to pass between them.
- 4) A location that is liable to be damaged during typhoons or floods should be avoided.
- 5) A new building shall be arranged so as not to adversely affect existing facilities. The building shall be arranged to allow for the economical and easy installation of water supply, drainage facilities and electrical supply lines. Especially where there is no water supply, the location of the toilet and science laboratory should be carefully reconsidered with regard to the location of the well to be drilled by the Philippine side.
- 6) Toilets and science laboratories should be arranged independently away from the classroom buildings. Their arrangement should be made by taking into consideration the movement routes between them and existing facilities. Also, toilet locations should be decided upon by first giving careful consideration to the surrounding environment, such as odor problems.
- 7) Except for those schools having space limitations, classroom buildings

should be arranged in an east-west direction in view of the country's climatic conditions.

(2) Architectural Plan

A. Floor Plan

For the Project, the adopted room sizes were 8m x 7m for classrooms and 8m x 10.5 m for science laboratories. The minimum size of the module unit was 8m x 3.5 m (two units for classrooms and 3 units for science laboratories).

By arranging the concrete columns on the outer walls, the classroom will be rectangular in shape with no protrusions, allowing easy arrangement of furniture. For multipurpose use classrooms will have movable partitions (walls). The science laboratories will have work counters below the windows and five sinks. For secondary schools, science laboratories and toilets will be located next to each other. The water to the laboratory will be supplied by the cistern for the toilet.

To be prepared for rainy seasons, a 1.8 m wide outer corridor will be built on each facility. A slope and a special toilet will be set up for physically handicapped people. Table 2-11 shows the comparison of project facility features to those having Philippine standards.

Table 2-11 Comparison of Project Facility Features to Those Having Philippine Standards

| Structure | Type | Year Constructed | Clrm. Size (mxm) |
|-------------|--|------------------|------------------|
| Wood/Timber | Gabalton Type | 1910 | 7.00x9.00 |
| | Army Type | 1950 to 1960 | 6.00x7.00 |
| | Magsaysay Type | 1950 | 6.00x7.00 |
| Steel | Marcos Pre-Fab. | early 1970's | 6.00x7.00 |
| | Typhoon Resistant Schoolbuilding Project I - V | 1989 to 1994 | 6.75x8.00 |
| | FYR Type | 1993 | 7.00x8.00 |
| | Demountable Schoolbuilding | 1994 to 1995 | 7.00x8.00 |
| Concrete | R. P. /U. S. Bayanihan (funded by USAID) | 1973 | 6.00x7.35 |
| | Bagong Lipunan Type I - III | 1970 to 1984 | 6.00x8.00 |
| | Imelda Type | 1983 | 6.00x8.00 |
| | BSF (funded by USAID) | 1982 | 6.00x8.00 |
| | Pagcor/PMS (President's Social Fund) | 1988 to present | 6.00x8.00 |
| | SEDP (funded by ADB) | 1988 to 1995 | 7.20x8.00 |
| | LGIF (Local Government Infrastructure Fund) | 1994 (planning) | 7.00x8.00 |
| | The Project for the Improvement of Educational Facilities (Phase I, II, III) | 1993 to 1995 | 7.00x8.00 |
| | The Project for the Improvement of Educational Facilities (Phase IV) | 1996 | 7.00x8.00 |

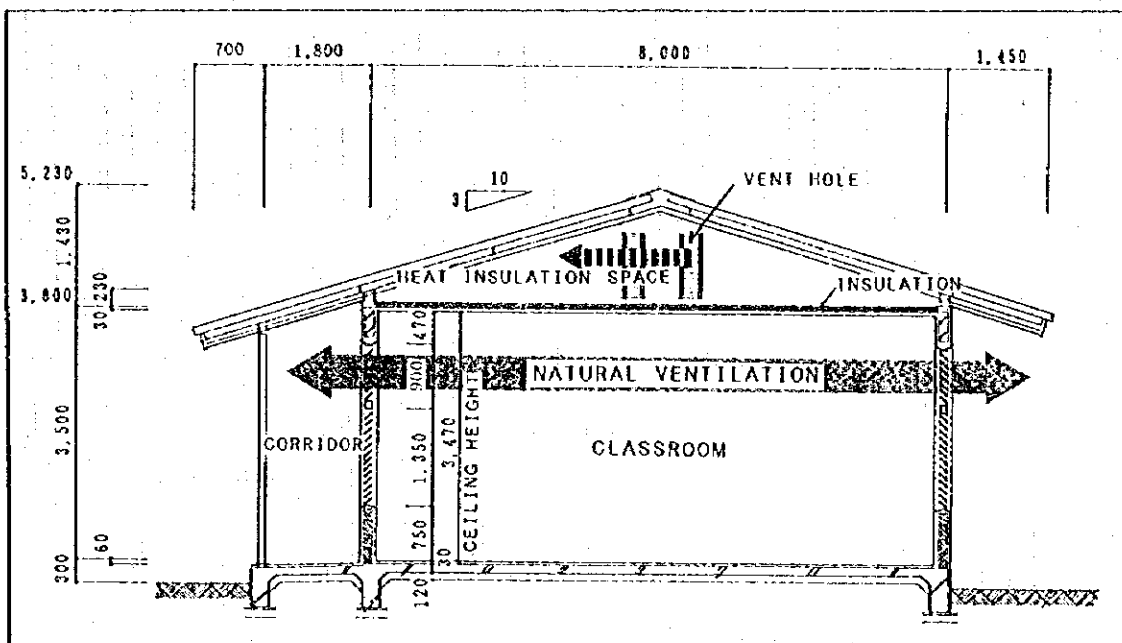
B. Section Plan

The standard height of the ceiling of classroom is from 2.7m to 3.0m and classrooms are usually without suspended ceilings in the Philippines. For this Project, the section plan was prepared so that classroom activities could be conducted comfortably as the Philippines is located in the tropical climate zone. An air vent will be installed in the loft to ease temperature rises. Insulation will be installed on the suspended ceiling to prevent heat from being transmitted into the classroom. Large windows will be provided to allow natural ventilation.

Eave lengths were examined from the viewpoint of intercepting direct sunshine, rain and wind. As a result, it was decided to have eave lengths of 2.5 m (1.8 m from the building walls to the center of the corridor columns and 0.70 m to the tip of the eaves). On the other side of the building, the eaves are to be 1.45 m. Considering the heat in the classrooms, the ceiling height will be 3.47 m.

The standard section is shown in Figure 2-2. To allow odors to escape from the toilets, ventilation blocks will be installed in the walls.

Fig. 2-2 Standard Section of Project Buildings



C. Structure Plan

1. Construction Method:

The structures will be built employing Philippine construction methods and will have reinforced-concrete columns and beams with trussed roofs. Local construction materials are not of uniform quality and the working conditions of the laborers in the Philippines are different from that of Japan. These factors will be taken into account during planning.

2. Design Loads and External Forces

The design loads stipulated by the National Structural Code of the Philippines will be adopted for designing Project facilities. The Code divides the entire country into three zones according to the frequency of typhoons and wind speeds. However, the strictest codes will be adopted for the Project considering the severe damage inflicted on the educational facilities in the Philippines. The following design loads were used for the structure design:

- (1) Live Loads Roofs: 61.2 kg/m² (600 pa)
 Classroom Floors: 204.1 kg/m² (2,000 pa)
 Corridor Floors: 490.0 kg/m² (4,800 pa)

- (2) Wind Loads $P = C_e \cdot C_g \cdot g_s$
 Where P = wind load per square meter
 C_e = coefficient of height
 C_g = wind force coefficient
 g_s = wind speed at the building location

- (3) Seismic Force $V = Z \cdot I \cdot C / R_w$
 Where Z = 0.4 (area coefficient)

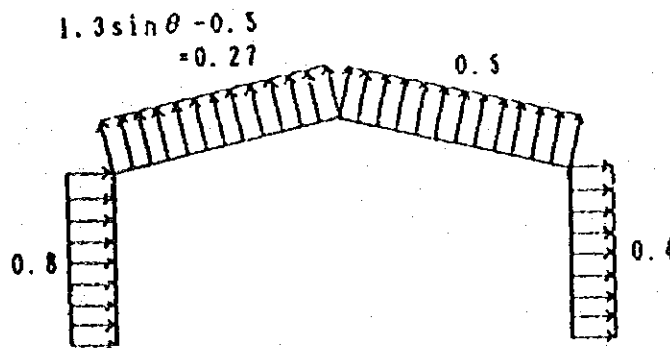
3. Building Structure Plan

Vertical forces, such as fixed loads and uplift forces of wind, should be taken by the 8 m span steel frame truss and reinforced concrete columns and beams. Horizontal forces, such as wind loads and seismic forces in the building's longitudinal direction should be taken by the rigidity of the reinforced concrete foundations and columns. Horizontal forces in the buildings' cross sectional direction should be taken by the rigidity of the reinforced concrete columns and frame structure.

At each Project school site simple penetration tests were conducted during the site survey to determine the bearing strength of the ground. The requested schools that had ground bearing strengths of less than 8 tons/m² were deleted from the list of Project schools. Thus, building structure design will be made on the bearing strength of 75 KN/m² (7.35 tons/m²).

Although some school sites have soil layers weaker than 8 tons/m² which are underlaid by more than 8 tons/m² at a depth of 1.5 to 2.0 m below ground surface, building structure design will be made based on the bearing strength of 8 ton/m² because the ground will be reinforced by placing rappel concrete. Wind force coefficients for building design are as shown in Figure 2-3.

Figure 2-3 Wind Force Coefficients



4. Structure Member Material

Two types of materials, wood and steel frames, can be used for the roof's steel frame trusses. As lumber products are difficult to procure in the Philippines, it was decided upon to adopt steel frames. The most commonly used equal angle section bars will be used.

As the quality of reinforcing bars and concrete may differ according to the region, quality control must be carefully conducted. Materials to be used for the Project must have the following strengths:

- a) Concrete: $F_c = 180 \text{ Kg/cm}^2$ 2,500 PSI
- b) Reinforcing Bars: $F_y = 2,376 \text{ Kg/cm}^2$ 33,000 PSI
- c) Steel Frames: $F_y = 2,592 \text{ Kg/cm}^2$ 36,000 PSI

D. Facility Plan

(1) Electrical Facility Plan:

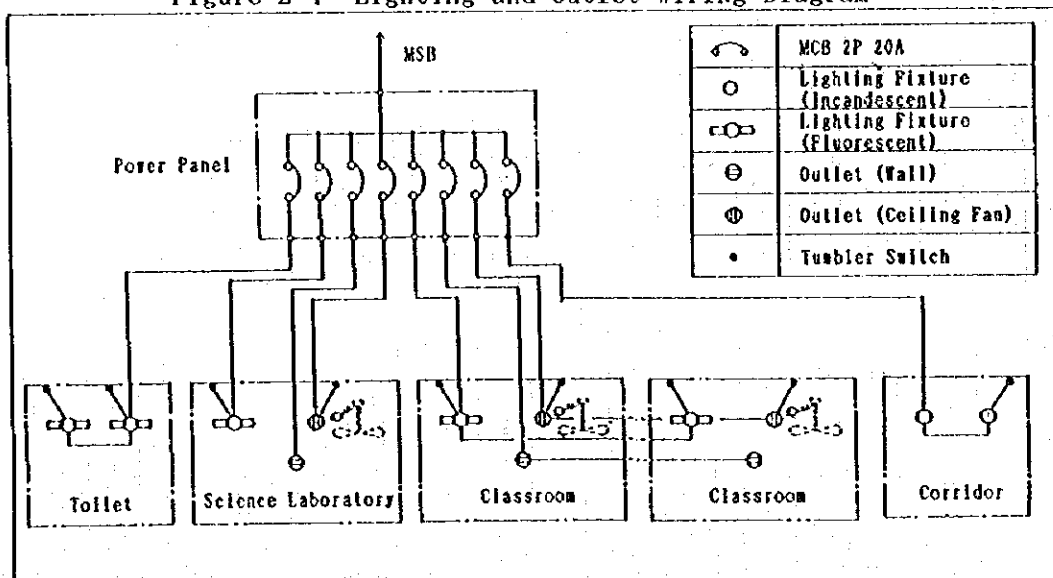
Project schoolbuildings will not only be used for ordinary classroom activities but also for non-formal education and as meeting places for area residents. It is assumed that the school buildings will also be used at night time. Thus, electrical facilities are planned to be installed in all Project school buildings. All materials for the electrical facilities will be procured in the Philippines. The installation of lighting fixtures, outlets, and ceiling fan receptacles is planned.

