Grant aid cooperation to the Philippines has been provided by Japan many times in the past in the form of general grant aid and cultural grant aid. Grant aid projects related to this Project are as follows:

1) The Project for the Construction of the National Learning Resource Center for Teacher Training in Science and Mathematics Education

The grant aid cooperation was provided for the construction of the center for the re-education and training of primary and secondary school science and mathematics teachers, and for installation of equipments to be used in conducting experiments and training. (The Exchange of Notes was signed by both governments in October 1988). 20.4 billion yen was granted by the Japanese Government. The Project was completed in March 1990.

2) The Project for Assistance to Secondary Education Instructional Equipment Program (Phase I)

This grant aid project concerns the installation of equipment for science, engineering and home economics classes in 210 secondary schools in Region V and Region VIII. The secondary schools included in Phase I and Phase II of the Project for constructing primary and secondary schoolbuildings have also been included in the project. (The Exchange of Notes was signed by both governments in April 1991. 540 million yen was granted by the Japanese Government. This Project was to be completed in March 1992).

3) The Project for Assistance to Secondary Education Instructional Equipment Program (Phase II)

This grant aid project concerns the installation of equipment for science, engineering and home economics classes in 241 secondary schools in Region II, IV, VI and Region X. The secondary schools included in Phase III and Phase IV of the Project for constructing primary and secondary schoolbuildings have also been included in the project. (The Exchange of Notes was signed by both governments in April 1992. 598 million yen was granted by the Japanese Government. This Project was to be completed in March 1993).

4) Rural Environmental Sanitation Improvement Project (Phase II)

This is a grant aid project to construct the water and sanitary facilities in Regions I and VI. It concerns the construction of water facilities and primary school toilets. One of the primary schools included in the Phase IV project and four of the primary schools included in the Phase V Project are also included in this project. (A total of 1.65 billion yen was granted by the Japanese Government during the 1990 and 1991 fiscal years. Project construction is scheduled to be completed in February 1994.)

3-2-4 Evaluation of the Requested Facilities and Equipment

The facilities requested by the Philippine government for this Project are classrooms and toilets for primary schools, and classrooms, science laboratories and toilets for secondary schools. The construction of classrooms is given utmost priority as the lack of classrooms is a serious problem throughout the country. Thus, it is believed that the contents of this project are appropriate. The equipment requested are the minimum education necessities, such as desks and chairs for the teacher and pupils, blackboards, bulletion board and shelves for classrooms and demomstration workbench, experiment tables, stools, student's closets, blackboard, bulletin board, storage shelve and steel shelve for science laboratories. Thus, the request is acceptable.

The construction of Project school toilets that are included in the abovementioned Rural Environment Sanitation Improvement Project (Phase II) are excluded from the Project.

When the Minutes of Discussions were signed, it was noted that the Basista Elementary School was included in the Rural Environmental Sanitation Improvement Project (Phase II). However, it was confirmed by a later study that the school was not included in the concerned project. Thus, the toilet for that school will be constructed in the Phase V Project.

As a result, the construction of four Project schools is excluded from the Project.

3-2-5 Evaluation of the Appropriateness of the Project Area

In 1991, there were approximately 579,000 public primary school students and 198,000 public secondary school students in Region I of the Project Area. There were 1,857 public primary schools and 342 public secondary schools. There was a lack of 4,766 classrooms.

In 1991, there were approximately 958,000 public primary school students and 228,000 public secondary school students in Region III of the Project Area. There were 1,829 public primary schools and 352 public secondary schools. There was a lack of 8,954 classrooms.

Improvement of the classroom shortage situation has been regarded as an urgent matter and the Government of the Philippines has been conducting schoolbuilding construction and rehabilitation work. Although temporary buildings are used for classrooms, the classroom shortage situation has not been solved.

When the typhoon damages that are inflicted on those two Regions every year are taken into account (see Table 2-23), the solution of the classroom shortages there are as urgent as in other Regions.

As a result of the field study, it was found that some schools included the Philippine Government's request were located in the high risk area of the volcanic mud flow hazard caused by the eruptions of Mt. Pinatubo. Thus, after discussions with DECS, those schools were excluded from the Project. Alternative schools proposed by the Philippine's side were investigated and selected as Project schools.

In view of the above, it was evaluated as being appropriate to include Regions I and III in the Project.

3-2-6 Basic Cooperation Policies

From the above, the effects, actuality and the country's capabilities in putting the project into operation have been confirmed. As the contents of the Project comply with the grant aid system, it has been judged that the Project may be program in mind, a basic design study will be conducted after evaluatin of the contents of the Project.

3-3 Project Description

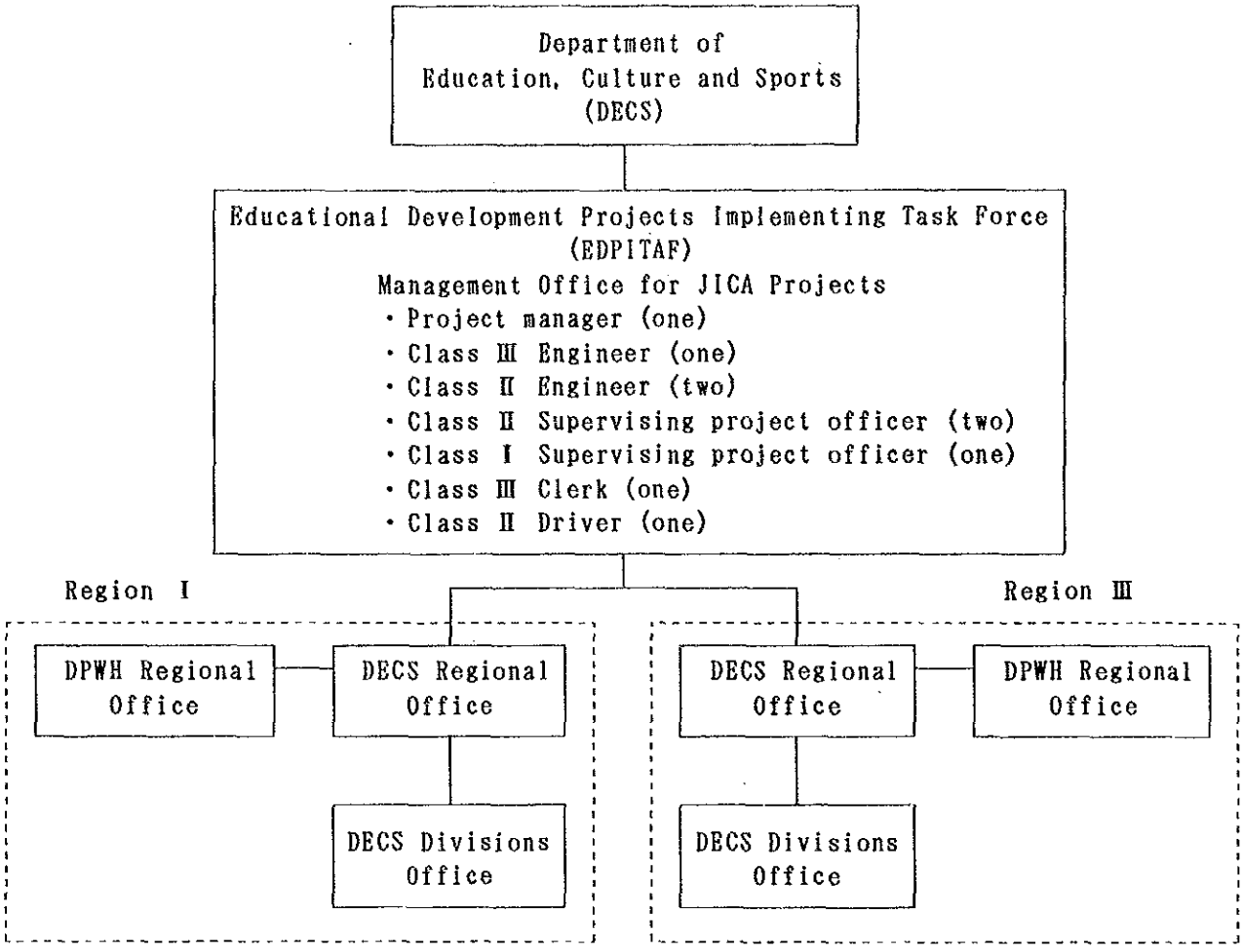
3-3-1 Executing Agency and Operating System

This Project will be implemented under the supervision of the Educational Development Projects Implementing Task Force (EDPITAF) of DECS, with the cooperation of the DECS regional offices at Regions I and III, and under the guidance of DECS.

EDPITAF will establish a JICA Project Management Department, consisting of a project manager, three engineers, three supervisors, one level III clerk and one driver.

The above two groups will form an operating and management office and will take care of supervising the Project and running operations after the Project has been completed. Fig. 3-1 shows the organization chart.

Figure 3-1 Project Implementation Organization



3-3-2 *Standards for Selecting Project Schools*

The standards for selecting the regions and the schools for the Project will take in those regions where schools were damaged by typhoons. Other standards are as follows:

1. Schools having sufficient area to be built on.
2. Schools that have a serious lack of classrooms.
3. Schools that do not expect to receive aid from USAID or ADB.
4. Schools that have access roads for the delivery of prefabricated material.
5. Primary schools that conduct education for all grades (grades 1 through 6).
6. As priority will be given to secondary schools that have become public, vocational training schools will be excluded.

7. Schools in remote islands, where the delivery of material is difficult, will be excluded.

8. Schools located within the high risk area of volcanic mud flow around Mt. Pinatubo will be excluded.

Upon applying these standards to primary and secondary schools in Regions I and III requested by the Philippine Government, 75 schools were selected for the Phase V Project.

3-3-3 Selection of Building Size for Each Project School

By taking into consideration the land and activity conditions of the 75 Project schools, 3 types of school facility sizes were established. The number of classroom shortage for each school ranged from 3 to 85. According to the requirements for classrooms and land conditions, a 3-classroom (B Type), a 4-classroom (C Type), and a 5-classroom (D Type) are to be selected. Science labs in combination with classrooms are designed for all secondary schools.

Considering the school's hygiene and sanitary education to be given to the students, toilets that meet the improved specifications of DECS will be built, in general, in a separate part of the school. As for the 4 primary schools already included in the Regional Sanitation Project, the toilets will not be constructed.

Table 3-6 shows the size and land conditions of the Project's schools. Table 3-7 shows the schoolbuilding type that corresponds to the classroom shortage of each Project school.

Table 3-6(1) Conditions of the Project Primary Schools

Recipient Schools	Enrollement 1991-92	No of Teachers & Adm. staff 1991-92	No of Class Rms. Science(a) Work Shops	School Type	Road Condition	W (m)	Aprox Site Area (m²)	Site Terrain	Soil Type	Leveling Required	Water Supply	Elec. Aavail.
REGION I:												
E- 1. CABULAAN ELEMENTARY SCHOOL	450	15	12	C	Good	10	20,600	Flat	Clayey	Slight	Well	Yes
E- 2. DINGRAS WEST CENTRAL SCHOOL	572	23	14	B	Good	8	10,000	Flat	Sandy	None	Public	Yes
E- 3. DON MARIANO MARCOS MEMORIAL SCHOOL	467	20	15	D	Good	12	11,574	Slightly Sloping	Clayey	None	Well	Yes
E- 4. CATALINO ACOSTA MEMORIAL ES	590	16	10	D	Good	20	19,500	Flat	Sandy	Slight	Well	Yes
E- 5. PIDDING CENTRAL SCHOOL	664	33	21	B	Good	10	21,743	Slightly Sloping	Clayey	Slight	Public	Yes
E- 6. BANGUI CENTRAL SCHOOL	451	16	11	B	Good	10	22,135	Flat	Sandy	None	Well	Yes
E- 7. TAGUDIN CENTRAL SCHOOL	618	19	11	C	Good	6.5	28,000	Flat	Clayey	Slight	Well	Yes
E- 8. SULVEC ELEMENTARY SCHOOL	266	11	4	B	Good	21	-	Flat	Sandy	None	Public	Yes
E- 9. SINAIT WEST CENTRAL SCHOOL	714	25	11	D	Good	20	-	Flat	Sandy	None	Well	Yes
E-10. STA. LUCIA SOUTH CENTRAL SCHOOL	555	15	11	B	Good	-	9,000	Flat	Sandy	None	Well	Yes
E-11. SAN JUAN SOUTH ELEMENTARY SCHOOL	476	20	15	B	Good	12	-	Flat	Sandy	None	Well	Yes
					·Not enough space							
E-12. MAGSINGAL NORTH CENTRAL SCHOOL	476	20	6	D	Good	20	-	Flat	Sandy	None	Well	Yes
E-13. STO. DOMINGO NORTH ELEMENTARY SCHOOL	448	16	7	C	Good	-	7,856	Flat	Sandy	None	Public	Yes
E-14. NAGSANGALAN ELEMENTARY SCHOOL	354	16	7	B	Good	12		Flat	Sandy	None	Well	Yes
E-15. BANGAR ELEMENTARY SCHOOL	760	22	12	B	Good	12	(875.25)	Flat	Sandy	None	Public	Yes
					·Not enough space							
E-16. PARINGAO ELEMENTARY SCHOOL	972	25	21	B	-	-	19,095	Flat	Sandy	None	Public	Yes
E-17. ROSARIO CENTRAL SCHOOL	1,638	45	35	D	Good	20	(805.60)	Flat	Sandy	None	Public	Yes
E-18. SANIJUBAR ELEMENTARY SCHOOL	236	8	3	B	Good	8	4,963	Flat	Clayey	None	Well	Yes
					*RESIP recipient school							
E-19. CALASIAO I CENTRAL SCHOOL	1,438	49	42	D	Good	4	23,461	Flat	Clayey	None	Public	Yes
					*RESIP recipient school							
E-20. DON AMADEO PEREZ (ANNEX)	995	31	20	D	Fair	-	5,000	Flat	Clayey	None	Well	Yes
E-21. BARANGOBONG ELEMENTARY SCHOOL	420	15	7	C	Poor	-	-	Flat	Clayey	None	Well	Yes
E-22. LIMANSANGAN ELEMENTARY SCHOOL	465	19	9	B	-	-	14,844	Flat	Clayey	None	Well	Yes