Electrical wiring and switches for ceiling fans is planned under the Project by taking into consideration the Philippine side's plan for future ceiling fans installation. The number of fluorescent lighting fixtures, outlets for ceiling fans, switches, and outlets per room are shown in Table 2-12. The lighting and outlet wiring diagram are shown in Fig. 2-4.

Table 2-12 The Designed Number of Electrical Appliance, Outlet and Switches per Room

| Type of Room | Fluorescent Lighting Fixtures | Incandescent Lighting Fixtures | Outlets (Ceiling Fans) | Switches | Outlets |
|-----------------------|-------------------------------|--------------------------------|------------------------|----------|---------|
| Classroom | 4 | 0 | 2 | 2 | 2 |
| Science Laboratory | 6 | 0 | 3 | 3 | 4 |
| Corridor | 0 | 1 | 0 | 1 | 0 |
| Toilets (Males) | 1 | 0 | 0 | 1 | 0 |
| Toilets (Females) | 1 | 0 | 0 | 1 | 0 |
| Toilets (Handicapped) | 1 | 0 | 0 | 1 | 0 |

Figure 2-4 Lighting and Outlet Wiring Diagram



Note: Only the conduit but not the lighting fixtures will be installed to those schools that not having power supplies.

(2) Water Supply Facility Plan:

Water supply method by gravity flow from elevated water tank located 4m above the ground with electrical pump to lift up water from city water line or well was adopted for the "Projects for Constructing Primary and Secondary School Buildings (Phase I-IV)".

It was found out that water supply conditions were very unstable. Although some of the Project schools have city water supplies, stable water supplies were not maintained due to the malfunctioning of electrical pumps, difficulty in securing water sources in dry season, and excessive pressure drops. Even at schools having their own wells, it was very difficult to maintain a stable water supply because of the malfunctioning of electrical pumps and insufficient amount of well water.

To improve this situation, hand pump, which has less maintenance problem, was adopted for the "Projects for Constructing Primary and Secondary School Buildings (Phase V)" and the Phase I of the Project. For the Phase II of the Project, it was decided that supply of water pumps to be shouldered by the Philippines side due to the lack of information regarding the depth of water table which is vital for the selection of types of hand pumps. Also, a low pressure water supply system having an elevated water tank of 2m vice 4m height was adopted to enable to put water from neighborhood by hands.

Although there were problems with the quality of rain water and with roof trough maintenance, it would be most useful to utilize rainwater in emergency situations. Thus, it was planned to install roof troughs so that rainwater could be used in toilets and science laboratories. The same water supply method shall be applied to this Project.

Cistern: Reinforced concrete

Volume: 1.16 m³ (toilet)

1.20 m³ (toilet + science laboratory)

Water supply piping: PVC pipes

Gutter : PVC gutter

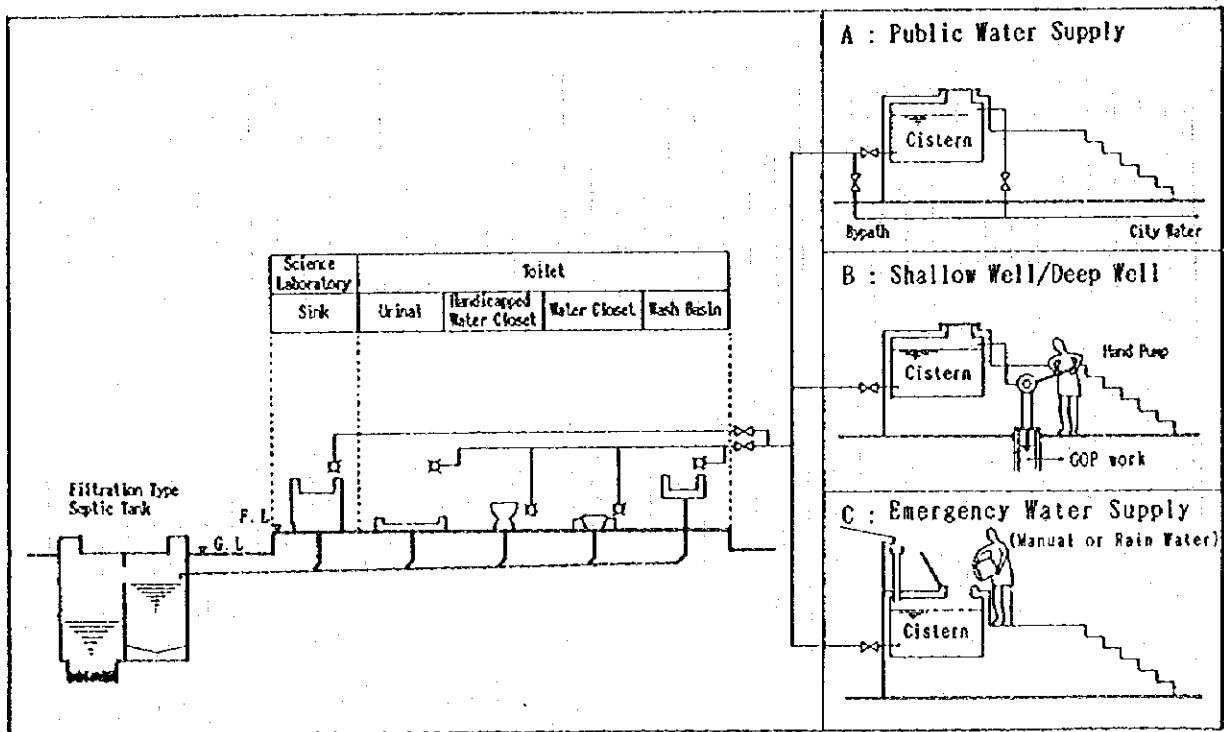
Down spout : PVC pipes

(3) Sewerage Facility Plan:

It will be necessary to install sewage treatment facilities for sewage of toilet wash basins, urinals, and water closets, and waste water from science laboratory sinks. It is planned to treat sewage and waste water using the combined system of simple infiltration and septic tanks commonly used in the Philippines. The water supply and sewerage system is as shown in Fig. 1-5. The sewerage facility includes the following items:

- . Water Closets: Squat type (2 in the boy's toilet; 3 in the girl's toilet)
Western type (1) (for handicapped pupils)
- . Urinals: Multiple unit type, partially tiled (1.7m)
- . Wash Basins: Reinforced-concrete and tiled.
Ready-made units will be used for handicapped toilet.
- . Piping Material: PVC pipe
- . Septic Tanks: Reinforced-concrete made; infiltration type

Figure 2-5 Water Supply and Sewerage System Diagram



E. School Building Material Plan

1. Basic Requirements:

In the Project, all building construction materials shall be obtained on the local market firstly, to minimize construction costs so that the maximum number of classrooms can be constructed and secondly, to simplify the completed buildings maintenance and management work.

2. Major Materials to be Used:

a) Structure Material

The reinforced concrete that is commonly used in the Philippines shall be used for foundations, columns and beams. As the quality of cement and aggregate material differ according to locality, quality control must be carefully conducted. As for truss structures to support roofs, wooden trusses are widely used throughout the country. However, as lumber is difficult to obtain in the Philippines, steel frame trusses shall be used for the Project.

b) Roofing Material

In the Philippines, most of the schools are roofed with zinc plated steel sheet; thus, leakage is occurring as a result of corrosion. For the Project, aluminum-zinc alloy plated steel sheets are to be used because some of the sites are along the coast and corrosion caused by sea water is prevalent.

c) Windows/Doors

Wooden jalousies are most commonly used in the Philippines and they agree with the country's climate. Jalousies shall be adopted for the Project. However, some Project schools presently are without power supplies; therefore, glass jalousies shall be installed to efficiently utilize natural lighting. By taking into account glass protection and security, steel-bar frames will be installed to each jalousie. As for doors, only the frames shall be made of steel. The door body shall be made of wood to allow for easy opening and closing.

d) Floors, Walls and Ceilings

Reinforced concrete will be used for floors as it is very durable, and be finished with colored cement mortar. Concrete blocks will be used for exterior walls in view of their insulation capability. Mortar will be put on the walls and painted. The inside partition walls will be made of hollow cement blocks, except walls where movable partitions are located, and ceilings will be made of painted plywood on lightweight steel frames. Ceilings will be painted plywood on wooden framings.

The major materials to be used for Project school buildings are shown in Table 2-13.

Table 2-13 Finish Materials to be Used for Project School buildings

| | Portion | Philippine Method | This Project's Method | Reason for Adoption |
|-----------------|-------------------------------------|---|--|---|
| Exterior Finish | Roofs | Zinc plated corrugated steel sheets | Aluminum-zinc plated steel sheets | Stronger anticorrosion resistance |
| | Underside of Eaves | Plywood | Marine Plywood with S.O.P. coating | Easy maintenance and durability |
| | Walls | Concrete blocks, mortar finish | Concrete blocks or bricks mortar finish with E.P. | Insulating effect and durability |
| | Windows | Wooden jalousies coated with S.O.P. | Glass jalousies (aluminum frame) | Maximize natural lighting |
| | Doors | Wooden doors | Wooden doors coated with S.O.P. finish (steel frame) | Durability and easy maintenance |
| | Baseboards | Cement mortar steel trowel finish | Cement mortar steel trowel finish | Durability and easy maintenance |
| | Corridor Floors | Cement mortar steel trowel finish | Cement mortar steel trowel finish | Durability and easy maintenance |
| | Septic Tanks | Reinforced concrete partially made of concrete blocks | Reinforced concrete and concrete block made (inside and outside tank tops are to be waterproof mortar steel trowel finish) | Durability and easy construction |
| Interior Finish | Classrooms and Science Laboratories | | | |
| | Floors | Reinforced concrete, mortar finish | Reinforced concrete, Colored cement mortar steel trowel finish | Durability |
| | Walls | Concrete blocks, mortar finish | Concrete blocks or bricks mortar with E.P., Plywood coated with O.P. (partition) | Easy maintenance and construction |
| | Ceilings | Plywood | Plywood coated with O.P. and insulation | Insulating effect |
| | Other Parts | | Work benches with sinks Ceramic tile finish (science laboratories only) | Easy maintenance and accurate finish work |
| | Toilets | | | |
| | Floors | Mortar finish | Mosaic tile | Easy maintenance |
| | Walls | Concrete blocks laying with E.P. finish | Concrete blocks or bricks, Mortar steel trowel finish with E.P. finish and partially decorative blocks | Easy maintenance |
| | Ceiling | No ceiling O.S. finish | Plywood with O.P. finish and insulation | Insulating effect |

(3) Equipment Plan

In order to fulfill the educational activities after the Project facilities are opened, proper equipment must be provided. Upon completion of the classrooms and science laboratories in the Project schools, various types of equipment will be used. Based on the contents of the request made by the Government of the Philippines for the Project and the results of the field surveys, the basic education equipment and science laboratory instruments will be provided as a part of the Project.

(1) Educational Equipment:

The selection of educational equipment was made by taking into consideration the standard types used in the elementary and secondary schools in the Philippines as well as the following aspects;

- 1) Desks and chairs for elementary school students shall be 2 person units.
- 2) Secondary school classrooms should be furnished with the desk-chair type for use by one person as is generally used in the Philippines.
- 3) Three-person type tables for the students and a demonstration workbench for the teacher (one workbench per room) should be installed in the science laboratories.
- 4) The storage cabinets to be provided in the science labs should have sufficient capacity to store the laboratory instruments.

As the equipment units to be provided by the Project will be used in elementary and secondary schools, they should be strong and durable, but not highly priced. The material for the units should be procured in the Philippines. By taking into consideration the availability of manufacturing technology and materials, the quality of materials to be used for the equipment should either be a combination of steel and plywood or plastic. The types of equipment and the number of units to be provided for each Project school classroom and science lab are listed in Table 2-14. The types of equipment and the number of units to be provided for each educational level are shown in Table 2-15.

Table 2-14 Equipment Types and Number of Units to be Provided for Each Project School Classroom

| | Name of Room | Name of Item | No. of Units for One Room | |
|--------------------|--------------------|--|---------------------------|---|
| Elementary Schools | Classroom | . Teacher's desk | 1 | |
| | | . Teacher's chair | 1 | |
| | | . Teacher's filing cabinet | 1 | |
| | | . Student's desks | 24 | |
| | | . Student's closets | 8 | |
| | | . Blackboard | 1 | |
| | | . Bulletin board | 1 | |
| Secondary Schools | Classroom | . Teacher's desk | 1 | |
| | | . Teacher's chair | 1 | |
| | | . Teacher's filing cabinet | 1 | |
| | | . Student's armchair | 42 | |
| | | . Student's closets | 8 | |
| | | . Blackboard | 1 | |
| | | | . Bulletin board | 1 |
| | Science Laboratory | . Experiment workbenches | 14 | |
| | | . Student's closets | 5 | |
| | | . Demonstration table | 1 | |
| | | . Stools (1 for Teacher, 42 for Students) | 43 | |
| | | . Blackboard | 1 | |
| . Bulletin board | | 1 | | |
| | | . Storage shelves | 1 | |
| | | . Steel shelves | 1 | |

Table 2-15 Equipment Types and Number of Units to be Provided for Each Educational Level

| Classroom Type | Region II | | | | | | | Region IV | | | | | | | Region VI | | | | | | | GRD. TTL | |
|--------------------------|---|---------|---|---------|--|---------|------|--|---------|---|---------|--|---------|------|---|---------|--|---------|---|---------|------|----------|------|
| | Elementary School ⁽¹⁾ (6) | | Secondary School ⁽²⁾ (14) | | Secondary School ⁽³⁾ (9) | | TTL | Elementary School ⁽¹⁾ (30) | | Secondary School ⁽²⁾ (27) | | Secondary School ⁽³⁾ (8) | | TTL | Elementary School ⁽¹⁾ (9) | | Secondary School ⁽²⁾ (6) | | Secondary School ⁽³⁾ (12) | | TTL | | |
| | For one Sch. | Sub TTL | For one Sch. | Sub TTL | For one Sch. | Sub TTL | | For one Sch. | Sub TTL | For one Sch. | Sub TTL | For one Sch. | Sub TTL | | For one Sch. | Sub TTL | For one Sch. | Sub TTL | For one Sch. | Sub TTL | | | |
| Teacher's desk | 3 | 18 | 3 | 42 | 3 | 27 | 87 | 3 | 90 | 3 | 69 | 3 | 24 | 183 | 3 | 27 | 3 | 15 | 3 | 36 | 78 | 348 | |
| Teacher's chair | 3 | 18 | 3 | 42 | 3 | 27 | 87 | 3 | 90 | 3 | 69 | 3 | 24 | 183 | 3 | 27 | 3 | 15 | 3 | 36 | 78 | 348 | |
| Teacher's filing cabinet | 3 | 18 | 3 | 42 | 3 | 27 | 87 | 3 | 90 | 3 | 69 | 3 | 24 | 183 | 3 | 27 | 3 | 15 | 3 | 36 | 78 | 1080 | |
| Student's desk (Large) | 24 | 144 | - | - | - | - | 144 | 24 | 720 | - | - | - | - | 720 | 24 | 216 | - | - | - | - | - | 216 | 1080 |
| Student's desk (Medium) | 24 | 144 | - | - | - | - | 144 | 24 | 720 | - | - | - | - | 720 | 24 | 216 | - | - | - | - | - | 216 | 1080 |
| Student's desk (Small) | 24 | 144 | - | - | - | - | 144 | 24 | 720 | - | - | - | - | 720 | 24 | 216 | - | - | - | - | - | 216 | 1080 |
| Armchair | - | - | 126 | 1764 | 126 | 1134 | 2898 | - | - | 126 | 2898 | 126 | 1098 | 3906 | - | - | 126 | 630 | 126 | 1512 | 2142 | 8946 | |
| Student's closet | 24 | 144 | 29 | 406 | 24 | 216 | 766 | 24 | 720 | 29 | 667 | 24 | 192 | 1579 | 24 | 216 | 29 | 145 | 24 | 288 | 649 | 2994 | |
| Experiment workbench | - | - | 14 | 196 | - | - | 196 | - | - | 14 | 322 | - | - | 322 | - | - | 14 | 70 | - | - | 70 | 588 | |
| Demonstration table | - | - | 1 | 14 | - | - | 14 | - | - | 1 | 23 | - | - | 23 | - | - | 1 | 5 | - | - | 5 | 42 | |
| Stool | - | - | 43 | 602 | - | - | 602 | - | - | 43 | 989 | - | - | 989 | - | - | 43 | 215 | - | - | 215 | 1806 | |
| Blackboard | 3 | 18 | 4 | 56 | 3 | 27 | 101 | 3 | 90 | 4 | 92 | 3 | 24 | 206 | 3 | 27 | 4 | 20 | 3 | 36 | 83 | 390 | |
| Bulletin board | 3 | 18 | 4 | 56 | 3 | 27 | 101 | 3 | 90 | 4 | 92 | 3 | 24 | 206 | 3 | 27 | 4 | 20 | 3 | 36 | 83 | 390 | |
| Storage shelf | - | - | 1 | 14 | - | - | 14 | - | - | 1 | 23 | - | - | 23 | - | - | 1 | 5 | - | - | 5 | 42 | |
| Steel shelf | - | - | 1 | 14 | - | - | 14 | - | - | 1 | 23 | - | - | 23 | - | - | 1 | 5 | - | - | 5 | 42 | |

(2) Science Laboratory Instruments:

Science laboratory instruments were selected from the subjects which were conducted in the science laboratory, i.e. general science, biology, chemistry and physics. Science instruments only available in Japan were included in the Project, and those obtainable in the Philippines were to be procured by DECS but were not obtained due to insufficient DECS funds. As a result, science teachers faced difficulties in conducting appropriate science experiments. Thus, the contents of instruments were improved in the 3rd phase of the Project, by including such necessary instruments.

In this Project, further improvement was made by taking into consideration of conformity with curriculum and easy handling for teachers. Items which can be procured in the Philippines with quality and quantity should be adopted in order to make the maintenance easier.

Instruments that require electrical facilities, chemicals that are difficult to obtain and consumable items, such as chemicals, were excluded from the Project.

Among the 71 secondary schools qualified for the project, 40 Project secondary schools have already been provided with science laboratory equipment units by other foreign aided projects. Thus, these schools will not receive science laboratory equipment under this Project. As a result, 31 schools were evaluated as recipient schools of science laboratory instruments. Schools with science laboratory equipment provided by other financial aid organizations are listed in Table 2-16. List of science laboratory equipment recipient schools is shown in Table 2-17. The list of science laboratory instruments to be provided to each school is shown in Table 2-18.

Table 2-16 List of Science Laboratory Equipment Recipient Schools

| | |
|---|---|
| REGION II - CAGAYAN VALLEY | |
| S-48. CAGAYAN NATIONAL HIGH SCHOOL(LINAO EXT.) | S-49. CAGAYAN NAT'L HIGH SCHOOL(CATAGAMAN EXT.) |
| S-59. PATTAO NATIONAL HIGH SCHOOL | S-55. DEEPIN ALBANO NATIONAL HIGH SCHOOL |
| S-57. SALINUNGAN NATIONAL HIGH SCHOOL | S-58. NAGUELIAN NATIONAL HIGH SCHOOL |
| S-60. SALINAS NATIONAL HIGH SCHOOL | S-61. MADDELA AGRO-INDUSTRIAL HIGH SCHOOL |
| S-62. DIFEUN NATIONAL HIGH SCHOOL | S-68. ANGADANAN NATIONAL HIGH SCHOOL |
| REGION IV - SOUTHERN TAGALOG | |
| S-69. BALER NATIONAL HIGH SCHOOL | S-72. BAYBAYIN NATIONAL HIGH SCHOOL |
| S-73. MAYURA NATIONAL HIGH SCHOOL | S-74. DASMARINAS NATIONAL HIGH SCHOOL |
| S-75. CARMONO NATIONAL HIGH SCHOOL | S-76. TRECE MARTINEZ NATIONAL HIGH SCHOOL |
| S-81. LUTUKAN NATIONAL HIGH SCHOOL | S-84. STA. CATALINA SUR HIGH SCHOOL |
| S-87. CAHAY NATIONAL HIGH SCHOOL | S-88. CALAUAG NATIONAL HIGH SCHOOL |
| S-89. GEN. LICERIO GERONIMO MEM'L. HIGH SCHOOL | S-91. BAYUGO NATIONAL HIGH SCHOOL |
| S-92. PINAMUCKAN NATIONAL HIGH SCHOOL | S-93. BALETE NATIONAL HIGH SCHOOL |
| S-94. CAVITE NATIONAL HIGH SCHOOL | S-96. PINACKAWITAN NATIONAL HIGH SCHOOL |
| S-97. SAN PABLO CITY NATIONAL HIGH SCHOOL (ANNEX) | |
| REGION VIII - EASTERN VISAYAS | |
| S-102. ALANG-ALANG NATIONAL HIGH SCHOOL | S-103. BABATAGON NATIONAL HIGH SCHOOL |
| S-105. DONGON NATIONAL HIGH SCHOOL | S-111. BOOL HIGH SCHOOL |

Table 2-17 Project Schools with Science Laboratory Equipment Provided by Other Foreign Aid Programs

| School No. | Name of School | HICA | SEDP | PASMEP | ESEP | ESP |
|--------------------------------------|---|------|------|--------|------|-----|
| REGION II - CAGAYAN VALLEY | | | | | | |
| S-46 | CAGAYAN NATIONAL HIGH SCHOOL | | | | ○ | |
| S-47 | PATTAO NATIONAL HIGH SCHOOL(MAIN) | | | ○ | | |
| S-51 | BAGA NATIONAL HIGH SCHOOL | | ○ | | | |
| S-52 | ISABELA NATIONAL HIGH SCHOOL | | | ○ | ○ | |
| S-53 | ROXAS NATIONAL HIGH SCHOOL | | ○ | | | |
| S-54 | RIZAL NATIONAL HIGH SCHOOL | | | ○ | | |
| S-56 | DOSA AURORA NATIONAL HIGH SCHOOL | | | | ○ | |
| S-59 | TUMAUINI NATIONAL HIGH SCHOOL | | ○ | | | |
| S-63 | PINARIPAD NATIONAL HIGH SCHOOL | | | ○ | ○ | |
| S-64 | QUIRINO GENERAL HIGH SCHOOL | | | ○ | | |
| S-65 | DIVISORIA NATIONAL HIGH SCHOOL | | ○ | | | |
| S-66 | CAGASAT NATIONAL HIGH SCHOOL | | ○ | | | |
| S-67 | CALIGUIAN NATIONAL HIGH SCHOOL | | | ○ | | |
| REGION IV - SOUTHERN TAGALOG | | | | | | |
| S-70 | LUCSUN NATIONAL HIGH SCHOOL | ○ | | | | |
| S-71 | DACANLAO AGONCILLO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-77 | MARAGONDON NATIONAL HIGH SCHOOL | ○ | | | | |
| S-78 | PEPRO GUEYARA MEMORIAL HIGH SCHOOL | | ○ | | ○ | |
| S-79 | SAN PEDRO RELOCATION NATIONAL HIGH SCHOOL | | | | | ○ |
| S-80 | CAMP VICENTE LEM NATIONAL HIGH SCHOOL | ○ | | | | |
| S-82 | LOPEZ NATIONAL HIGH SCHOOL | | ○ | | | |
| S-83 | CLARO M. RECTO MEMORIAL HIGH SCHOOL | | ○ | | | |
| S-85 | STO. DOMINGO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-86 | DACATAN NATIONAL HIGH SCHOOL | ○ | | | | |
| S-90 | ANGONO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-95 | INGLOBAN NATIONAL HIGH SCHOOL | ○ | | | | |
| S-98 | SAN CELESTINO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-99 | PAIARANG NATIONAL HIGH SCHOOL | | ○ | | | |
| REGION VIII - EASTERN VISAYAS | | | | | | |
| S-100 | BAYBAY NATIONAL HIGH SCHOOL | | ○ | | | |
| S-101 | KANANGA NATIONAL HIGH SCHOOL | | ○ | | | |
| S-104 | ICION BARANGAY HIGH SCHOOL | | ○ | | | |
| S-106 | PANBUJAN NATIONAL HIGH SCHOOL | | ○ | | | |
| S-107 | SAN ISIDRO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-108 | CATARKAN NATIONAL HIGH SCHOOL | ○ | | | | |
| S-109 | GRMOC NATIONAL HIGH SCHOOL | | ○ | | | |
| S-110 | SAGKALAN NATIONAL HIGH SCHOOL | | ○ | | | |
| S-112 | SAN ROQUE NATIONAL HIGH SCHOOL | | ○ | | | |
| S-113 | BARO NATIONAL HIGH SCHOOL | | ○ | | | |
| S-114 | SAN JOAQUIN NATIONAL HIGH SCHOOL | | ○ | | | |
| S-115 | IPIL NATIONAL HIGH SCHOOL | | ○ | | | |
| S-116 | VALENCIA NATIONAL HIGH SCHOOL | | ○ | | | |