Table 3-6(2) Conditions of the Project Primary Schools

Recipient Schools	Enrollement 1991-92	No of Teachers & Adm. staff 1991-92	No of Class Rms Science(a) Work Shops	School Type	Road Condition	W (m)	Aprox Site Area (m²)	Site Terrain	Soil Type	Leveling Required	Water Supply	Elec. Aavail.
E-23. BASISTA ELEMENTARY SCHOOL	1,262	44	29	C	Good	4	12,000	Flat	Clayey	None	Well	Yes
					·Not enough space							
E-24. SAN VICENTE ELEMENTARY SCHOOL	458	14	14	B	Good	16	14,000	Flat	Clayey	None	Well	Yes
E-25. LINGAYEN I ELEMENTARY SCHOOL	1,226	44	31	D	Good	-	19,211	Flat	Sandy	None	Well	Yes
					*RESIP recipient school							
E-26. MALASIN ELEMENTARY SCHOOL	317	12	6	B	Good	12	-	Flat	Clayey	None	Well	Yes
E-27. MALASIQUI CENTRAL SCHOOL	1,562	12	58	C	Good	-	65,000	Flat	Clayey	None	Well	Yes
					*RESIP recipient school							
E-28. LOBONG ELEMENTARY SCHOOL	479	66	8	C	Good	-		Slightly Sloping	Clayey	None	Well	Yes
E-29. SALINGCAOET ELEMENTARY SCHOOL	186	15	6	B	-	5	5,562	Flat	Clayey	None	Well	Yes
E-30. CARMEN ELEMENTARY SCHOOL	888	8	20	B	Good	-	14,694	Flat	Clayey	None	Well	Yes
REGION III:												
E-31. ORION ELEMENTARY SCHOOL	1,707	32	45	D	Good	-	20,061	Flat	Sandy Loam	None	Public	Yes
E-32. BALANGA ELEMENTARY SCHOOL	2,461	53	50	D	Good	-	-	Flat	Clayey Loam	None	Well	Yes
E-33. GEN. GREGORIO DEL PILAR ES	1,204	33	24	D	Fair	-	12,800	Flat	Sandy	None	Public	Yes
E-34. SAN MIGUEL SOUTH CENTRAL SCHOOL	2,664	69	52	D	Good	10	2,664	Flat	Sandy	None	Well	Yes
E-35. BALIWAG SOUTH CENTRAL SCHOOL	1,150	35	15	D	Good	12	14,398	Flat	Sandy	Much	Well	Yes
E-36. GAPAN SOUTH CENTRAL SCHOOL	1,418	45	37	C	Good	20	20,900	Flat	Clayey	None	Public	Yes
E-37. CABIAO CENTRAL SCHOOL	1,048	40	24	D	-	12	16,000	Flat	Clayey	None	Well	Yes
E-38. LAUR CENTRAL SCHOOL	909	30	15	D	Good	-	10,000	Flat	Clayey	None	Public	Yes
E-39. BONGABON CENTAL SCHOOL	1,635	36	32	D	Good	-	10,240	Flat	Clayey	None	Public	Yes
E-40. SAN ISIDRO CENTRAL SCHOOL	1,243	46	27	C	Good	-		Flat	Clayey	Slight	Well	Yes
E-41. BASANG HAMOG ELEMENTARY SCHOOL	273	7	3	C	Good	-	2,484	Flat	Clayey Loam	None	Well	Yes
E-42. SAN ISIDRO ELEMENTARY SCHOOL	524	14	6	D	Fair	-	1,375	Flat	Sandy	Slight	Public	Yes
E-43. CALLOS ELEMENTARY SCHOOL	937	28	16	D	Good	-	7,410	Flat	Clayey	None	Public	None
E-44. SAN ROQUE ELEMENTARY SCHOOL	544	16	4	D	Good	-		Flat	Clayey	None	Well	Yes
E-45. ARAYAT CENTRAL SCHOOL	1,371	35	31	B	Good	12	18,708	Flat	Sandy	Slight	Public	Yes
E-46. BATASAN CENTRAL SCHOOL	433	15	12	B	Good	-	10,040	Flat	Clayey	Slight	Public	Yes
					·Not enough space							
E-47. SAN SIMON ELEMENTARY SCHOOL	558	18	16	B	Good	12	11,452	Flat	Sandy	Slight	Well	Yes

Table 3-6(3) Conditions of the Project Primary and Secondary Schools

Recipient Schools	Enrollement 1991-92	No of Teachers & Adm. staff 1991-92	No of Class Rms Science(a) Work Shops	School Type	Road Condition	W (m)	Aprox Site Area (㎡)	Site Terrain	Soil Type	Leveling Required	Water Supply	Elec. Aavail.
E-48. STA. INES EAST ELEMENTARY SCHOOL	263	7	7	C	Good	-		Rolling	Clayey	Slight	Well	Yes
E-49. BULAWEN ELEMENTARY SCHOOL	547	12	7	D	Good	20	7,900	Flat	Sandy	None	Well	Yes
E-50. STA. CRUZ NORTH ELEMENTARY SCHOOL	910	30	12	D	Good	20	15,236	Flat	Sandy	None	Public	Yes
E-73. SAN ISIDRO ELEMENTARY SCHOOL	643	17	16	C	Good	-	-	Flat	Sandy	None	Well	Yes
					·Not enough space							
E-74. RIO CHICO ELEMENTARY SCHOOL	937	27	18	C	Fair	12	33,909	Flat	Sandy	Slight	Well	Yes
E-75. MALIGAYA ELEMENTARY SCHOOL	553	15	11	B	Good	-	-	Flat	Sandy	Slight	Well	Yes
REGION I:												
S-51. LT. E. FOZ MHS SAN MARCELINO CAMPUS	336	10	0	SD	Fair	8	11,000	Flat	Sandy	Slight	None	Yes
S-52. LUZONG NATIONAL HIGH SCHOOL	307	8	2	SD	Good	8	48,000	Flat	Sandy	Slight	Public	Yes
S-53. PAGSANAHAN BARANGAY HIGH SCHOOL	208	7	0	SD	Fair	8	2,675	Flat	Sandy	Slight	Well	Yes
S-54. NAGLAOA-AN HIGH SCHOOL	587	13	7	SD	Good	12	8,107	Flat	Clayey	None	Well	Yes
S-55. SABUANAN HIGH SCHOOL	323	8	1	SD	Good	12		Flat	Clayey	None	None	None
S-56. DILI HIGH SCHOOL	494	10	8	SC	Good	20	5,696	Flat	Sandy	None	Well	Yes
S-57. OAQUI HIGH SCHOOL	320	12	0	SD	Good	18	4,326	Flat	Clayey	None	None	None
S-58. TANGLAG BARANGAY HIGH SCHOOL	257	6	1	SD	-	-	12,322	Flat	Clayey	None	Public	None
S-59. SAN GREGORIO BARANGAY HIGH SCHOOL	297	8	4	SB	Poor	6	4,000	Flat	Clayey	None	None	None
S-60. PANGASINAN NATIONAL HIGH SCHOOL	5,434	177	62	SD	Good	16	46,786	Flat	Sandy	None	Public	Yes
S-61. BINALONAN NATIONAL HIGH SCHOOL	2,138	71	47	SD	Good	30	11,500	Flat	Clayey	None	Public	Yes
S-62. TOBOY HIGH SCHOOL	491	15	0	SD	Good	12		Flat	Clayey	None	None	None
S-63. BUER-BAYAOAS HIGH SCHOOL	680	20	6	SD	-	-	6,735	Flat	Clayey	Much	Well	None
REGION III:												
S-64. MARIVELES MEMORIAL HIGH SCHOOL ANNEX	1,204	31	9	SD	Good	-	15,390	Flat	Clayey	Slight	Public	Yes
S-65. STA. RITA HIGH SCHOOL	1,054		0	SC	Fair	-		Flat	Clayey	Extensive	Well	Yes
S-66. MAMBANGNAN HIGH SCHOOL	352	14	0	SD	Fair	16	6,800	Flat	Clayey	Extensive	None	Yes
S-67. RIZAL HIGH SCHOOL	1,223	36	16	SD	Fair	-	10,085	Rolling	Clayey	None	Well	Yes
S-68. BARANGAY MILITAR HIGH SCHOOL	263	12	0	SD	Good	-	20,000	Flat	Clayey Loam	None	Well	None
S-69. SAN CRISTOBAL BARANGAY HIGH SCHOOL	529	19	0	SD	Good	-	12,000	Flat	Clayey	Slight	None	Yes
S-70. MAPANIQUE HIGH SCHOOL	298	9	0	SD	Fair	-	8,268	Flat	Clayey	Slight	Well	Yes
S-71. SACATA NATIONAL HIGH SCHOOL	220	11	4	SC	Good	-	4,000	Flat	Clayey	None	Well	Yes
S-72. ZAMBALES NATIONAL HIGH SCHOOL	3,027	100	43	SD	Fair	-	90,000	Flat	Sandy	None	Well	Yes

Table 3-7 Schoolbuilding Type Corresponding to Classroom Shortage of Each Project School

Primary School				Secondary School							
Number of Classroom Shortage	School No.	Building Type	Remarks	Number of Classroom Shortage	Schhol No.	Building Type	Remarks	Number of Classroom Shortage	Schhol No.	Building Type	Remarks
3	E－ 2	B		6	E－ 3	D		3	S－59	S B	
	E－ 5	B			E－11	B	* Not enough site space	4	S－56	S C	
	E－ 6	B			E－12	D			S－71	S C	
	E－ 8	B			E－17	D		5	S－53	S D	
	E－10	B			E－33	D			S－54	S D	
	E－14	B		7	E－ 9	D			S－58	S D	
	E－16	B			E－15	B	* Not enough site space	6	S－52	S D	
	E－18	B	+RESIP		E－23	C	* Not enough site space		S－68	S D	
	E－22	B			E－31	D		7	S－55	S D	
	E－24	B			E－42	D			S－70	S D	
	E－26	B			E－43	D		8	S－51	S D	
	E－29	B			E－49	D			S－57	S D	
	E－30	B		8	E－38	D		9	S－56	S D	
	E－45	B			E－74	C	* Not enough site space	11	S－63	S D	
	E－47	B		9	E－25	D	+RESIP	12	S－61	S D	
	E－75	B		10	E－44	D			S－62	S D	
4	E－ 1	C		11	E－19	D	+RESIP	13	S－69	S D	
	E－ 7	C			E－32	D		21	S－64	S D	
	E－13	C			E－50	D		22	S－67	S D	
	E－21	C		13	E－37	D		26	S－65	S D	
	E－27	C	+RESIP	14	E－35	D		33	S－72	S D	
	E－28	C			E－39	D		85	S－60	S D	
	E－36	C		25	E－34	D					
	E－40	C									
	E－41	C									
	E－46	B	* Not enough site space								
	E－48	C									
5	E－ 4	D									
	E－20	D									
	E－73	C	* Not enough site space								

Note: Type A - 2 classrooms, Type B - 3 classrooms, Type C - 4 classrooms, Type D - 5 classrooms, S - sciencs laboratory
RESIP Recipient School of the Rural environmental Sanitation Improvement Program

3-3-4 Project Area Locations and Conditions

1) Outline of the Project Area

The two regions to be covered by the Project are Region I (Ilocos) and Region III (Central Luzon Region). Project schools are scattered throughout the entire area of Region I stretching 400 km from north to south and 150 km from east to west. The schoolbuildings of 53 primary and 22 secondary schools (75 schools in all) will be constructed under this Project.

The infrastructure for the Project will include electric and water supplies and drainage facilities. The electric power in both regions is 220 V. Presently, 8 project schools have no electricity. As for the water supply, 23 schools are receiving city water. 45 schools use water from wells, and 7 schools have no water supply facilities. For schools not having water or electric supplies, the Philippine Government will install them before the start of Project construction.

As drainage facilities are not fully installed, the sewage from toilets will pass through septic tanks and be infiltrated into the ground. Rain water and other drainage will also use the ground infiltration method.

Table 3-8 shows the number of Project schools in each school district in Regions I and III.

Table 3-8 Number of Project Schools in Each School District in Region I and III

Division	Primary School	Secndary School	Total
Region I			
Ilocos North	6	3	9
Ilocos Sur	8	3	11
La Union	4	3	7
Pangasinan	12	4	16
Subtotal	30	13	43
Region III			
Bataan	2	1	3
Bulacan	3	1	4
Nueva Ecija	11	4	15
Pampanga	4	1	5
Tarlac	1	1	2
Zambales	2	1	3
Subtotal	23	9	32
Total	53	22	75

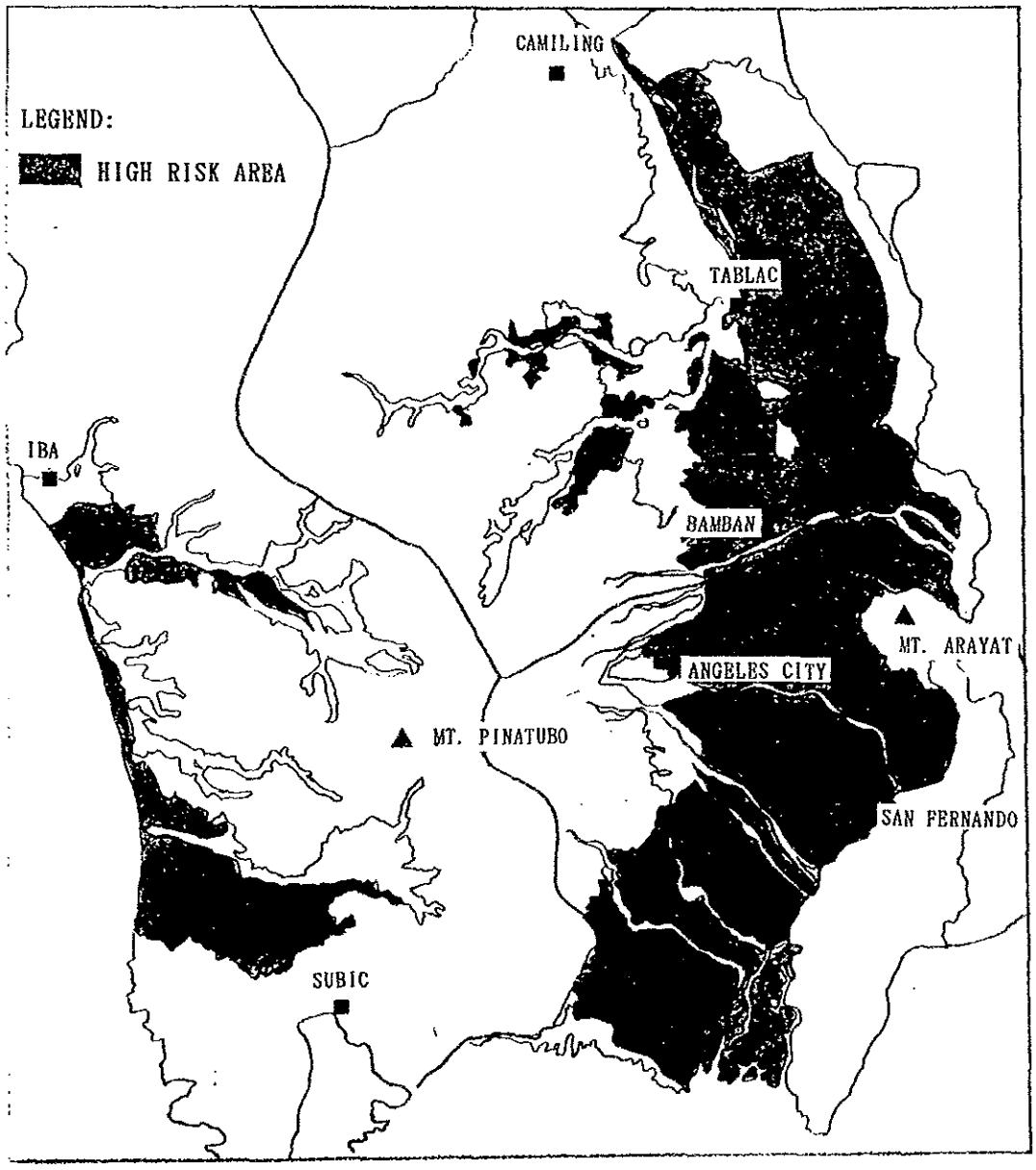
2) Examination of Project Area Located Around Mt. Pinatubo

During Project school selection time, schools located within the high risk area of volcanic mud flows around Mt. Pinatubo were excluded in view of possible effects on the schoolbuildings. Schools located within such areas that are thought to be extremely low or no risk area of volcanic mud flows are included in the Project.

The evaluation of the danger of volcanic mud flows was made based on the advice given by the Soil Research and Development Center.

Fig. 3-2 shows the map of volcanic mud flows effect around Mr. Pinatubo.

Figure3-2 MUDFLOW & SILTATION RISK MAP



Source:DISASTER PLANNING AND MANAGEMENT FOR AGRICULTURE

3-3-5 Outline of the Facilities and Equipment

1) Differences from the Phase IV Project

The basic design will follow that of the Phase IV project. However, the following items were altered after discussions with the Philippine side:

* By taking into consideration the number of handicapped students and their accessibility to the toilet, toilets will be partitioned into 3 rooms by installing walls. One of the rooms will be equipped with a toilet for handicapped students. The number of handicapped primary and secondary school students in Regions I and III are as shown in Table 3-9.

Table 3-9 Number of Handicapped Students in Region I and III

	Region I			Region III		
	Elementary	Secondary	Total	Elementary	Secondary	Total
Using Wheel Chair	0	1	1	7	7	14
Other Physical Handicap	162	5	167	318	97	415
Total	162	6	168	325	104	429

2) Outline of the Facilities

As stated in Section 3-3-3, the number of classrooms will be selected from the 3 types according to the number of students, and the land and schoolbuilding conditions. Table 3-10 is an outline of the schoolbuilding types.

Table 3-10 Outline of Schoolbuilding Types

Building Type	Building Method	Number of Classrooms	Total Floor Area (m²) Including Corridor
B Type	Prefabricated Unit Method	3	228.88
C Type	"	4	293.00
D Type	"	5	357.13
Science Laboratories	"	1	106.88
Toilet	Local Method	Males, females and handicapped for one each	36.50

3) Outline of Equipment Plan

The equipment to be installed in Project schools will be the basic educational equipment specified by DECS's local specifications. The outline is shown in Table 3-11.

Table 3-11 Outline of Equipment to be Provided

School	Type of Room	Name of Equipment Unit
Primary Schools	Classrooms	-Teachers' desks, chairs and closets -Students' desk-chairs (large, medium and small) and closets -Blackboards and bulletin boards
Secondary Schools	Classrooms	-Teachers' desks, chairs and closets -Students' desk-chairs and closets -Blackboards and bulletin boards
	Science Laboratories	-Demonstration workbench -Experimental tables and stools -Students' closets -Blackboards and bulletin boards -Storage lockers and steel shelves

3-3-6 Maintenance and Management Plan

The maintenance and management of Project school facilities after Project implementation will be conducted by the local offices of the Department of Public Works and Highways (DPWH) in Regions I and III. The costs will be alotted by DECS.

Since 1980, DECS has been able to secure funds, Maintenance and Other Operating Expenditures (MOOE), for simple repair work, and Capital Outlay (CO) for repair and construction work, and has been conducting repair work at various schools under the guidance of DPWH. When repairs or maintenance becomes necessary, a request is made by the school principal and is forwarded to DECS's regional office for evaluation. After being evaluated, the request is then sent to DECS's Central Office. DPWH's Central Office is then notified of the costs. After being approved by the Department of Budget and Management, the final budget is decided upon. Based on the budget, DECS's Central Office will determine the amount to be allocated to each school and DPWH's Engineering Section will set up the maintenance and repair program which each school principal will be notified of.

The construction contractors will be chosen by DPWH's Engineering Section and the maintenance and repair work will be conducted under the supervision of DECS and DPWH.

Since 1990, DECS has been able to carry out procedures for small-scale repair work and maintenance quickly with the cooperation of each school district's PTA and local agencies.

Table 3-12 shows the flow of school maintenance and repair work. Table 3-13 shows the actual costs for maintenance and repair at DECS's local offices in Regions I and III for the past 3 years.

Table 3-12 Flow of Maintenance and Repair Work

Responsible Department	Work Flow Order and Content
DECS	1. Examine the necessity of repair work requested by each school's principal and submit necessary budget and work proposal to DECS's local office.
DECS	2. DECS's local office examines the proposal and submits to DECS's Central Office a list of the schools needing repair work.
DECS	3. DECS's Central Office notifies DPWH of DECS's budget.
DPWH	4. DPWH's Central Office submits a proposal to DBM's Infrastructure Program.
DBM	5. Examine the submitted proposal and budget request and notifies DPWH the limit of available budgetary funds.
DPWH	6. DPWH's Central Office notifies DECS's Central Office of the amount of the budget.
DECS	7. Determine amount of money to be allocated to each school according to the needs of the school and the priority and notifies DPWH.
DPWH	8. DPWH's Central Office delivers the budget document to its Engineering Section.
DPWH	9. DPWH's Engineering Section sets up the repair and maintenance program according to the budget document and notifies each school principal of the program.
DECS	10. Notify each school of the repair and maintenance program.
DECS	11. Manage overall repair and maintenance work.
DPWH	12. Manage repair and maintenace work until its completion.
DPWH	13. Deliver repaired or maintained school facilities to DECS.
DECS	14. Accept repaired or maintained school facilities from DPWH.

Table 3-13 Actually Spent Maintenance and Management Expenditures of DECS's Local Offices in Regions I and III (1989-1991)

Year	Amount (Unit:Peso)		
	Region I	Region III	Total
1989	242,086,960.83	177,454,550.82	419,541,511.65
1990	201,200,494.67	227,370,431.83	428,570,926.50
1991	298,276,171.50	387,699,198.15	685,975,369.65
Total	741,563,627.00	792,524,179.80	1,534,087,806.80

The construction of additional school facilities will necessitate securing teachers and providing funds for facility operations and maintenance.

This Project was proposed as part of the Philippine Government's School Construction Plan, and the teaching staff and maintenance costs are planned as part of the entire Project.

The major objective of this Project is to rebuild the schoolbuildings destroyed by typhoons and thus, as previously stated in the Operation and Management Plan section, maintenance and operations may be adequately carried out with the same number of staff and the same budget as before.

As for the maintenance costs, the equipment and facilities have been chosen so that the actual maintenance may be conducted at low costs. The main structures should be maintenance free; thus, the total costs should be quite low. However, wooden doors, jalousies, color-crete floors and plywood walls that are to be obtained locally will have to be regularly maintained to have them last over a long period of time.

Table 3-14 shows the operation, management and maintenance cost per schoolbuildings.