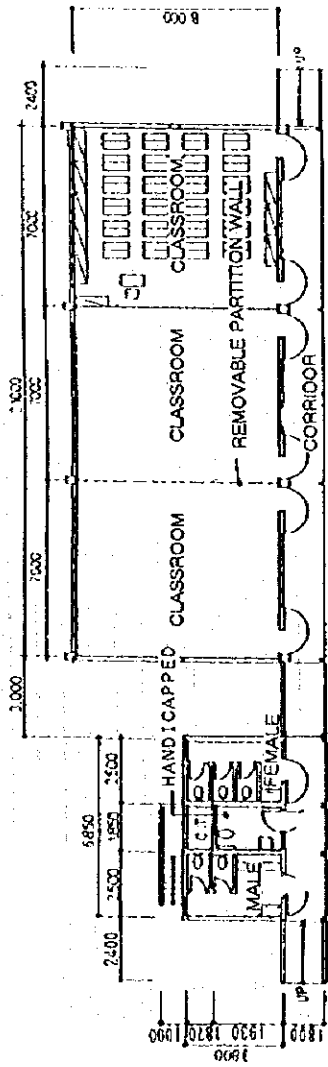
Table 2-18 List of Science Laboratory Instruments to be Provided To Each School

| Subject | Description | Specification | Quantity |
|---|---|--|----------|
| Science & Technology I (General Science) | 1. Platform Balance | Capacity 200g | 4 |
| | 2. Hand Lens | 75mm diameter | 8 |
| | 3. Magnetic Compass | 45mm diameter | 8 |
| | 4. Stop Watch | Digital | 8 |
| | 5. Mercury Thermometer | Range -5 to 105°C | 8 |
| | 6. Mercury Thermometer | Range -20 to 50°C | 1 |
| | 7. Mercury Thermometer | Range 0 to 300°C | 1 |
| | 8. Terrestrial Globe | 300mm diameter | 1 |
| | 9. Graduated Cylinder | Capacity 10ml | 8 |
| | 10. Alcohol Burner | Capacity 120ml | 8 |
| | 11. Beaker | Capacity 50ml | 8 |
| | 12. Beaker | Capacity 100ml | 8 |
| | 13. Beaker | Capacity 200ml | 8 |
| | 14. Beaker | Capacity 500ml | 8 |
| | 15. Evaporating Dish | 50mm diameter | 8 |
| | 16. Vesterstick | Hardwood | 8 |
| | 17. Cork Stopper | 150 sets | 2 |
| | 18. Cork Borers | 12 bits | 1 |
| | 19. Cork Squeezer | Cast iron body | 1 |
| Science & Technology II (Biology) | 1. Compound Microscope | Fine adjustment, lens cleaning solution | 4 |
| | 2. Slide Glass | 50 pcs/set | 8 |
| | 3. Cover Glass | 100 pcs/set | 8 |
| | 4. Mitosis Model | Hard resin | 1 |
| | 5. Chart on Chromosomes | | 1 |
| | 6. Chart on Dominance | | 1 |
| | 7. Dissecting Set | With wooden case | 8 |
| | 8. Dissecting Pans | Metal made | 8 |
| | 9. Petri Dish | 90mm diameter | 8 |
| | 10. Mortar and Pestle | 120mm diameter | 8 |
| | 11. Test Tube | 15mm diameter, 50 pcs/set | 1 |
| | 12. Test Tube | 18mm diameter, 50 pcs/set | 1 |
| | 13. Test Tube Stand | 6 test tube stand, wooden made | 8 |
| | 14. Test Tube Box | Polypropylene made | 1 |
| | 15. Medicine Dropper | Polyethylene made | 8 |
| | 16. Medicine Dropper | Glass made | 8 |
| Science & Technology III (Chemistry) | 1. Triple Beam Balance | Capacity 2500g | 4 |
| | 2. Graduated Cylinder | Plastic made, 100ml | 8 |
| | 3. Graduated Cylinder | Glass made with safety ring, 100ml | 8 |
| | 4. Erlenmeyer Flask | 250 ml | 1 |
| | 5. Flask round bottom | 250 ml | 8 |
| | 6. Pipet | 10 ml | 8 |
| | 7. Iron Stand | Universal type, h=700m | 8 |
| | 8. Tripod and Wire Gauge | 85 mm diameter, h=100m | 8 |
| | 9. Evaporating Dish | 90mm diameter | 8 |
| | 10. Test Tube Holder | Wooden made | 8 |
| | 11. Glass Tube | 5 kinds/set | 8 |
| | 12. Watch Glass | 100mm diameter | 8 |
| | 13. Funnel | 90mm diameter | 8 |
| | 14. Stirring Rod | 1-300m, glass made | 8 |
| | 15. Spoon | S.M.L size, stainless steel | 1 |
| Science & Technology IV (Physics) | 1. Convex and Concave Mirrors | 50mm diameter, Focal length=75mm, 150mm, 300mm | 8 |
| | 2. Spring Balance (Newton) | 2.5×0.1N/dynes, 10×0.2N/dynes | 8 |
| | 3. Dynamic Carts | Two pulleys and one test bench | 8 |
| | 4. Electroscope | Quadrant scale 0° to 90°, in step of 9° | 1 |
| | 5. Prism Set (Equilateral) | 3 prisms, iron stand | 1 |
| | 6. Magnet | U-shape | 4 |
| | 7. Magnet | Alcomax | 4 |
| | 8. Magnet | Bar | 4 |
| | 9. Multi-tester | Analog | 4 |
| | 10. Logic Gates (For Teachers) | | 1 |
| | Logic Gates (For Students) | | 7 |
| | 11. Set of Tuning Forks | 8 kinds/set | 1 |
| | 12. Resonance Apparatus | Plastic made, 40×300mm | 1 |
| | 13. Electric Motor Generator | Transparent plastic case | 4 |
| | 14. Scientific Calculator | With solar battery | 8 |
| | 15. Biconcave and Biconvex Lens Set | 50mm diameter | 1 |
| | 16. Lead Line with Alligator Clip Attached | 20 leads | 8 |
| | 17. Electric Circuit Experimental Apparatus | With case | 4 |
| | 18. Copper Wire | 0.3mm, 0.5mm, 1.0mm diameter | 1 |
| | 19. Vacuum Experimental Equipment | Manual vacuum pump | 1 |
| | 20. Water Pressure Sensor | Plastic made | 8 |
| 21. Water Wave Projector | Sunlight type | 1 | |

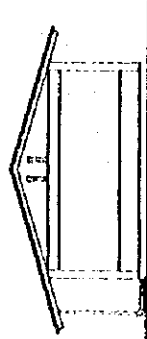
(4) Basic Design Drawings

Drawing List

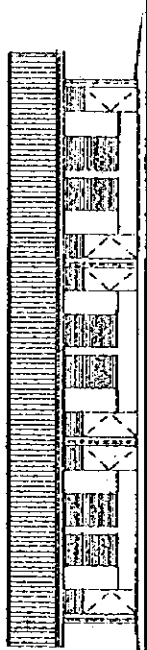
| <u>No.</u> | <u>Title</u> |
|------------|--|
| 01 | Elementary School Type 1 Plan, Elevations, Sections |
| 02 | Secondary School Type 2 Plan, Elevations, Section |
| 03 | Secondary School Type 3 Plan, Elevations, Sections |



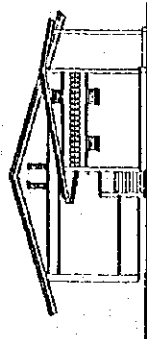
FLOOR PLAN



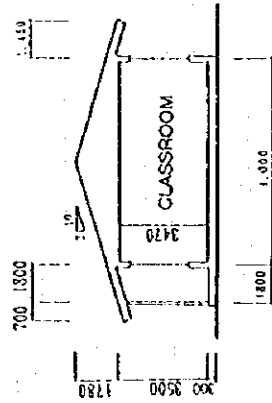
LEFT SIDE ELEVATION



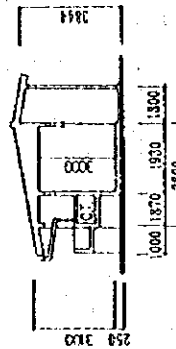
FRONT ELEVATION



RIGHT SIDE ELEVATION



SECTION OF CLASSROOM BUILDING



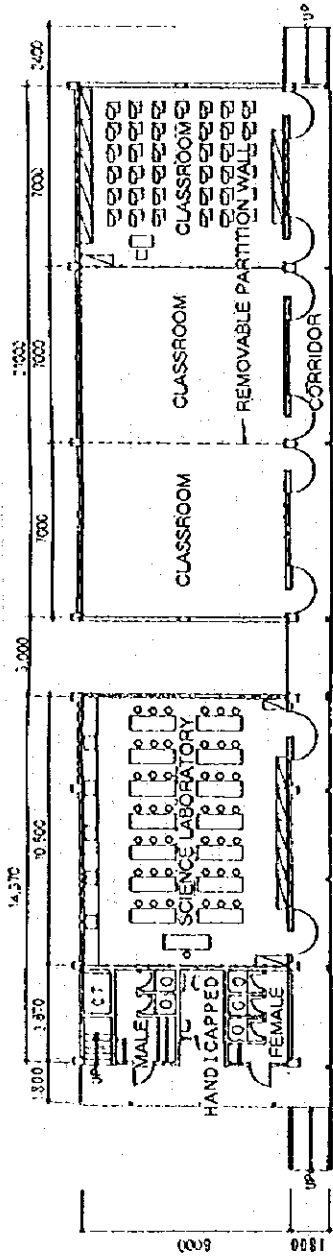
SECTION OF TOILET BUILDING

THE PROJECT FOR THE IMPROVEMENT OF EDUCATIONAL FACILITIES (PHASE IV)

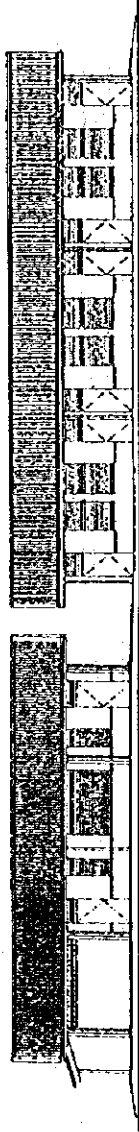


ELEMENTARY SCHOOL TYPE
FLOOR PLAN, ELEVATIONS
& SECTIONS

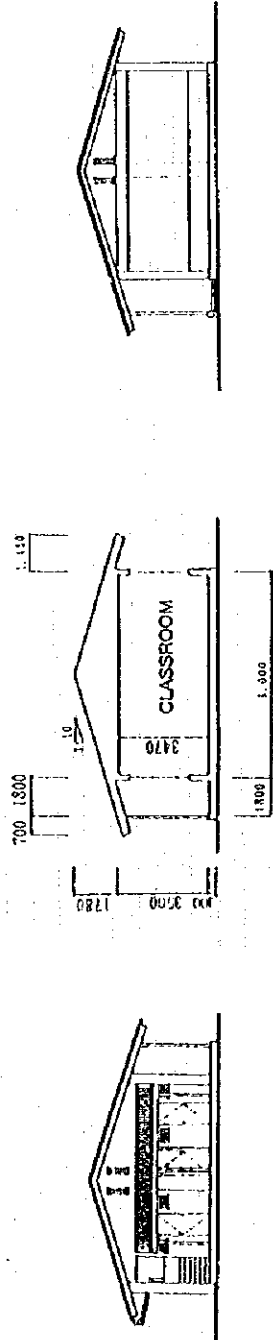
01



FLOOR PLAN



FRONT ELEVATION



LEFT SIDE ELEVATION

SECTION OF CLASSROOM BUILDING

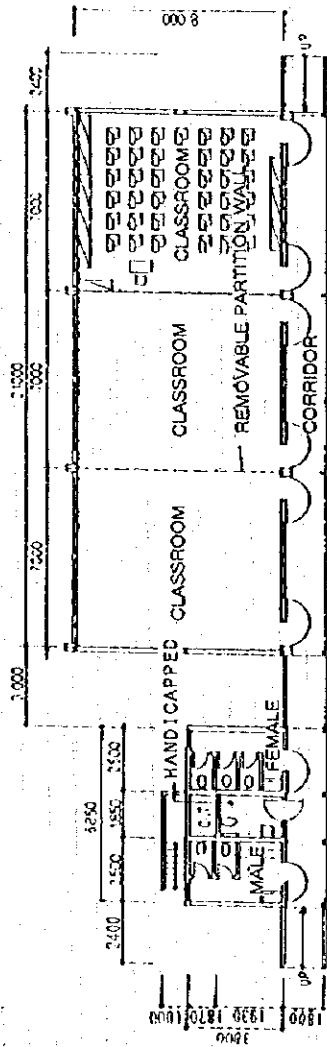
RIGHT SIDE ELEVATION

THE PROJECT FOR THE IMPROVEMENT OF EDUCATIONAL FACILITIES (PHASE IV)