Table 3-14 Operation, Management and Maintenance Annual Costs for One Schoolbuilding (C Type)

Item	Material Costs (pesos)	Labor Costs (pesos)	Maintenance Frequency	Remarks
Wooden Doors & Jalousies	1,250	530	Once every other year	Recommended to paint once every two years to prolong jalousie life
Floor (color-crete)	14,760	2,040	Once a month	To maintain color texture, monthly waxing is required
Plywood wall & ceiling painting	210	120	Once every five years	Basically, the wall is maintenance free; it will be necessary to paint stains and smudges.
Painting of elevated water tank support	210	100	Once every other year	Special cares shall be given to schools located close to the sea coast.
Pump	3,140		Once every seven years	Unit required replacement at seven year intervals.
Total annual Material and Labor Costs	22,360			

3-3-7 Evaluation of Buildings for Phase I - III

72 schoolbuildings and separate workshops were completed in Phase I, 69 schoolbuildings and toilets in Phase II, and 72 schoolbuildings and toilets in Phase III. All of the schools were equipped with appliances. The person in charge DECS's Office of Planning Service, who is presently in charge of Project implementation for other project, was asked about the condition of Phase I buildings. The persons in charge of Project implementation for Phase II and III were asked about the conditions of Phase II and III buildings. Their answers indicated that the Phase I, II and III buildings showed no signs of damage from natural disasters and that the classrooms seemed to be in full use.

Their answers are summarized as follows:

Buildings completed in Phase I:

1) The cost of the project buildings were high in comparison to those built by DECS.
2) There were no problems concerning the shape, size or maintenance of the buildings.

Buildings of Phases II and III:

1) Considering the future increase in the number of students, the size of the classrooms should be 7.0 x 8.0. m.
2) The elevated tanks included in the facility plans from Phase I were effective from a hygienic viewpoint and were highly evaluated.
3) The types of buildings and facilities were highly evaluated.

The facilities completed under Phases I, II, and III have contributed a great deal to the education of Philippine children. Not only has it become possible to provide education without being affected by weather or natural calamities, it is now possible to provide places of evacuation necessitated by calamities, and to have places where area residents can hold meetings. The completed facilities are contributing significantly to the local communities. It has also been evaluated that the project has made an extremely substantial contribution to the transfer of technology to construction engineers of the Philippines, the increase in job opportunities the activation of the local economy.

As for the higher construction costs for the Project's Schoolbuildings in comparison to DECS' Philippine style schoolbuildings, the nature of the Project is to construct the schoolbuildings for approximately 70 schools located in areas severely damaged by typhoons during a short time period of each project phase by using typhoon resistant prefabricated structures. Further, the grade of the Project's schoolbuildings in higher than those of the Philippine style schoolbuildings. For this reason, the construction costs of the Project's schoolbuildings are higher than those for the Philippine style schoolbuildings.

The Schoolbuilding Construction Plan with Typhoon Resisting Prefabricated Structures will be completed by the Phase V Project.

In order to improve the chances of a child to attend school in the Philippines, it is felt to be necessary to take into consideration the construction of many low-cost schoolbuildings from the viewpoint of utilizing the budgeted funds efficiently.

CHAPTER 4. BASIC DESIGN

CHAPTER 4. BASIC DESIGN

4-1 Design Policies

The examination of the construction method and the preparation of the construction plan are the most important factors for the basic design of the Project because of the Project's peculiarity wherein many schoolbuildings must be constructed within a short period of time.

For the Project facilities arrangement plan, the relationship between the new facilities and the existing facilities should, in addition to the general basic design conditions of the Project facilities, be taken into consideration. In particular, such consideration of the construction methods and procedures that would not hinder activities in existing facilities during the new facility construction period should be taken into account as the design conditions.

Based on the contents of the Government of the Philippines' request and the series of discussions held with concerned officials of the Government, the following Basic Design policies were established:

1) Design Policies for Natural Conditions

By taking into consideration the natural conditions in the Philippines, such as the typhoons that frequently occur every year, the tropical climate, and the area characteristics of Regions I and III, the Basic Design shall be prepared as follows:

1. The design must be prepared with emphasis placed on typhoon-resistant capabilities.

   Every year the Philippines suffers from the effects of typhoons. School facilities in Regions I and III in the Project Area are not an exception. The schoolbuildings to be built under the Project will be used as places of refuge for the area residents. The buildings must therefore be designed to be typhoon resistant structures that will last for many years. There is no need for these buildings to be of high-grade quality nor have elaborate decorative designs and quality materials, but they should be simple and practical.

2. Examination of the Natural Environment and Meteorological Conditions.

The Philippines has a tropical climate; its annual average temperature is 26 to 27℃. The schoolbuildings, as a general principle, shall be designed to have large openings for natural ventilation purposes.

Further, to provide comfortable classroom environment, electrical wiring for fan installation (fans to be installed by the Philippine side) shall be planned.

Open corridors with roofs should be built to offer students and teachers shelter when moving from classroom to classroom on rainy days. The corridors shall be designed to prevent raindrop splashes, mud, and dirt from entering.

When schoolbuildings are to be built near seasides, the design of the buildings, the probability of salt damage must be taken into consideration.

Anti-termite treatment of wooden portions must be planned in the design.

The annual rainfall of 1991 in Ilocos of Region I was 2,078 mm; at Central Luzon of Region III it was 1,974. In these regions, it will be necessary to consider taking measures against flooding, such as the adoption of elevated foundations.

As a general principle, natural lighting must be fully utilized. Electric lighting shall only be used on occasions when classes are conducted at night or during dark, rainy days. To obtain sufficient natural light at the center of classrooms is a very important factor for the building design. For this reason, building beam spans shall be limited to 8 m. Wooden jalousies shall be painted white to increase the lighting efficiency.

2) Design Policies for Social Conditions

The design shall be prepared by respecting the Philippines' school facility design standards and by taking into consideration the living mode of the people.

In the Philippines, school facilities are not only used for children's education but for the meeting places for area residents, and as places of refuge during calamities. Therefore, to create larger spaces, movable partitions must be designed for installation between classrooms for the Project schoolbuildings.

By taking into account the possibility that double-shift classes or meetings may take place at night, all schoolbuildings shall be designed to have lighting systems.

According to the Philippines' accessibility laws, Batas Pambansa Bilang 344, the installation of sloped accesses and special toilets for handicapped students shall be planned. Furthermore, by considering students' safety, round-shaped columns shall be used for corridor structures and the use of independent columns in classrooms shall be avoided.

3) Design Policies for the Situations of Local Construction Field

In the Philippines there is the National Building Code that corresponds to the *Building Design Standards in Japan*. Similar to Japan, it is necessary to obtain various permits by submitting formal applications to start building construction.

There are some high level local construction contractors and consultant firms. It is believed that they can be used for the Project, but careful screening would be necessary prior to hiring them as subcontractors.

A number of construction workers are available in the Philippines. Their skills are regarded as being high. However, it would be necessary to dispatch engineers from Japan when special knowledge for the construction of prefabricated structures is required. The work skill level of local construction workers is equal to that found in other Southeast Asian countries, such as Thailand, Indonesia, etc. With proper guidance, the workers can accomplish a high level of work.

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

The levels of local construction contractors and consultant firms are high. Use of local contractors for building construction, finish work, and

facility installation will be possible. If technical manuals are provided, local consultants will be able to assist in supervising construction work.

Except for the prefabricated materials to be procured in Japan that are required for securing the typhoon-resisting capabilities of Project schoolbuildings, Project use materials and equipment shall be procured locally by taking into account of easy maintenance and management of school facilities after Project completion. The quality of local materials are thought to be satisfactory. Most of the necessary materials and equipment are available in Regions I and III. Some items that are required to be of higher grade or are needed in greater quantities than are available in Regions I and III, will be procured in Manila.

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

By taking into consideration the Philippine Governments financial difficulties, building structures shall be planned by giving top priority to a maintenance-free concept to allow minimum maintenance and management costs and easy maintenance and management after completing Project facilities. Furthermore, consideration shall be given to the use of local materials, except prefabricated materials, for effecting easy repairs to damaged or deteriorated facilities.

6) Design Policies for Scope and Level of Project Facilities and Equipment to be Provided

The contents of the Project include the construction of classrooms and toilets for primary schools and classrooms, science laboratories, and toilets for secondary schools, and the furnishing of associated basic educational equipment. These facilities will provide basic educational spaces in the Philippines and they should be designed to be comfortable for daily class activities. For the design, emphasis shall be placed not only on their looks but on their quality and quantity. Further, they should be designed not only for class use but for multipurpose use such as places of refuge during natural calamities.

In particular, the equipment plan shall be made to provide basic units necessary for classroom activities. By considering the use frequencies of

In particular, the equipment plan shall be made to provide basic units necessary for classroom activities. By considering the use frequencies of equipment units for daily classroom activities, practicality and durability shall be emphasized when preparing the design.

7) Design Policies for Project Construction Period

The Project is to construct 75 primary and secondary schoolbuildings in Regions I and III which stretches approximately 400 km in a north-south direction and 150 km in an east-west direction. The construction work must be completed within the limited time span.

An effective Project construction plan shall be carefully prepared -- the construction of building foundations and toilets may be undertaken while the prefabricated materials are being manufactured in Japan.

As there will be many schoolbuilding under construction at the same time, the entire Project Area will be divided into five areas for Region I and five areas for Region III for a total of 10 areas and the Project construction in each area will be carried out by one work group.

4-2 Examination of Design Criteria

To meet various site conditions and the size of each Project school, three types of schoolbuildings were designed. Each one of them was adopted according to each school's classroom shortage situation and site condition.

Optimum room sizes were decided upon by referring the Philippines' design standards and Japanese design standards. For reducing costs, it is extremely important to establish appropriate prefabricated unit sizes and shorten the construction period by simplifying construction work.

By taking into consideration the number of students to be assigned in each class and the furniture arrangement, a classroom size was decided upon as being 8 m x 6.75 m (54 m^2) and a science laboratory as being 8 m x 11.25 m (90 m^2).

Toilets are planned according to local building methods as described in DECS's improved specifications. A toilet for males is 9.45 m^2, the one for

Table 4-1 Features of Project Schoolbuildings

Building Type	Name of Room	No. of Units	Area (m²)	Remarks
Primary School Type B	Classrooms	3	162.00	40 students per room
	Corridor	1	30.38	
	Toilet(male)	1	9.45	
	Toilet(female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
	*exception of 1school 192.38m²		228.88m²	For 1 school
Total			4,312.22m²	19 schools 2,280 students
Primary School Type C	Classrooms	4	216.00	40 students per room
	Corridor	1	40.50	
	Toilet(male)	1	9.45	
	Toilet(female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
Subtotal	*exception of 2schools 256.50		293.00m²	For 1 School
Total			3,772.50m²	13 schools 2,080 students
Primary School Type D	Classrooms	4	270.00	40 students per room
	Corridor	1	50.63	
	Toilet(male)	1	9.45	
	Toilet(female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
Subtotal	*exception of 2schools 320.63m²		357.13m²	For 1 School
Total			7,426.73m²	21 schools 4,200 students
Total Floor Area of Primary Schools:			15,511.45m²	53 schools 8,560 stuents
Secondary School Type SB	Classrooms	3	162.00	42 students per room
	Science Lab	1	90.00	
	Corridor	1	47.25	
	Toilet (male)	1	9.45	
	Toilet (female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
Subtotal			335.75m²	For 1 school
Total			335.75m²	1 schools 126 students
Secondary School Type SC	Classrooms	4	216.00	42 students per room
	Science Lab	1	90.00	
	Corridor	1	57.38	
	Toilet (male)	1	9.45	
	Toilet (female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
Subtotal			399.88m²	For 1 school
Total			799.76m²	2 schools 336 students
Secondary School Type SD	Classrooms	5	270.00	42 students per room
	Science Lab	1	90.00	
	Corridor	1	67.50	
	Toilet (male)	1	9.45	
	Toilet (female)	1	9.45	
	Toilet(handicapped)	1	5.13	
	Corridor	1	12.47	
Subtotal			464.00m²	For 1 school
Total			8,816.00m²	19 schools 3,990 students
Total Floor Area of Secondary Schools:			9,951.51m²	22 schools 4,452 students
Grand Total			25,462.96m²	75 schools 13,012 students

4-3 Basic Plan

4-3-1 Site and Layout Plan

Building arrangement must be made by taking into account the following aspects:

1) A new building shall be arranged as being functional as one school complex together with existing facilities. This arrangement plan shall be made by taking into consideration the movement of people between the new building and the existing facilities.

2) A new building shall be arranged on flat land as much as possible by avoiding dipped areas, from the viewpoint of the building structure's safety.

3) To utilize natural ventilation, a new building shall be arranged by taking into account the prevailing wind direction. Furthermore, the building arrangements shall be made by considering the distance between the existing building and the new building for allowing drafts to pass between them and for avoiding wind force concentration during typhoon periods.

4) A new building's longitudinal direction shall be decided upon by taking into consideration the sunshine entering the classrooms.

5) A new building shall be arranged as not to adversely affect existing facilities. The building shall be arranged to allow for the economical installation of facilities and electrical supply lines.

6) The toilet facilities shall be built using the Philippine method and shall be separate from the prefabricated main structure. New facilities shall be arranged by taking into account the movement of people so that they will be functional together with the existing facilities.

4-3-2 Architectural Design

a. Floor Plan

When the prefabricated unit-construction method is used, the setting of the adequate size module is a very important matter for simplifying construction work and reducing construction time. DECS's school construction manual specifies that the size of one classroom shall be 6 m x 8 m. The Japanese standard is about the same and the classroom size is appropriate.

For Project schoolbuildings, the minimum size of the module was decided upon as being 2.25 m wide, and classrooms as 8 m x 6.75 m (2.25 m x 3 units) and science laboratories as 8 m x 11.25 m (2.25 m x 5 units).

The toilets that are to be built based on Philippine standards shall be arranged separate from the prefabricated main structure. Taking into account odor problems, the toilets will be located away from other buildings.

Science laboratories shall be arranged to keep water supply and drain pipe installation work to a minimum. All Project buildings shall be arranged from the viewpoint of overall school facility use.

By taking into consideration the Project site areas' population, the condition of infrastructure such as roads and water supply system, the number of students of each Project school, the land conditions, and the condition of existing buildings, the floor plans of the three basic buildings and the science laboratory were prepared. Each school's arrangement plan was made to suit the needs of the school and area conditions by using these floor plans.

An open corridor is designed to allow teachers and students to move easily.

A comparison of Project facility features to those having Philippine standard is given in Table 4-2.

Table 4-2 Comparison of Project Facility Features to Those Having Philippine Standards

	Name of Room	Philippine Standard	Project Facility Standard	Difference
PRIMARY SCHOOL	Classroom	1.2 m²/student (minimum requirement)* but actual figure is 1.17m²/student	1.35m²/student (40 student/class)	· Typhoon-resisting capability · Unit area per student was increased to meet possible future inrcease of students per class-room · Sliding partition is adopted to permit combining two class-room. · Major structure is maintenance free type · High ceilings are adopted to allow natural ventilation
	Toilet	One urinal per 50 males. Two urinals for additional 100 males. One toilet bowl per 50 students. One sink per one toilet bowl. One water faucet per two classrooms.	Male Toilet: · Two toilet bowls · One urinal (4 persons use). · One local method sink (2 persons use). Female Toilet: · Three toilet bowls. · One local method sink (2 persons use). Handicapped Toilet: · One toilet bowl. · One ready-made sink	· Adopted Philippine Standard, but added handicapped person use toilet units
	Corridor	No rule exists for the outside corridor. 2.0m wide for inside hallway for a school having less than 500 students.	1.5m wide for outside corridor	· Similar to Philippine Standards

	Name of Room	Philippine Standard	Project Facility Standard	Reference
SECONDARY SCHOOL	Classroom	1.4 ㎡/student (minimum requirement) but actual figure is 1.11㎡/student	1.28㎡/student (42 students/ class)	· Same as for Primary Schools · Unit area per student is slightly smaller than Philippine standard, but one classroom can accommodate 42 students.
	Science Laboratory	2.4 ㎡/student (minimum requirement)	2.14㎡/student (42 students/ class)	· Typhoon-resisting capability · Designed to install one steel shelf unit in each laboratory. · Designed to install sink units for experiment
	Toilet	Same as primary school standards	Same as primary school standards	· Same as Philippine Standards, but added handicapped person use toilet units
	Corridor	Same as primary school standards	Same as primary school standards	· Similar to Philippine Standards

Source:The Present of Educational facilities in the Philippines and Future Issues.

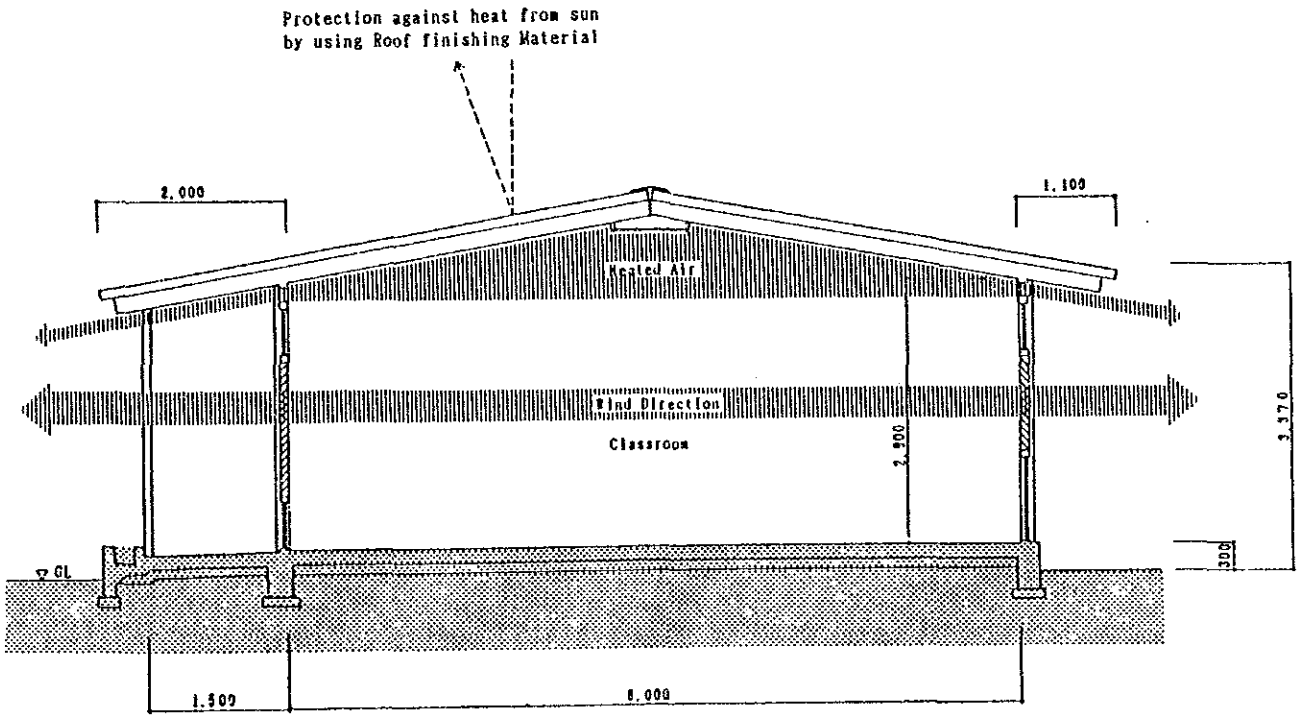
Note :According to DECS, standard classroom space per student is 1.2㎡ for a primary school and 1.4㎡ for a secondary school. However, RP-US Bayanihan type, one of the Philippines' standard type, has 1.17㎡ per student for a primary school and 1.11㎡ for a secondary school.

b. Section Plan

As a general principle, the section plan for the Phase V Project followed the one for the Phase IV project. By taking into consideration the tropical climate of the Philippines, the graded ceiling was adopted to keep the air stratum as thick as possible above the classroom.

The length of the eaves was decided upon from the viewpoint of the effects of intercepting direct sunshine, providing Protection against rain, and offering strength against uplifting wind forces. Eaves on the open corridor side are to be 2.0 m long -- 1.5 m from the building's wall to the corridor columns, and 0.5 m from the columns to the tip of the eaves. Eaves on the other side of the building are to be 1.1 m long. The standard section of Project buildings are shown in Fig. 4-1.

Fig. 4-1 Standard Section of Project Building



c. Structure Plan

1. Basic Requirements

The main purpose of the Project is to restore or rebuild 75 schoolbuildings that were damaged by large typhoons in Regions I and III. The following three aspects specifically required for the Phase V Project's structure plan were also applicable in the Phase I, Phase II, Phase III, and Phase IV projects:

(1) Typhoon-resistant capabilities
(2) Durability
(3) Short construction period

Based on the experience gained during the Phase I, Phase II, Phase III, and Phase IV projects, steel-frame prefabricated panel structures are thought to be most suitable for meeting the above requirements. The panel units are to be fabricated with factory made steel frames. The panel units made in Japan will be shipped to each Project site and assembled there to make a permanent structure. By using this method , construction quality control and a short construction period can be accomplished.

From the viewpoint of the above concept, the structure plan was made to ensure the typhoon-resistant capabilities and durability of the buildings as follows:

2. Design Policies

a) Design Loads and External Forces

Basically, the National Structural Code of the Philippines was used to determine the design loads for Project schoolbuildings. From the viewpoint of typhoon-resistant capabilities, the design loads were decided upon by taking into account not only the loads specified in the Philippine Code, but also the actual building damage conditions and loads specified in the Standards of the Japan Society of Architects.

The Philippine Code does not specify the local wind force for building design. However, the design load condition equivalent to that specified by the Japanese Code was adopted for the Project. "The Building Design Load Manual and Its Interpretation" published by the Japan Society of Architects specifies the external force factors for local wind forces.

Examples of typhoon damages to buildings are shown in "The Building Damages in Hachijo Island caused by Typhoon No.13 in 1975" published by the Japan society of Architects. Typhoon No.13 was about the same scale as the typhoons that caused extensive damages in the Philippines. Many similarities were found between the above record and the recorded damages in the Philippines. Therefore, the design loads for Project schoolbuildings were decided upon after carefully examining the above publication.

b) Building Structure Plan

Project buildings must have sufficient strength to support fixed loads, live loads on roofs, wind loads, and seismic loads. The ways in which building structures will resist against each load are described below:

(1) Vertical external forces (fixed loads, live loads on roofs, and uplift wind forces on roofs) will be taken by the prefabricated module unit (8 m x 2.25 m per unit). The module units are to be weatherproof lightweight shaped steel frames.

(2) Longitudinal direction horizontal external forces (wind forces and seismic forces) will be taken by the vertical braces on the side frames and the fixed-partition walls, and the rigid frames of each module unit.

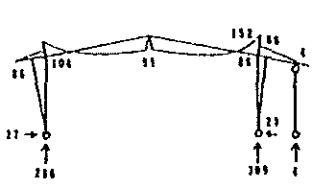
(3) Beam direction horizontal external forces (wind forces and seismic forces) will be taken by the rigidity of the wall panels. In general, the beam direction of steel frame structures is the weaker structure direction against horizontal external forces. Therefore, vertical bracings are used to take the external forces.

From an esthetic viewpoint, the exposed vertical bracings are not desirable. Thus, the external forces will be taken by the internal rigidity of the wall panels instead of installing vertical bracings.

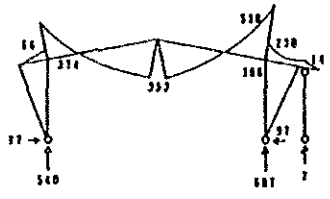
Mat foundations will be constructed around the buildings. The thickness and reinforcement of the foundations will be decided upon to suit the condition of each Project school site. For example, according to the Building Damages in Hachijo Island Caused by Typhoon No.13 in 1975, it was reported that wind forces lifted buildings from their concrete block foundations.

For Project schoolbuildings, the large lifting forces of winds and the column pulling forces by an overturning moment acting on the schoolbuildings may occur, thus, special attention shall be paid to the method of fixing building structures to foundations.

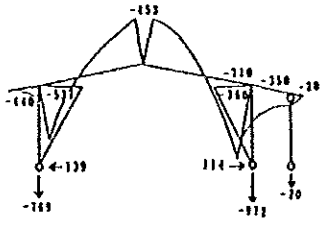
The results of the stress analyses of the rigid frame structure against beam direction horizontal external forces are shown below.