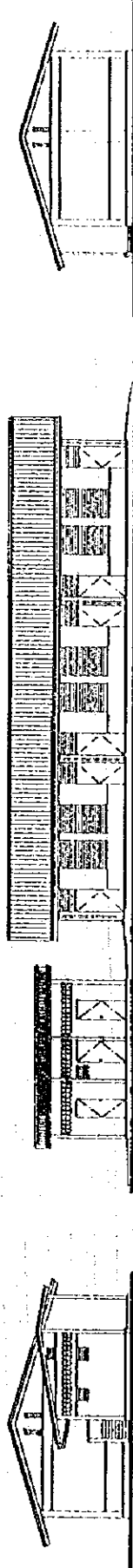
SECONDARY SCHOOL TYPE ②
FLOOR PLAN, ELEVATIONS
& SECTION



02



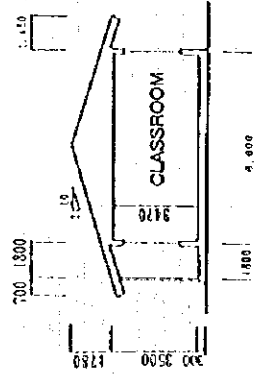
FLOOR PLAN



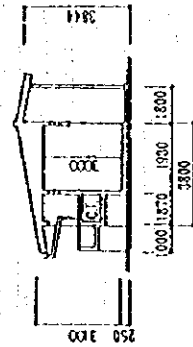
LEFT SIDE ELEVATION

FRONT ELEVATION

RIGHT SIDE ELEVATION



SECTION OF CLASSROOM BUILDING



SECTION OF TOILET BUILDING

THE PROJECT FOR THE IMPROVEMENT OF EDUCATIONAL FACILITIES (PHASE IV)

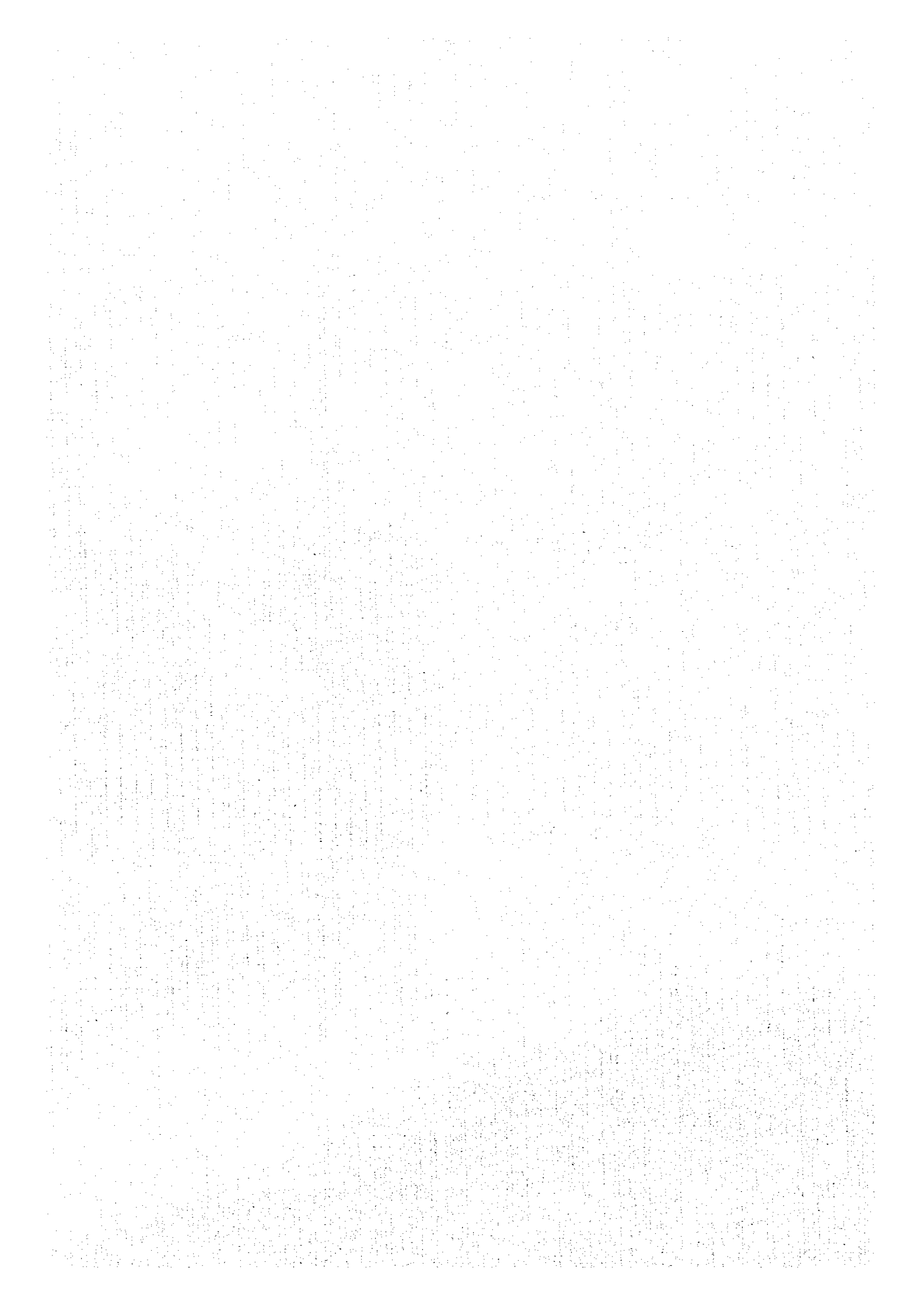
SECONDARY SCHOOL TYPE ③
FLOOR PLAN, ELEVATIONS
& SECTIONS

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CHAPTER 3. IMPLEMENTATION PLAN



CHAPTER 3 IMPLEMENTATION PLAN

3-1 Implementation Plan

3-1-1 Implementation Concept

This plan aims to construct a number of school buildings in wide area consisting of Regions II, IV and VIII which stretches about 920 km from north to south and 460 km from east to west, within a limited period of time. An appropriate construction plan was made by obtaining the existing site situations. Main policies on the construction plan are described below.

- 1) It is impossible to construct all project facilities within one fiscal year. Thus, the project should be divided into 2 stages, so that each stage of the Project can be completed within one fiscal year, and thus the whole project within two fiscal years.
- 2) The construction plan should take into consideration of the local conditions of laborers, construction methods and common practice in the Philippines.
- 3) To ensure smooth implementation of the project, a headquarter will be established in Metro Manila and construction bases will supervise the construction activities in each region under the supervision from the headquarter.
- 4) Those in charge of construction at each school will be consulted prior to formulation of the construction plan to avoid problems which may arise from the simultaneous construction of multiple school buildings.
- 5) Because the facilities are constructed on the premises of the existing school, effects to educational activities and security of students will be sufficiently considered.
- 6) At schools without electricity, small generators must be used. With regard to the use of water for construction purposes, public water or well water will be used.

- 7) Throughout the construction period, the maintenance of security and prevention of theft at the construction site will be considered.

3-1-2 Implementation Conditions

Because the quality of the reinforced concrete for this plan depends significantly on the work situation at the site, and due to the pressure for accurate work, allowances will be made for differing standards of work between sites. In addition, under the guidance of the Japanese consultants, local consultants must closely supervise each step of construction. Reliable subcontractors and laborers must be used. A specialist must be dispatched to the schools to provide instructions on how to use the science laboratory equipment.

Reliable implementation of the construction is to be borne by the Government of the Philippines (refer to 3-1-7 obligation of Recipient Country). Without proper development of the construction site, construction cannot begin. Therefore, work instructions must be given so that the Philippine side can implement proper development work without delay.

3-1-3 Scope of Work

Table 3-1 shows the division of work between the Japanese and Philippine sides. The detailed cost estimation to be borne by the Philippines are listed in the appendices attached at the end of this report.

Table 3-1 Scope of Work

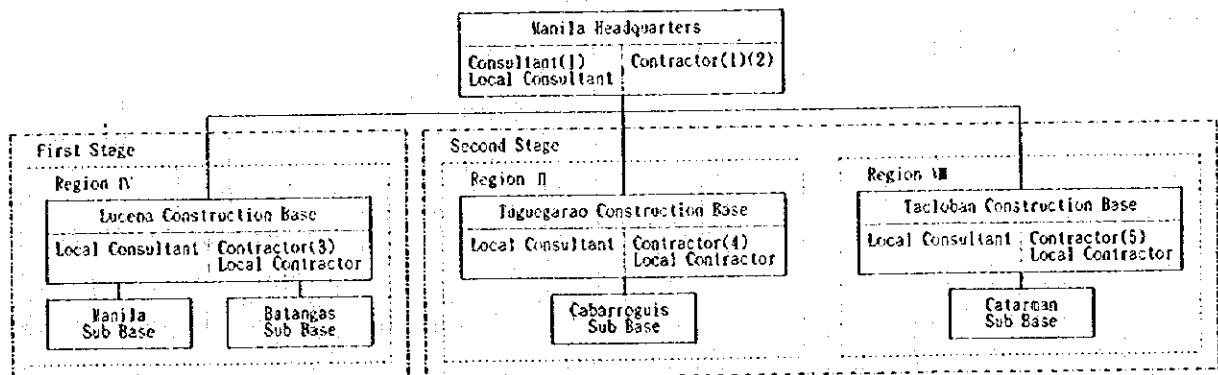
| Work Items | Japanese Side | Philippine Side |
|---|---------------|-----------------|
| 1. Site clearing work before school building construction | | ○ |
| 2. Removal/demolition of existing facilities at school sites before the commencement of school building construction | | ○ |
| 3. Removal of rocks and obstructions at school sites before the commencement of school building construction | | ○ |
| 4. Associated exterior work, such as landscaping and fencing | | ○ |
| 5. Construction of access roads to the Project sites prior to the commencement of school building construction | | ○ |
| 6. School building construction | ○ | |
| 7. To provide facilities for distribution of electricity 1) The distributing line to the site 2) The drop wiring and internal wiring within the buildings | ○ | ○ |
| 8. Water Supply 1) Securing of water source for toilet and science laboratory use and installation of water supply lines up to the sisterns 2) Installation of sisterns and water supply system from sisterns | ○ | ○ |
| 9. Equipment (educational equipment, science laboratory instruments) | ○ | |

3-1-4 Consultant Supervision

The Project area is 42 thousand km² which is double the area of the 3rd Phase Project. The number of the Project schools has also increased from 69 schools in the 3rd Phase to 116 schools. Furthermore, many project schools have poor access conditions. Thus, it can be concluded that it is impossible to construct all the project schools within one fiscal year. Therefore, the project should be divided into 2 stages and the both stages will be completed within two fiscal years.