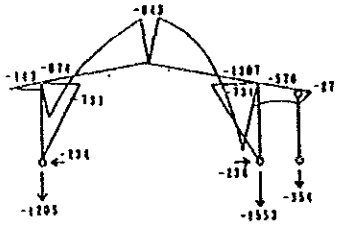
Fixed load



Roof Area Live Load



Wind Load
(Open Windward and Leeward)



Wind Load
(Only Windward Open)
* Vertical Component Only

Unit: kg·m

c) Design of Each Structure Member

The most influential force exerted on the buildings will be the wind force. Thus, special attention must be paid to wind forces when designing structure members.

· Eaves and Roof Ridges:

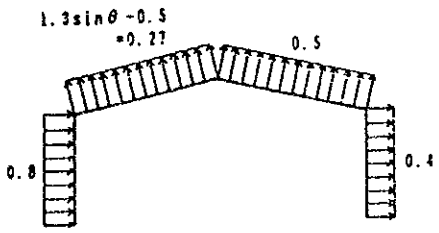
During the field survey period, in particular, many damaged eaves and roof ridges were observed. Special attention must be paid when designing these building parts because they will receive the impact from highly concentrated wind forces. Judging from the actual typhoon damage conditions, it is necessary to include the external force factors into the design load conditions.

One method for reinforcing eaves and roof ridges is to utilize deform preventive materials.

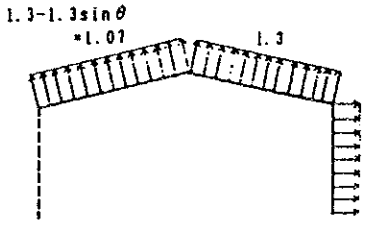
The installation of these members shall be taken into consideration in the detailed design of Project buildings.

· Wall Panel's Strength Against External Forces:

"The Building Damages in Hachijo Island Caused by Typhoon No.13 in 1975" reported on the damaged buildings whose roofs were completely blown away by the lifting wind forces that might have resulted after the collapse of the walls. Wind force coefficients for closed and open wall types are shown in the following figure:



Closed



Open Windward

As the above figure shows, the failure of walls will create enormous wind forces in the building which might result in its complete destruction. Thus, it is necessary to pay special attention to wall panel strength against external forces. Since it is planned to utilize removable wooden jalousies that are to be made in the Philippines, the details of window joints must be carefully examined.

· Joints Between Wall Panels:

Careful examination must be made not only of the strength of the panel itself, but the strength of the panel joint must also be examined. For the panel joint design, it is necessary to consider special means, such as increasing the design safety factor of the panel itself in order to avoid panel failure at the joints.

d. Building Facility Plan

(1) Electrical Facility Plan

Electrical facilities are planned to be installed in all Project schools. All materials for the electrical facilities will be procured in the Philippines.

Lighting fixtures, outlets, and ceiling fans will be installed. For fan installation, electrical conduits, wiring and switches will be installed -- fan units will be installed by the Philippine side.

Table 4-3 shows the electrical facility Plan.

Table 4-3 The Designed Number of Fluorescent and Incandescent Lighting Fixtures, CeilingFans, Switches and Outlets for Each Room

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

(2) Water Supply Facility Plan

The same as for the Phase I, II, III and IV projects, pipe supply or well water will be lifted by electric power or manual pumps into 4 m high elevated tanks. The water will then be supplied to the wash basins in toilets, water closets, urinals, and the science laboratory sinks by gravity flow.

The water supply facility includes the following items:

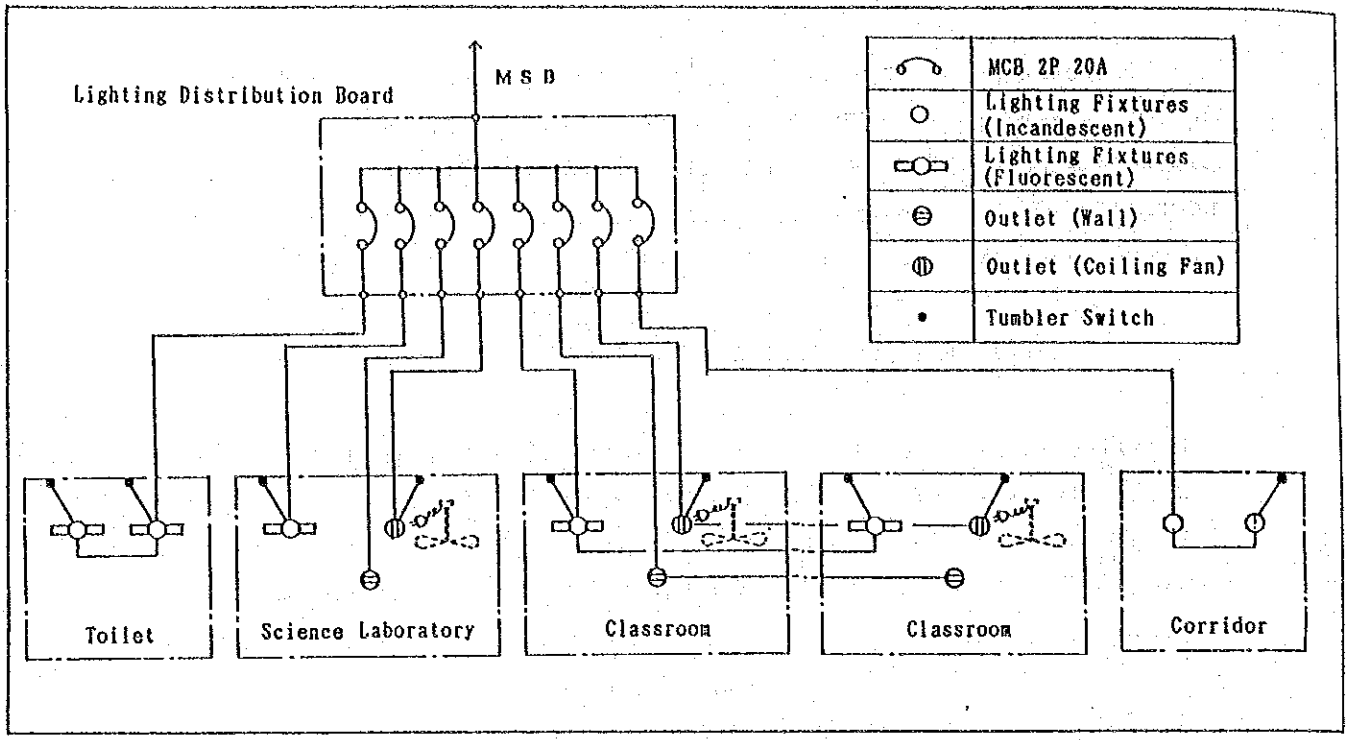
· Elevated tanks:	F.R.P. tanks, 2.0 m^3 capacity
· Supporting structures:	Fabricated with steel angle bar
· Pumps:	Motor operated pumps or hand pumps (for schools having no power supply)
· Piping material:	PVC pipe and ductile iron pipe for tank connection portions.

(3) Sewerage Facility Plan

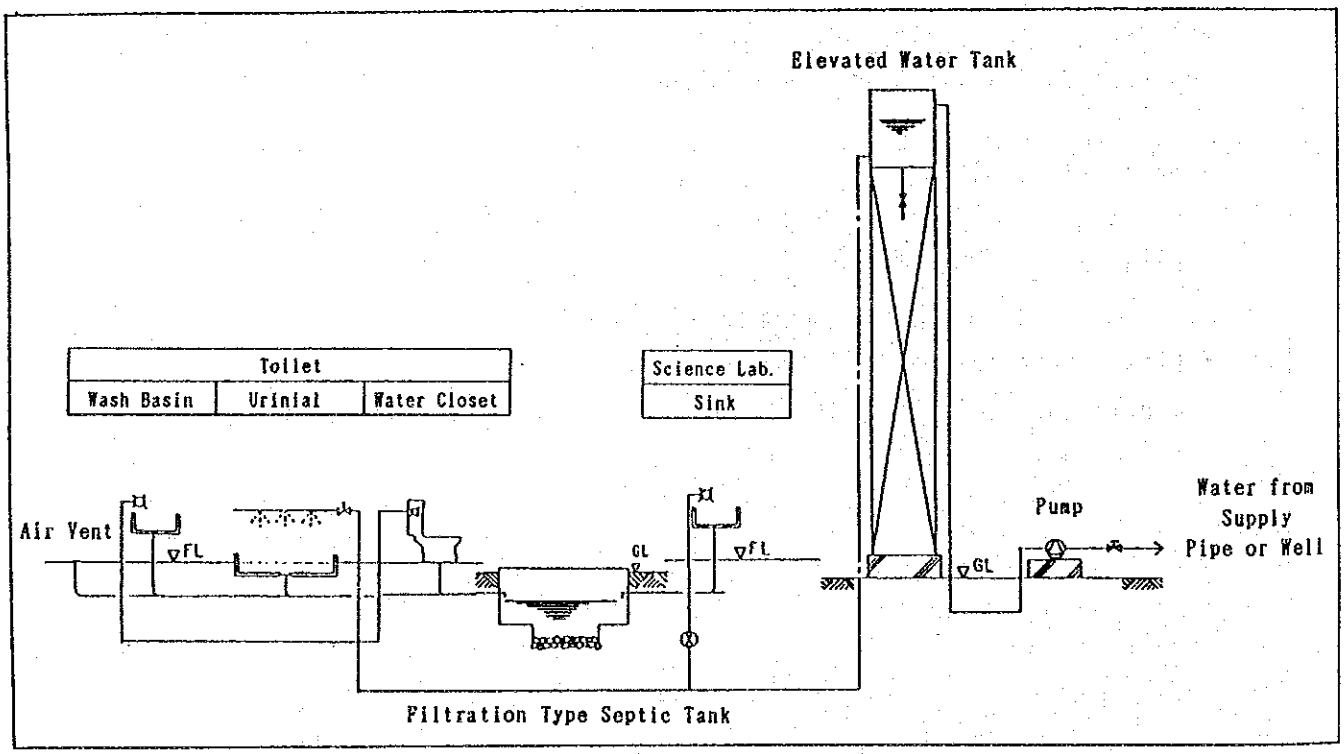
It will be necessary to install sewage treatment facilities for sewage from toilet wash basins, urinals, and water closets, and water from the sinks in the science laboratories. It is designed to treat sewage and waste water by simple infiltration type septic tanks. The sewerage facility includes the following items:

· Water closets:	Western type
· Urinals:	Multiple unit type, partially tiled
· Wash basin:	Reinforced-concrete with tile (china for handi-capped students)
· Piping material:	PVC pipe
· Septic Tanks:	Infiltration type, made of reinforced concrete and CHB

Lighting and Outlet Wiring Diagram



Water Supply and Sewerage System Diagram



e. Schoolbuilding Material Plan

1. Basic Requirements

As in the Phase IV project, in view of durability and short construction period requirements, prefabricated materials, such as steel structures and roofing materials, the long sandwiched insulated panels shall be procured in Japan for the Project. Since no problems are foreseen in the use of local materials for the interior walls, local dressed plywood is to be used as the finish material of interior walls and ceilings, and colored mortar cement for interior floors.

2. Major Materials to be Used

a) Structure Material

Weatherproof, lightweight shaped steel that provides longer life than regular steel is to be used for the main members of buildings.

b) Roofing Material

Most of the schools in the Philippines are roofed with zinc plated steel sheets. Unfortunately, most of them are corroded. thus, aluminum-zinc alloy plated steel sheets that have a stronger anti-corrosion resistance than zinc Plated steel sheets were selected. Also, uncoated aluminum-zinc alloy plated steel sheets have a better capability to reflect sunshine than the zinc plated steel sheets. It is expected that the selected roofing material will be helpful in preventing temperature rises in the rooms.

c) Windows

Sliding glass windows that are used extensively in Japan are rarely found in Philippine primary and secondary schoolbuildings -- wooden jalousies are most commonly used in the Philippines. Wooden jalousies are durable, easily maintainable and manageable and yet allow effective natural ventilation. Therefore, it was decided to used wooden jalousies for the schoolbuildings.

d) Walls and Ceilings

It was decided to use long insulation sandwich panels for exterior wall material by taking into account their high insulating capabilities. Local dressed plywood will be used for partition walls and ceilings. Some movable walls are designed for Project schoolbuildings. Since the movable walls require highly accurate finish work, they are to be procured in Japan.

The finish materials to be used for Project schoolbuildings are listed in Table 4-4.