For this project, sufficient attention must be paid to the both the supervision of construction and quality control for the Project. Thus, stationed at the site will be a Japanese consultant who is experienced in the supervision of overseas construction and Philippine chief consultants who are experienced in the supervision of construction conducted under the grant aid from Japan. In order to integrate all aspects of supervision, consultants and contractors will be based in Manila both in the 1st and 2nd stages, which has the advantage of easy access to the DECS Head Office. Under the control of this head office, the construction base of Region IV will be established in Lucena city, the sub-base in Batangas city for the 1st stage of the Project, the construction base of the Region II in the Tuguegarao city and the sub-base in Cabarroguis city, construction base of the Region VIII in Tacloban city, and the sub-base in Catarman city shall be established for the 2nd stage of the Project. Each construction base and sub-base will take charge of 9 to 11 construction sites. They will become the bases for the delivery of equipment to construction sites, as well as for close supervision of the construction sites by the consultants, local consultants, contractors and local engineers. After considering several factors, including air transportation links, it was decided that Japanese supervisors will be stationed in Metro Manila. Figure 3-1 shows the organization table of the system of supervising construction.

Figure 3-1 Project Construction Management Organization Chart

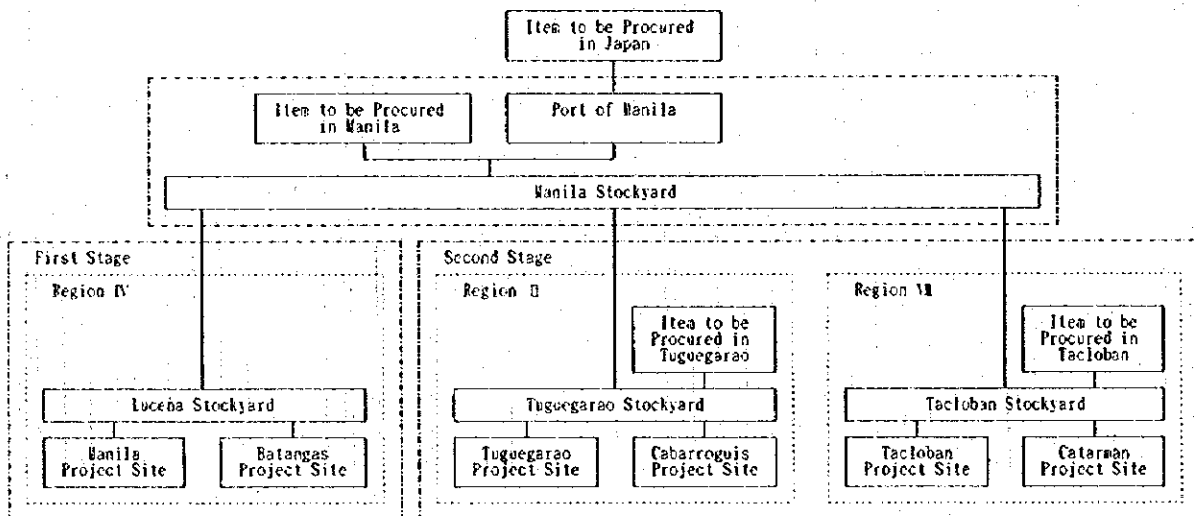


3-1-5 Procurement Plan

(1) Policy of the Procurement Plan

For the case of facility maintenance after they are delivered, almost all of the construction equipment and furniture is to be procured at the Project area. Most of the construction equipment can be obtained from the main cities. However the items that cannot be or those being of inferior quality if obtained in the Project area, will be transported from the city of Manila via overland or sea. Science laboratory instruments will be provided in the Philippines. However, items of poor qualities or insufficient quantities will be procured in Japan. With regard to the procurement of the science equipment, shipping schedule will be arranged to coincide with the completion of facilities. Figure 3-2 shows the procurement plan of construction equipment.

Figure 3-2 Transportation Plan for Procured Equipment and Materials



(2) Transportation and Storage Plan

The equipment for science experiments imported from Japan will be unloaded at the Manila International Port. After clearing customs, they will be temporarily stored at the equipment storage base in Manila along with other equipment obtained in Manila. Then they will be delivered to the equipment storage bases in Region II, IV and VIII via overland or sea and transported to each construction site via land. With regard to the land route, the main highways are in good condition but the access roads from the main highways and

bridges en route to the schools often have weight and width limitations. Therefore alternative access roads must also be considered in the transportation plan. Collapsed bridges may affect the progress of work during the rainy season.

3-1-6 Implementation Schedule

The Project's implementation within the framework of the grant aid system will become effective after the division of work by the Government of Japan and the necessary procedures have been completed. The Project will commence following the signing of the E/N by the two countries. After the signing, the Project will be implemented in 5 stages: detailed design; tender; procurement and transportation of equipment and materials; and construction.

<Detailed Design>

After approval of the consultant agreement, the Consultant will prepare the tender documents based on the basic design, and will consult with the representatives of DECS to decide on the specifications. Regarding the size of the Project based on the E/N and grant aid system and the division of work, confirmation must be received at the early stage of the basic design thereby allowing the Government of the Philippines set up a budget and a construction management system, adjusting it to a single year budget of the grant aid system method. Two months will be required to prepare the detailed design.

<Tender>

This includes the announcement of the tender, qualification examination of the companies, open tender, results, and the construction agreement. The methods for construction orders and bids will be decided prior to consultation.

<Procurement and Transportation of Materials and Equipment>

Following the signing of the construction agreement, preparation of shop drawings should start immediately. Procurement of equipment shall start after approval of shop drawings. The first equipment is expected to be delivered to the site about one month after the conclusion of contract.

<Construction>

After a month of preparation following the signing of the agreement, the construction work shall commence. Each of construction bases and sub-bases takes charge of the construction of 9 to 11 schools. A total of 24 months, 12

months each for 1st and 2nd stages, will be required to complete all of the schools.

The project schedule is shown in Table 3-2.

Table 3-2 The Project Implementation Schedule

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------------------|-------------------------------------|---|-----------------------------------|---------------------------|---|---|---|---|---|---|--------------------|-------------------|----|
| First Stage | Detailed Design & Tender | | (Design Work in the Philippines) | | | | | | | | | | |
| | | | (Design Work in Japan) (2 Months) | | | | | | | | | | |
| | | | | (Tender Work) (1.3 Month) | | | | | | | | | |
| | | | | | | | | | | | (Total 3.3 Months) | | |
| Procurement & Construction Work | Preparation Work | | | | | | | | | | | | |
| | Foundation Work | | | | | | | | | | | | |
| | Building Construction | | | | | | | | | | | | |
| | Facility & Interior Finish Work | | | | | | | | | | | | |
| | Manufacture/Procurement (Equipment) | | | | | | | | | | | | |
| | Transportation | | | | | | | | | | | | |
| | Transportation | | | | | | | | | | | | |
| | Inspection & Turn Over | | | | | | | | | | | | |
| | Inspection & Turn Over | | | | | | | | | | | | |
| | | | | | | | | | | | | (Total 12 Months) | |
| Second Stage | Detailed Design & Tender | | (Design Work in the Philippines) | | | | | | | | | | |
| | | | (Design Work in Japan) (1 Month) | | | | | | | | | | |
| | | | (Tender Work) (1.3 Month) | | | | | | | | | | |
| | | | | | | | | | | | (Total 2.3 Months) | | |
| Procurement & Construction Work | Preparation Work | | | | | | | | | | | | |
| | Foundation Work | | | | | | | | | | | | |
| | Building Construction | | | | | | | | | | | | |
| | Facility & Interior Finish Work | | | | | | | | | | | | |
| | Manufacture/Procurement (Equipment) | | | | | | | | | | | | |
| | Transportation | | | | | | | | | | | | |
| | Transportation | | | | | | | | | | | | |
| | Inspection & Turn Over | | | | | | | | | | | | |
| | Inspection & Turn Over | | | | | | | | | | | | |
| | | | | | | | | | | | | (Total 12 Months) | |

3-1-7 Obligations of Recipient Country

(1) Project Construction Boundaries

The construction boundaries to be undertaken by the Japanese and Philippine side are shown in Table 3-3.

| Work Item | Japanese Side | Philippine Side |
|---|---------------|-----------------|
| 1. Securing of Project sites. | | ○ |
| 2. Site clearing prior to commencing Project construction work. | | ○ |
| 3. Incidental work, such as gardening and fencing. | | ○ |
| 4. Construction of access roads to Project sites prior to the commencement of Project construction work. | | ○ |
| 5. Installation of facilities for distribution of electricity, water supply, drainage and other incidental facilities to Project sites when needed. | | ○ |
| 6. Obtaining building, occupancy and all necessary permits for the Project with respect to the laws and regulations of the Philippine Government. | | ○ |
| 7. Securing the necessary budget and personnel for the proper and effective maintenance of Project school-buildings and equipment. | | ○ |
| 8. Procurement of Project use equipment and materials in Japan and their shipment to Project sites in the Philippines. | ○ | |
| 9. Procurement of Project use equipment, materials and labour in the Philippines and their transportation to Project sites. | ○ | |
| 10. Construction of Project facilities. | ○ | |
| 11. Exempting Taxes and all other levies and duties and ensuring prompt unloading and customs clearances at the port of disembarkation in the Philippines for Project use materials and equipment. | | ○ |
| 12. Exempting Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines with respect to the supply of the equipment and services under the verified contracts. | | ○ |
| 13. According Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts for their entry into the Philippines and stay therein for the execution of the Project. | | ○ |
| 14. Bearing of commissions to the Japanese foreign exchange bank for the banking services based on the Banking Arrangement in accordance with the standard grant procedure. | | ○ |
| 15. Bearing all expenses other than those to be borne by the Grant, necessary for the construction of the schoolbuildings as well as for the transportation and installation of the equipment. | | ○ |
| 16. Effective operation and management of the facilities and equipment to be provided under the Grant Aid. | | ○ |

3-2 Operation and Maintenance Plan

The maintenance of the facilities after they are completed and delivered to the recipients of this plan is conducted by the division office of the Department of Education, Culture, and Sports (DECS divisional office), and the maintenance costs are allocated by DECS.

Prior to the introduction of this system in June 1994, the maintenance of the necessary costs allocated by DECS was the function of the division office of the Department of Public Works and Highway (DPWH divisional office). When the budget allocation system was changed to rationalize the maintenance of educational facilities, the maintenance costs which had been allocated through complicated procedures were divided to each school according to the activity level of each school from DECS through each DECS divisional office. DECS secures the two necessary fund sources for the maintenance and other operating expenditure (MOOE) for basic repairs and the capital outlay (CO) for large-scale repairs, construction work, and implements the annual repair of school facilities.

When the school needs basic building repairs, an application is submitted from the DECS district office to the DECS regional office. After an evaluation of the application, a school list is submitted to the DECS head office. Then the Department of Budget and Management (DBM) approves the necessary expenditures and the final amount of budget is determined. Based on the determined budget, the DECS head office determines the distribution of budget to each school, and the engineering division of the DPWH makes the implementation plan and informs the principle of each school. The construction is conducted under the management of the DECS and the DPWH.

When the school needs large-scale building repairs, such as when damaged by natural disasters, the principle of the said school directly submits an application to the DECS head office, then the government service insurance system (GSIS) is informed. Under this system, said school is individually inspected to evaluate the validity of the request. The GSIS informs the DECS head office of the results of the inspection which examines the report. When the implementation of repair work is decided, the budget is determined and GSIS informed, followed by the DPWH regional office. The construction is implemented by the DPWH division office and delivered to the school, and finally the DECS head office accepts it.

Table 3-4 shows the procedure for basic repairs of school facilities and Table 3-5 shows the flow of maintenance operation with regard to a large-scale of repair caused by natural disasters.