Table 4-4 Finish Materials to be Used for Project Schoolbuildings

EXTERIOR	PHILIPPINE METHOD	THIS PROJECT'S METHOD	REASON FOR ADOPTION
Roofs	Zinc plated corrugated steel sheets	Aluminum-zinc alloy plated steel sheets	Stronger anti-corrosion resistance
Roof edges	No underlay, O.S. finish	Waterproof plywood. S.O.P. coating	Easy maintenance and adoption of looal material
Walls	Concrete blocks. mortar finish	Long-sized insulating sandwich panels	Insulating effect
Windows	Wooden jalousies coated with S.O.P.	Wooden jalousies coated with S.O.P.	Easy maintenance
Doors	Wooden doors	Wooden doors coated with S.O.P.	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 particially made of concerete blocks	Reinforced concrete and concrete block made (inside, and outside tank tops are to be waterproof mortar steel trowel finish)	Durability and easy maintenance

EXTERIOR	PHILIPPINE METHOD	THIS PROJECT'S METHOD	REASON FOR ADOPTION
Classrooms and Science Laboratories			
Floors	Reinforced concrete, mortar finish	Colored cement mortar steel trowel finish	Durability
Walls	Concrete blocks, mortar finish	Partition walls-- decorative plywood S.O.P. Side plank--long-sized insulating sandwich panels	Durability, insulating effect, easy construction, and adoption of local materials
Ceilings	No ceiling, O.S. finish(truss structures)	Decorative plywood	Easy to install
Other parts		Work benches with sinks Mortar steel trowel finish (science laboratories only) Dadoes-- CHB mortar, E.P. coating	Easy maintenance and accurate finish work
Toilets			
Floors	Mortar finish	Mosaic tile	Easy maintenance
Walls	Concrete blocks, V.P. laying	Concrete blocks, Mortar steel trowel finish, V.P. laying	Easy maintenance
Ceiling	No ceiling, O.S.finish	Plywood, O.P. finish	Easy maintenance

4-3-3 Equipment Plan

In order to fulfill the educational activities conditions after the opening of the Project schools, proper accommodations must be installed. Upon completion of the classrooms, science laboratories, and toilets in the Project schools, various types of equipment will be used.

Based on the contents of the Philippine Government's request for the Project and the results of the field surveys, the basic equipment necessary for school use will be provided as part of the Project. It was decided that the desks and chairs for primary school classrooms would be the double-seated types. It was planned to provide three different sizes of desks and chairs to suit the different body sizes of the students. Single person desk-chairs that are generally used in the Philippines will be furnished to secondary school classrooms.

For the science laboratories, three-person type tables were decided upon. One workbench (to be used for teacher demonstrations) will be installed in each of the science laboratories. Judging from the purposes for which they are to be used, it was planned to provide practical, strong equipment. As in Phase IV, steel and wooden furniture will be used in this Project.

The equipment types and number of units to be provided for each Project school classroom are shown in Table 4-5. The equipment types and number of units to be provided for each different size Project school are shown in Table 4-6.

Table 4-5 Equipment Types and Number of Units to be Provided for Each Project School Classroom

Primary Schools

Name of Room	Name of Item	No. of Units for One Room
Classroom	• Teacher's desk	1
	• Teacher's chair	1
	• Teacher's filing cabinet	1
	• Student's chair-desks (large size)	8
	• Student's chair-desks (medium size)	8
	• Student's chair-desks (small size)	8
	• Student's closets	8
	• Blackboard	1
	• Bulletin board	1

Secondary Schools

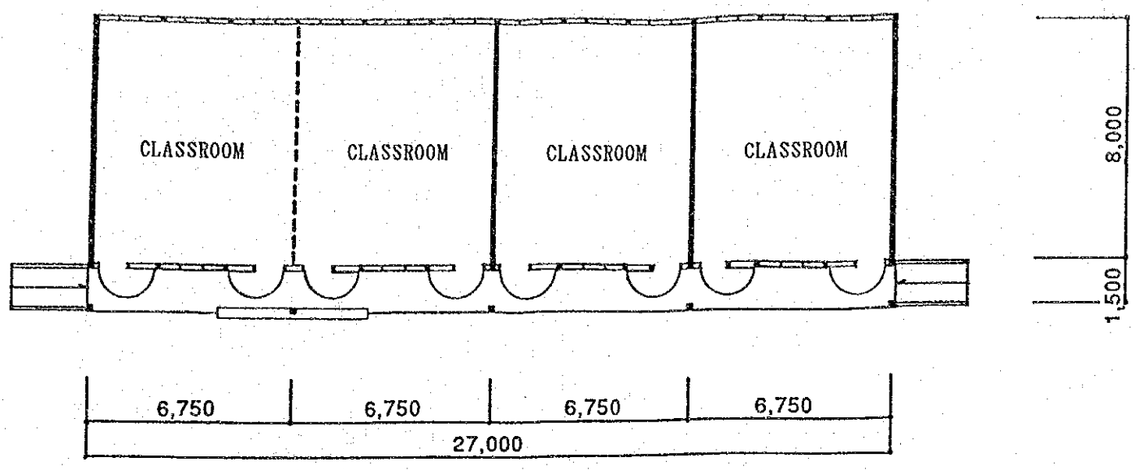
Name of Room	Name of Item	No. of Units for One Room
Classroom	• Teacher's desk	1
	• Teacher's chair	1
	• Teacher's filing cabinet	1
	• Student's chair-desks	42
	• Student's closets	8
	• Blackboard	1
	• Bulletin board	1
Science Laboratories	• Experiment workbenches	14
	• Student's closets	5
	• Demonstration table	1
	• Stools (1 for Teacher, 42 for Students)	43
	• Blackboard	1
	• Bulletin board	1
	• Storage shelve	1
	Steel shelve	1

Table 4-6 Equipment Types and Number of Units to be Provided for Each Different Size Project School

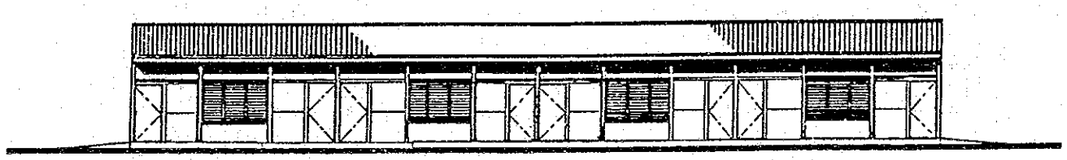
Furniture	Primary Schools							Secondary Schools							Total of All Project Schools
	B Type Three Classrooms (19 schools)		C Type Four Classrooms (13 schools)		D Type Two Classrooms (21 school)		Subtotal	SB Type Three Classrooms (1 schools)		SC Type Four Classrooms (2 schools)		SD Type Five Classrooms (19 schools)		Subtotal	
	For one school	19 schools	For one school	13 schools	For one school	21 schools	53 schools	For one school	1 schools	For one school	2 schools	For one school	19 schools	22 schools	
Teacher's desk	3	57	4	52	5	105	214	3	3	4	8	5	95	106	320
Teacher's chair	3	57	4	52	5	105	214	3	3	4	8	5	95	106	320
Teacher's filing cabinet	3	57	4	52	5	105	214	3	3	4	8	5	95	106	320
Student's chair (Large)	24	456	32	416	40	840	1,712								1,712
Student's chair (Mediun)	24	456	32	416	40	840	1,712								1,712
Student's chair (Small)	24	456	32	416	40	840	1,712								1,712
Armchair								126	126	168	336	210	3,990	4,452	4,452
Student's closet	24	456	32	416	40	840	1,712	29	29	37	74	45	855	958	2,670
Experiment Workbench								14	14	14	28	14	266	308	308
Demonstration Table								1	1	1	2	1	19	22	22
Stool								43	43	43	86	43	817	946	946
Blackboard	3	57	4	52	5	105	214	4	4	5	10	6	114	128	342
Bulletin board	3	57	4	52	5	105	214	4	4	5	10	6	114	128	342
Storage shelf								1	1	1	2	1	19	22	22
Steel shelf								1	1	1	2	1	19	22	22

4-3-4 Basic Dosign Drawings

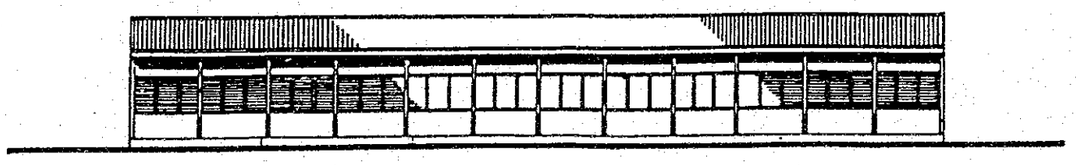
Drawing List



ELEMENTARY SCHOOL C-TYPE PLAN

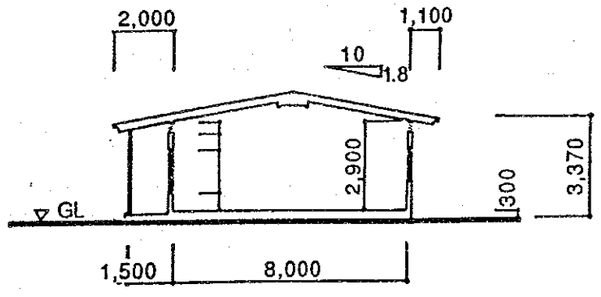


ELEVATION



ELEVATION

立面図



SECTION

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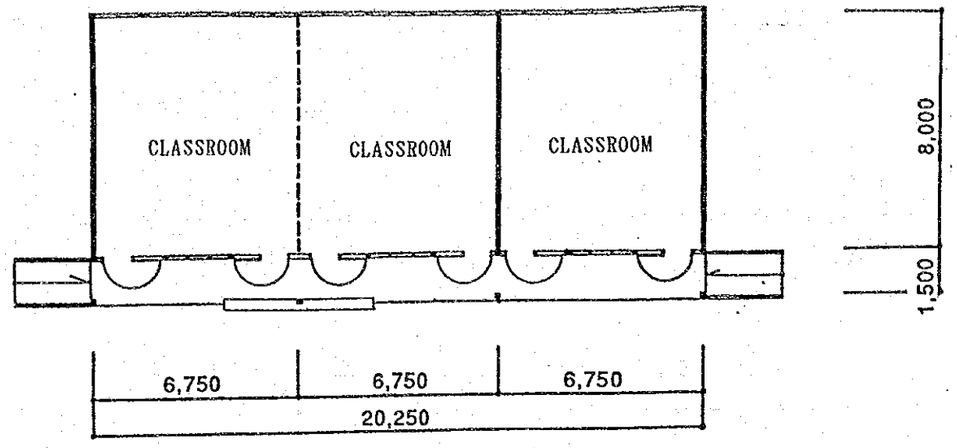

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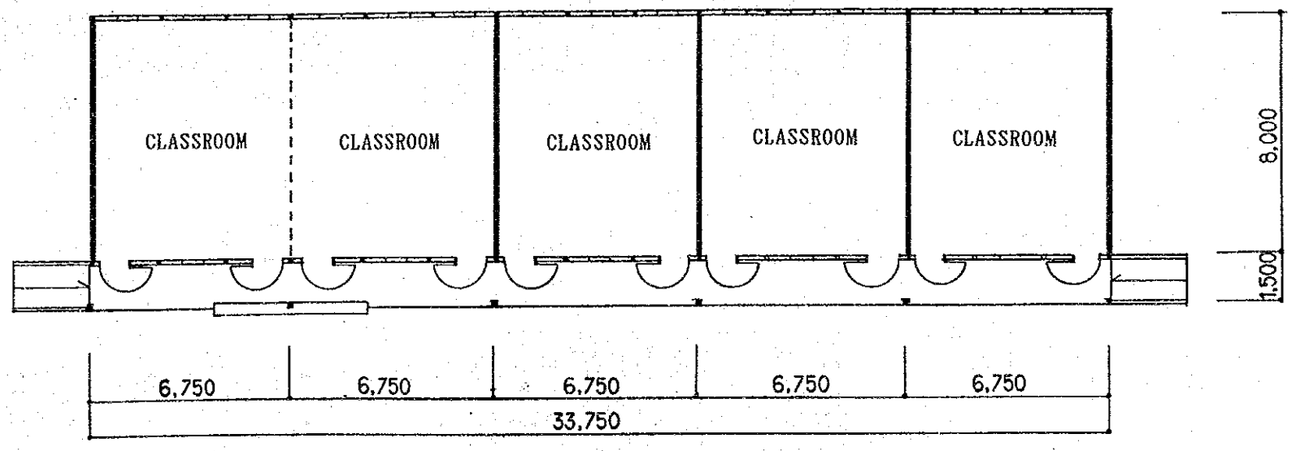