Table 3-4 Flow of Maintenance Operations for Easy Repair Works of School Facilities

| Responsible Agency | Work Procedures and Contents |
|------------------------|--|
| DECS | ① Each school's principal investigates the necessity of repair work and requests funding from DECS's regional office. |
| | ② DECS' regional office examines the requests and submits a list indicating the schools that require repair work to DECS head-quarters. |
| | ③ DECS headquarters requests budgetary funds from DBM. |
| DBM | ④ DBM evaluates DECS' request and reports the amount of budgetary funds to be authorized to DPWH's regional office. |
| DPWH's Regional Office | ⑤ DPWH's regional office notifies each concerned school of the repair work program. |
| DPWH's Area Office | ⑥ The repair work is implemented under the management of DECS and DPWH. The repaired school facilities are to be turned over to each concerned school. |
| School Principal | ⑦ The principal accepts the repaired facilities. |

Table 3-5 Flow of Maintenance Operations for Large-scale Repair Works Caused by Natural Disasters

| Responsible Agency | Work Procedures and Contents |
|----------------------|--|
| DECS | ① Each school's principal submits the request for large-scale repair work to DECS. |
| | ② DECS forwards the school principal's request to the Government Service Insurance System (GSIS) Agency. |
| GSIS Agency | ③ GSIS Agency investigates and evaluates the appropriateness of the school's request. |
| | ④ GSIS Agency reports the results of its investigation and evaluation to DECS. |
| DECS | ⑤ DECS re-examines the request and determines the amount of budgetary funds to be allotted for the repair work and notifies the GSIS Agency of their decision. |
| GSIS Agency | ⑥ GSIS Agency reports the budgetary fund amount to the DPWH regional office. |
| DPWH Regional Office | ⑦ DPWH regional office notifies the DPWH area office of the budgetary fund amount. |
| DPWH Area Office | ⑧ DPWH area office implements the repair work and turns over the completed facilities to the school concerned. |
| DECS | ⑨ DECS officially accepts the completed school facilities from the DPWH regional office. |

To efficiently conduct classes in the classrooms to be built under the Project, it will be necessary to secure teachers. This plan is to construct school buildings in order to solve the insufficient number of classrooms in existing schools which has meant that classes are held in open-air classrooms, temporary classrooms, or rented facilities. In these cases, there is no need to employ further teachers with the construction of school buildings. The plan also aims to alleviate the problem of shift classes. In this case, additional teachers are necessary.

In the 1995 fiscal year, there is a deficit of about 35,800 teachers in elementary and secondary schools in the Philippines, (26,246 teachers in elementary schools and 9,565 teachers in secondary schools). DECS is coping with this situation by increasing the number of students per class and the number of class teaching hours, or asking the administrative teaching staffs to teach classes. The average yearly salary of a teacher is about 60,000 pesos. The total number of teachers required under this plan is about 348. The budget necessary for these additional teachers is 20.88 million pesos, which is about 0.44% of the budget for DECS in the 1996 fiscal year. Thus it is determined that the additional salary is within the budget allocation.

The maintenance costs of this Project will be budgeted in the same manner as in Phases I, II and III. Maintenance and operation costs were important factors in the selection of facility equipment, so that overall costs could be minimized. However, for wooden doors, jalousie windows, fluorescent lamps, and gutters, regular adjustment, inspection, and replacement are indispensable to prolong durability. In addition, aesthetically, it is desirable to paint the interior and exterior walls as well as the ceiling and to wax floors regularly, but these not considered as necessary for the maintenance of the school buildings. Table 3-6 shows the operation and maintenance costs of an average school building with public water supply and electricity.

Table 3-6 Operation and Maintenance Costs of One School Building in a Year
(Unit: in Pesos)

| Items | Material Costs | Labor Costs | Maintenance Frequency | Annual Costs (converted) | Remarks |
|--------------------------|----------------|-------------|-----------------------|--------------------------|--------------------------------------|
| Wooden Doors & Jalousies | 3,530 | 1,540 | Once every other year | 2,535 | Require painting and repair work |
| Toilet Tiles | 460 | 1,210 | Once every 3 years | 557 | Requires repair or replacement |
| Gutters | 2,675 | 385 | Once every 6 years | 510 | Requires repair or replacement |
| Fluorescent Lamps | 750 | 250 | Once every other year | 1,000 | Replacement is required periodically |
| Electric Fee | 330/Month | | | 3,960 | |
| Water Fee | 250/Month | | | 3,000 | |
| Total | | | | 11,562 | |

In this plan, the budget for teaching staffs and the operation of school buildings, which will become necessary after completion of the construction of 116 school buildings, will be covered by the previous budget of each administrative district.

Table 3-7 shows the budget allocation of each administrative district for the past 3 years, in which the budgets of Region II, IV and VIII for the fiscal year 1996 were 1.76 billion pesos, 56.3 billion pesos, and 26.4 billion pesos respectively. The average annual increase rates for the past 3 years were 12.3%, 12.6%, and 10.9% respectively. Table 3-8 shows the number of classrooms at the public elementary and secondary schools in the areas included in the plan, in which 16,534, 48,886 and 22,994 classrooms exist for each of the district mentioned above. The three classroom building is given to each school and the number of classrooms will become 87, 183, and 78 respectively for each region. The increase rate against the existing classrooms will be 0.53%, 0.37%, and 0.34% respectively. These rates are relatively low compared with the increase rate of the budget allocation. For these reasons it is determined that there will be no problem with the operating ability of each region after the school buildings are turned over.

However, due to the financial restrictions in each school, a construction plan that poses minimum maintenance costs must be made. In order to improve the maintenance ability of the school, participation of local residents is indispensable. Incentives may increase their participation level.

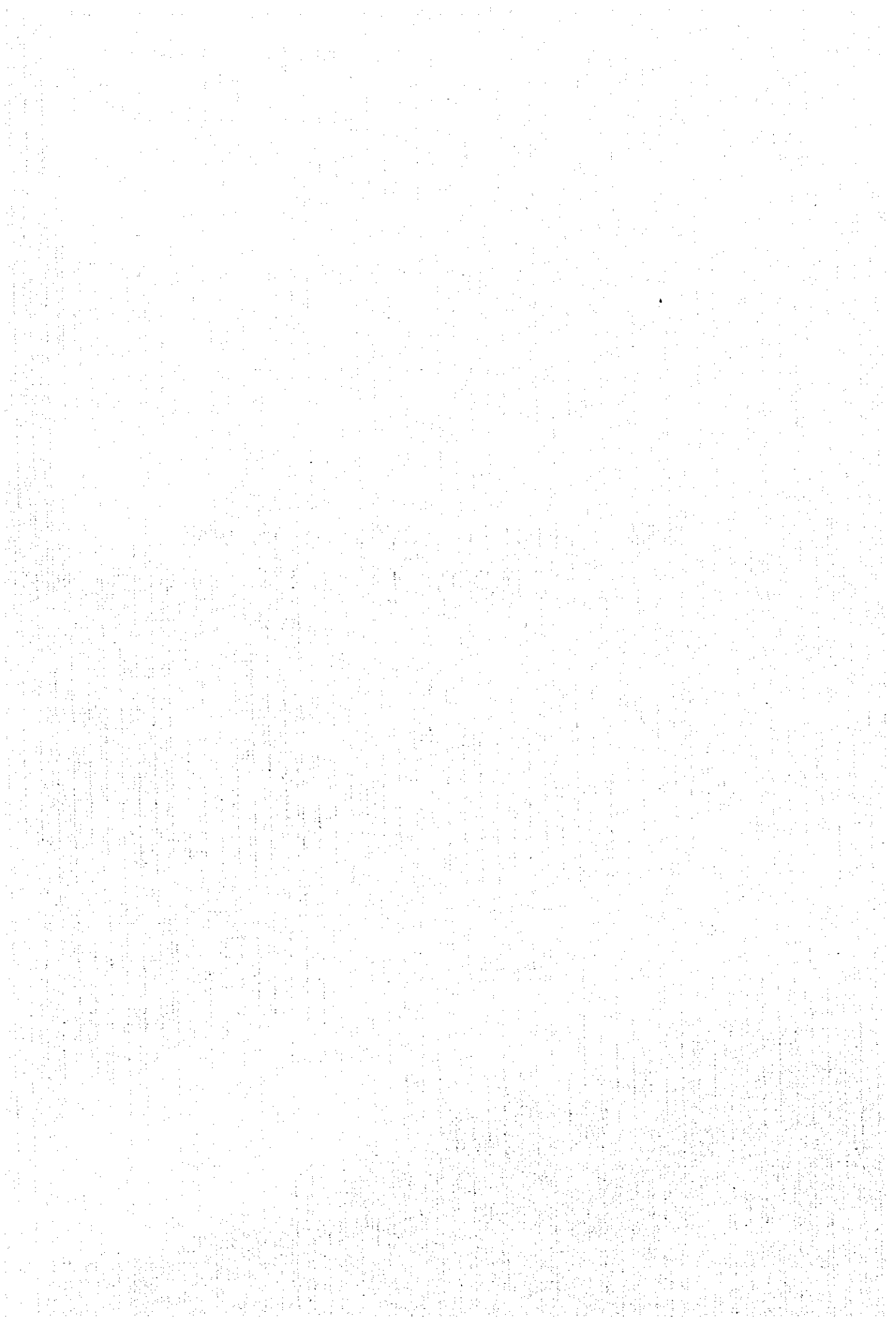
Table 3-7 Transition of Educational Budget Allocation in Each Region
(Unit: in thousand peso)

| Year | Region II | | Region IV | | Region VII | |
|--------------|-----------|---------------|-----------|---------------|------------|---------------|
| | Budget | Increase Rate | Budget | Increase Rate | Budget | Increase Rate |
| 1994 | 1,401,033 | -- | 4,482,661 | -- | 2,161,358 | -- |
| 1995 | 1,492,248 | + 6.5% | 4,592,578 | + 2.5% | 2,227,206 | + 3.1% |
| 1996 | 1,761,437 | +18.0% | 5,630,301 | +22.6% | 2,640,628 | +18.6% |
| Average Rate | -- | +12.3% | -- | +12.6% | -- | +10.9% |

Table 3-8 Increase Ratio of Classrooms

| | Region II | Region IV | Region VII |
|--|-----------|-----------|------------|
| Number of existing classrooms | 16,534 | 48,886 | 22,994 |
| Number of classrooms to be constructed | 87 | 183 | 78 |
| Increase rate | 0.53% | 0.37% | 0.34% |

CHAPTER 4. PROJECT EVALUATION AND RECOMMENDATION



CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATIONS

4-1 Project Effect

The Government of the Philippines has prioritized the improvement of the quality of education and educational facilities, and has made continuous efforts in laying the foundations for training human resources. However due to the financial situation, there is still a lack of educational facilities and equipment. In addition, due to the damages caused by natural disasters such as typhoons and the annual population increase, the lack of classrooms has become more impending. Thus the construction of school facilities is an important subject to the Government of the Philippines.

(1) Project Effects

Construction of school buildings and the provision of fundamental educational equipment and science laboratory instruments for the 116 primary and secondary schools that are scattered in the Project Area (Region II, IV and IIIIV) will have the following effects.

1. Increase of the Chances of School Age Children to Attend School:

116 selected schools for the Project presently have a total of 2,471 classrooms and 184,073 students. Based on the number of the students, the schools are lacking 1,994 classrooms and are facing serious classroom shortages. Under the Project, a total of 390 classrooms (135 primary schools and 255 secondary school classrooms, including 42 science laboratories) will be built. These classrooms will be able to accommodate 14,346 students and will greatly contribute to increase the chances of school age children to attend school.

2. Improvement of Educational Environment:

The Project facility is designed to be stronger than the standard Philippine school facility against typhoons and will receive less damage caused by natural hazards. It will allow the accommodation of continuous educational activities.

3. Improvement of Educational Quality:

The Project will build science laboratories and provide fundamental science laboratory instruments. Thus, it will be possible to conduct science education that meets the Philippines' educational objectives and curriculums and it is believed that the comprehension of science by students will be improved. As a result, the Project will contribute to the improvement of the educational quality in the country.

4. Contribution to Area residents:

The Project area is hit by many typhoons every year. These typhoons inflict serious damage to school facilities and houses. The Project's school buildings are designed to be typhoon-resistant structures. They may be used as places of refuge for area residents during natural calamities. In addition, most of present Project schools are provided with electricity. Project schools may be utilized as places of holding meeting or conducting adult education for communities during nighttime.

5. Improvement of Sanitary Conditions:

Most of Project schools have certain toilet facilities, but they are unsanitary. Toilets with water supply and drainage systems will be built at every Project school. Thus, the sanitary conditions at the schools will be improved by the Project.

(2) Examination of the Appropriateness of the Project

1) Alleviation of Classroom Shortage

The Government of the Republic of the Philippines established the Medium-term National Development Plan (1993-1998) and has been making efforts to improve the country's industry and economy. The Government regards the improvement of the education as a very important subject and places the first priority on the promotion of manpower development by improving the country's school education. In spite of the great effort of the Government, annual increase rates of primary and secondary students are about 2% and 3.99% respectively. These rates can be interpreted as an annual increase of the students as being approximately

420,000. To accommodate the increasing number of students, approximately 10,000 new classrooms are needed annually. To improve the classroom shortage situation, Phase I through III Projects constructed 873 classrooms. This Project (Phase V) will build 348 classrooms. Thus, the total number of classrooms to be built by a series of the Project will be 1,221. These classrooms will be able to accommodate approximately 50,000 students.

In view of the above, the Project can alleviate the country's classroom shortage and provide educational chances for those school age children who could not attend schools because of classroom shortages.

2) Improvement of Educational Quality

The Philippines has a problem in that secondary school students have a poor understanding of science education. One reason for this situation is pointed out as that about 46% of the country's secondary schools do not have science laboratories. The total number of science laboratories to be constructed by the series of Projects are 332 (9 by Phase I Project, 35 by the Phase II Project, 71 by the Phase III Project, and 42 by this Phase V Project). It will be possible to conduct adequate science education in these laboratories. Thus, the Project will contribute to the improvement of the students' understanding of science education.

3) Alleviation of Area Differences of Educational Levels

The Government of the Philippines has been conducting a policy to alleviate the country's area differences of educational levels through the social reform agenda. But, DECS' annual budgetary amount is insufficient. The construction of school facilities is being supplemented with finance from local authorities. As a result, educational levels greatly deviate according to the financial conditions of each local authority. The Project intends to alleviate classroom shortage condition in city area as well as improve educational facilities in economically unfavorable local areas that have very poor educational facilities. Thus, the Project will contribute to the alleviation of area differences of educational levels in the country.

4-2 Recommendation

As mentioned above, the Project will have great effects and will contribute to the improvement of the educational situations in the Philippines. The appropriateness of the Project implementation with the Grant aid Cooperation Program of Japan has been confirmed. If the following matters are improved or accomplished, the Project may be more efficiently and smoothly implemented.

(1) Accomplishment of Undertakings to be Borne by the Philippines Side:

The Project will be implemented under the joint efforts of Japan and the Philippines. For Project implementation, it is inevitable that the undertakings to be borne by the Philippines side be accomplished on time. In particular, the Philippines side's site clearing work must be accomplished without delay prior to the commencement of construction work by the Japanese side. Thus, the Project implementation plan must be carefully examined in advance and a construction schedule must be prepared in close cooperation between both sides.

(2) Adequate Maintenance of Completed Project Facilities

Although the Project facilities are designed by placing special emphasis on easy operation and maintenance, the necessary budget for operation and maintenance of the completed Project facilities must be secured and participation of communities must be also encouraged by the Philippines side.

APPENDICES

APPENDICES

1. Member List of the Survey Team
2. Survey Schedule
3. List of Party Concerned in the Recipient Country
4. Minutes of Discussion
5. Cost Estimation Borne by the Recipient Country
6. The Contents of the Project for Constructing Primary and Secondary School Buildings (Phase 1-5) and the Project for the Improvement of Educational Facilities (Phase 1-3)
7. References

APPENDIX 1. MEMBER LIST OF THE SURVEY TEAM

Basic Design Study Team (February 5 through March 14, 1996)

| | | |
|-------------------------|--|---|
| Mr. Satoshi Machida | Leader | Director, Training Division, Nagoya International Training Center, JICA |
| Mr. Shiro Sasaki | Chief Consultant | Mohri, Architect & Associates, Inc. |
| Ms. Akiko Okui | Educational Planner | Mohri, Architect & Associates, Inc. |
| Mr. Nobuhiro Mohri | Facility Planner/ Site Surveyor I | Mohri, Architect & Associates, Inc. |
| Mr. Yoshiaki Ichibagase | Facility Planner/ Site Surveyor II | Mohri, Architect & Associates, Inc. |
| Mr. Seiichi Mori | Facility Planner/ Site Surveyor II | Mohri, Architect & Associates, Inc. |
| Mr. Hiroyuki Yoshizawa | Quantity Surveyor/ Construction Planner | Mohri, Architect & Associates, Inc. |

Basic Design Study Draft Report Explanation Team (May 20 through May 29, 1996)

| | | |
|----------------------|---------------------|---|
| Mr. Juro Chikaraishi | Leader | Deputy Resident Representative JICA Philippines Office |
| Mr. Shiro Sasaki | Chief Consultant | Mohri, Architect & Associates, Inc. |
| Ms. Akiko Okui | Educational Planner | Mohri, Architect & Associates, Inc. |

APPENDIX 2. SURVEY SCHEDULE

ITINERARY OF THE BASIC DESIGN STUDY TEAM

| No. | Mon/Day | Wk | Itinerary | Team Leader | Team Member ① | Team Member ② | Team Member ③ | Team Member ④ | Team Member ⑤ |
|-----|---------|----|--|--|---|--|--|---|---------------|
| 1 | 27 | Mo | Manila 9:45 - Manila 13:20. Meeting with Manila JICA Office | | | | | | |
| 2 | 28 | Tu | Courtesy call and meeting with DECS. Courtesy Call to NEDA | | | | | | |
| 3 | 29 | We | Meeting with DECS. Courtesy Call to NEDA | | | | | | |
| 4 | 30 | Th | Meeting with DECS regarding the Draft of Minutes of Discussions. Meeting with Mr. TRENDA, JICA Expert. Meeting with JICA, Signing of Minutes | | | | | | |
| 5 | 31 | Fr | Meeting with JICA. Meeting with DECS | | | | | | |
| 6 | 1 | Sa | Meeting among Team Members. Data Analysis | | | | | | |
| 7 | 2 | Su | Meeting among Team Members. Data Analysis | | | | | | |
| 8 | 12 | Mo | Meeting with JICA Manila - Nagoya | Courtesy Call to DECSRO S81, AE12, IS81, S84 (Lucena City) | Courtesy Call to DECS Regional Office S74, E23, AE24, AE5, S71 (Manila) | | Manila - Tacloban (Tacloban) | Manila - Tuguegarao (Tuguegarao) | |
| 9 | 13 | Tu | | AE13, S82, S79, AE11, E18, E25, AF27 (Lucena City) | S74, S73, AF4, AE3, S71 (Manila) | | Courtesy call to DECSRO S38, S120, S102 (Tacloban) | Courtesy call to DECSRO E38, S42, S43 (Tuguegarao) | |
| 10 | 14 | We | | AS4, AE14, S80, S83, AE13, S81, V15 (Clanagan) | Inspection on the Facilities and Equip. (TRSO III, Region IV) | S72, E15, E18, AE1, S95 (Batangas City) | S107, E29, S100 (Tacloban City) | E2, E1, E4 (Tuguegarao) | |
| 11 | 15 | Th | | S80, Courtesy Call to DECSRO (Manila) | Meeting with DECS | Courtesy Call to DECSRO S96, AS47, E7, AE29, S99 (Batangas City) | S08, E28 (Ormoc City) | E3, S40, E5 (Aparri) | |
| 12 | 16 | Fr | | AE18, S90, AF21, S88, AE20, (Manila) | Interview with OISCA | AS48, S92, S89, S70, AF2 (Batangas City) | E37, S119, S99 (Ormoc City) | S41, S44, S45 (Tuguegarao) | |
| 13 | 17 | Sa | | S89, S24, S91 (Manila) | Data analysis | E14, S68, S67 (Manila) | E30, S103, S108 (Maasin) | Courtesy Call to DECSRO S49, S52, S54 (Iligan) | |
| 14 | 18 | Su | Meeting Among Team Members. Data Analysis | | | | E32, S107, S106, E34 (Maasin) | S46, S53, E6 (Iligan) | |
| 15 | 19 | Mo | Data analysis | | Inspection on the facilities by the foreign agency | Same as team ① | Data Analysis (Tacloban City) | Data Analysis (Iligan) | |
| 16 | 20 | Tu | Meeting with DECS, Data collection | | Interview with ADB, Meeting with DECS | | S27, S104, S105 (Tacloban City) | S47, S50, S51 (Santiago) | |
| 17 | 21 | We | | | | | S15, S111 (Cathalogan City) | E7, S48, S60 (Catarroguis) | |
| 18 | 22 | Th | Inspection on the National Science Teaching Instrumentation Center (Cebu) | | | | S10, S109, E33 (Cathalogan City) | Courtesy Call to DECSRO S83, S82, S81 (Catarroguis) | |
| 19 | 23 | Fr | Report to Manila JICA Office | | | | S116, S118 (Cathalogan City) | S60, E10 (Santiago) | |
| 20 | 24 | Sa | Inspection on the facilities of EFIP Phase 2 | | Courtesy Call and Report to Embassy of Japan | | S112, S113, S114 (Caterman) | S56, S55, S54 (Bayabong) | |
| 21 | 25 | Su | Data Analysis & Evaluation. | | Manila - Narita | Data Analysis | E34, E35, E36, S111 (Caterman) | S57, E9, E8 (Cabanatuan City) | |
| 22 | 26 | Mo | | | | Same as Team ① | Caterman - Manila Data Analysis | Cabanatuan City - Baier Data Analysis | |
| 23 | 27 | Tu | Meeting with DECS | | | Supplementary Site Survey : S-91 | S76, S78, S77 (Los Banos/Catamba) | Courtesy Call to DECSRO S84, S86, S85 (Baier) | |
| 24 | 28 | We | Data Collection (FAGASA) | | | | E16, E17, S75 (Pagsanjan) | E11, E12 (Manila) | |
| 25 | 29 | Th | Data Collection (NEDA) | | | | E27, S97 (Manila) | S90, S89, S88 (Manila) | |
| 26 | 30 | Fr | Meeting with DECS | | | | Analysis of Data Collected During Site Survey | | |
| 27 | 1 | Sa | Meeting among Team Members, Data Analysis & Evaluation | | | | | | |
| 28 | 2 | Su | Meeting with DECS | | | | | | |
| 29 | 3 | Mo | Meeting with DECS | | | Same as Team ① | | Supplementary Site Survey | |
| 30 | 4 | Tu | Supplementary Site Survey | | | Same as Team ① | | Inspection on the Factory of Construction Material | |
| 31 | 5 | We | Meeting with DECS | | | | | Interview with Science Equipment Manufacturer | |
| 32 | 6 | Th | Meeting with JICA Expert Meeting with DECS | | | | | Data Collection | |
| 33 | 7 | Fr | Report to Manila JICA, Meeting with DECS | | | | | | |
| 34 | 8 | Sa | Meeting Among Team Members, Data Analysis | | | | | | |
| 35 | 9 | Su | Meeting with DECS | | | | | | |
| 36 | 10 | Mo | Meeting with DECS | | | | | | |
| 37 | 11 | Tu | Meeting with DECS | | | | | | |
| 38 | 12 | We | Meeting with DECS, Report to Embassy of Japan | | | | | | |
| 39 | 13 | Th | Manila - Narita | | | | | | |

ITINERARY OF THE BASIC DESIGN STUDY REPORT EXPLANATION TEAM

| No. | Mon/Day | Wk | Team Leader - Team Member ① - Team Member ② |
|-----|---------|----|--|
| 1 | 5/29 | Mo | Manila 9:45 - Manila 13:20. Meeting with Manila JICA Office |
| 2 | 30 | Tu | Courtesy Call and Meeting with DECS |
| 3 | 31 | We | Meeting with DECS |
| 4 | 1 | Th | Meeting with DECS |
| 5 | 2 | Fr | Signing of Minutes of Discussion |
| 6 | 3 | Sa | Meeting Among Team Members. Data Analysis |
| 7 | 4 | Su | Meeting Among Team Members. Data Analysis |
| 8 | 5 | Mo | Meeting with DECS. Meeting with JICA Experts |
| 9 | 6 | Tu | Meeting with DECS. Report to Manila JICA Office and Embassy of Japan |
| 10 | 7 | We | Manila - Narita |

Note) Team Member ① Shiro Sasaki: Chief Consultant (Architectural Planner), Team Member ② Akiko Okui: Educational Planner,
Team Member ③ Nobuhiko Mohri: Facility Planner / Site Surveyor I, Team Member ④ Yoshiaki Ichibagase: Facility Planner / Site Surveyor II,
Team Member ⑤ Seiichi Mori: Facilities Planner / Site Surveyor III