ELEMENTARY SCHOOL D-TYPE PLAN

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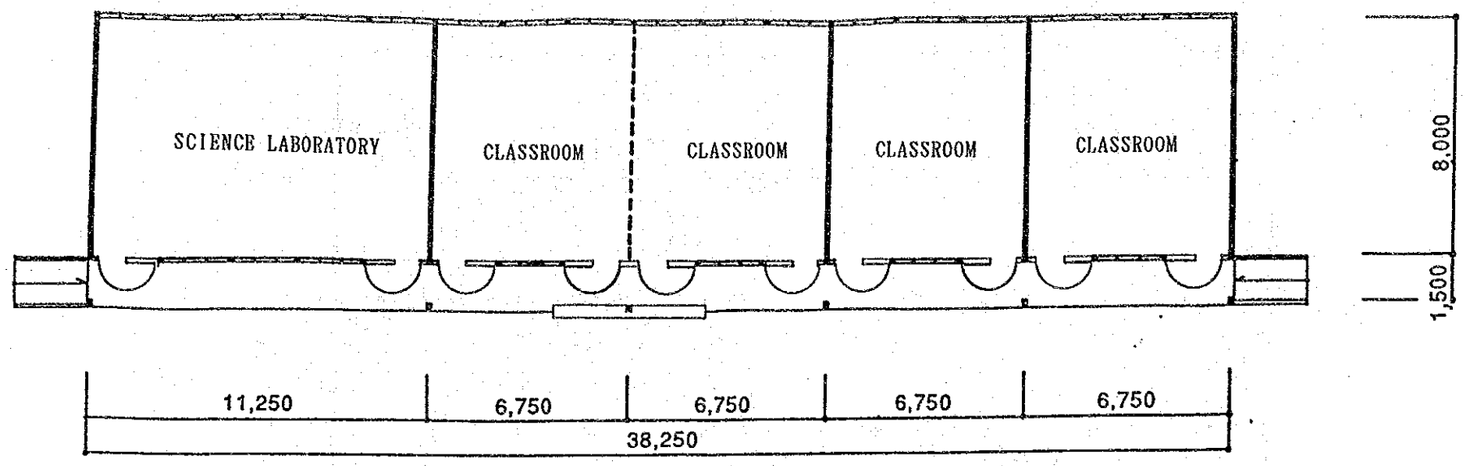
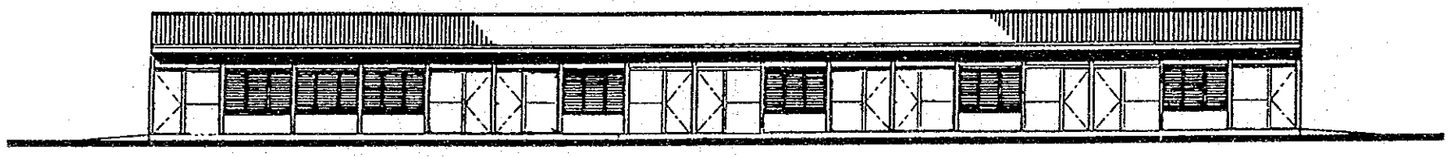


SECONDARY SCHOOL SC-TYPE PLAN



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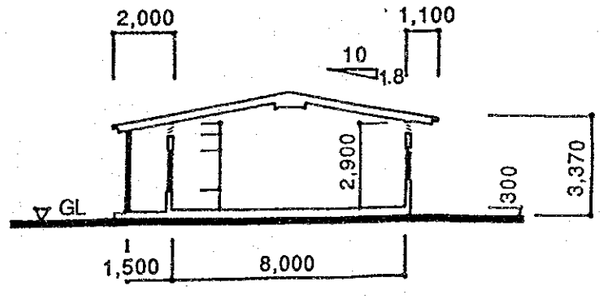
ELEVATION

ELEVATION



SECTION

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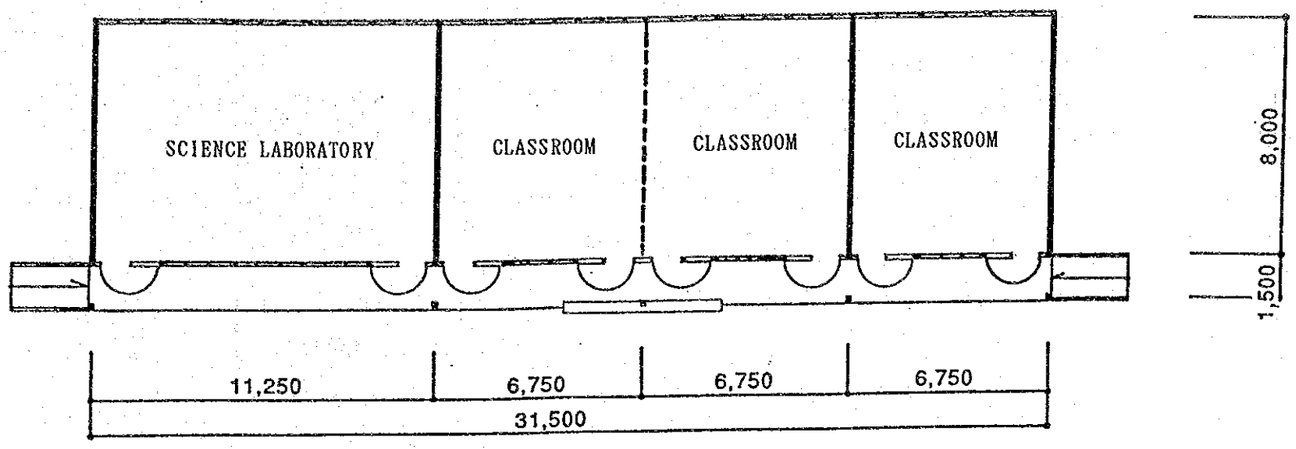
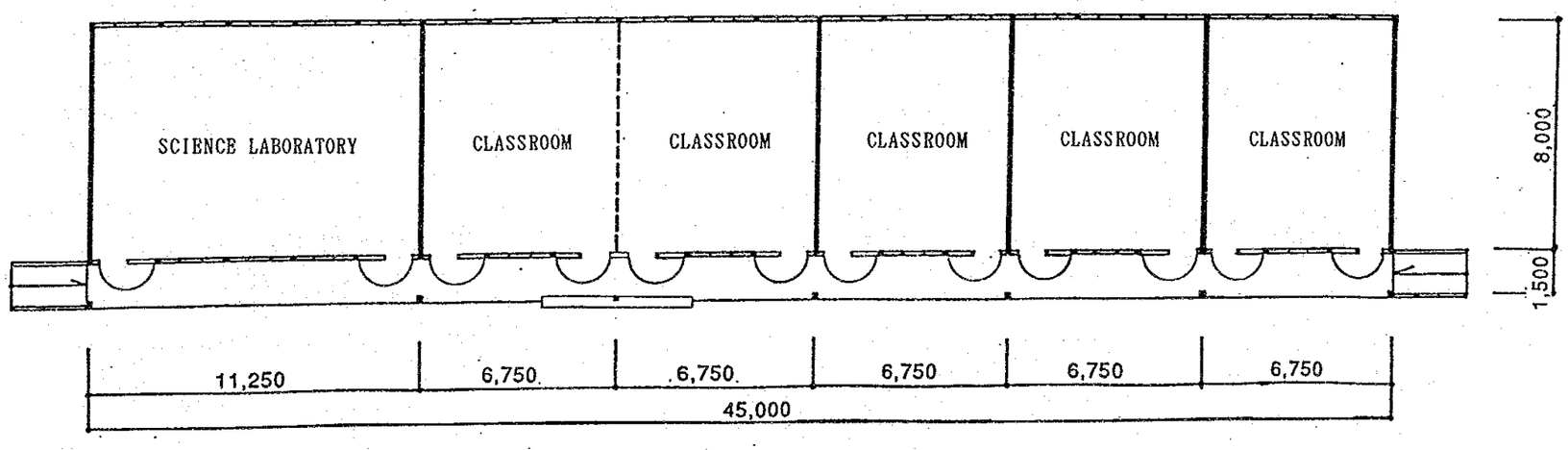
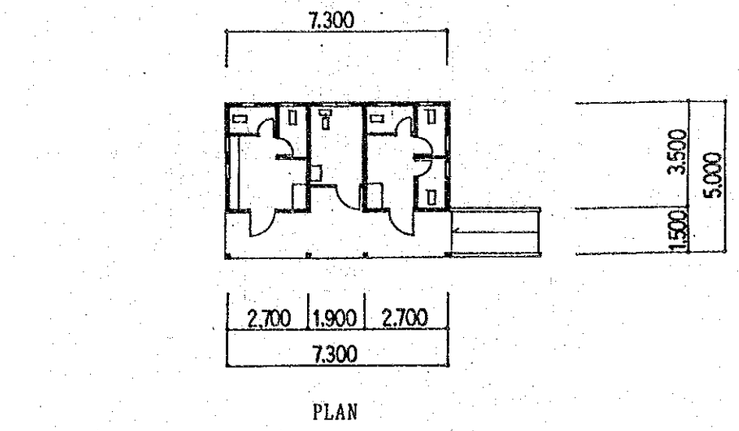


SECONDARY SCHOOL SB-TYPE PLAN

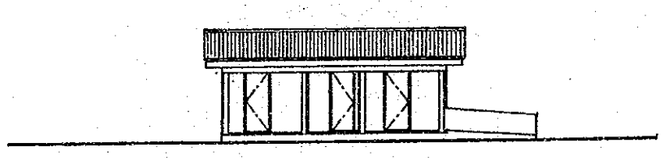


SECONTARY SCHOOL SD-TYPE PLAN

0 1 5 10m



PLAN



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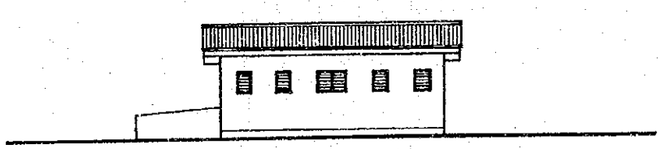
ELEVATION



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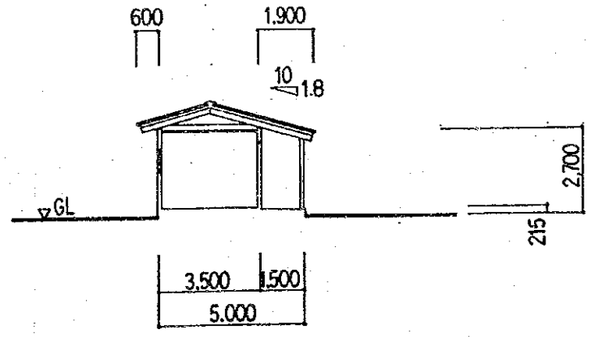

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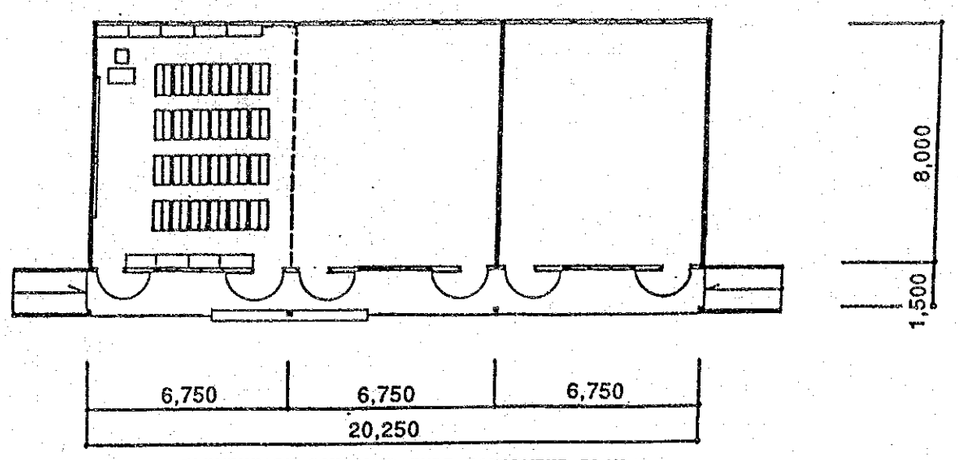
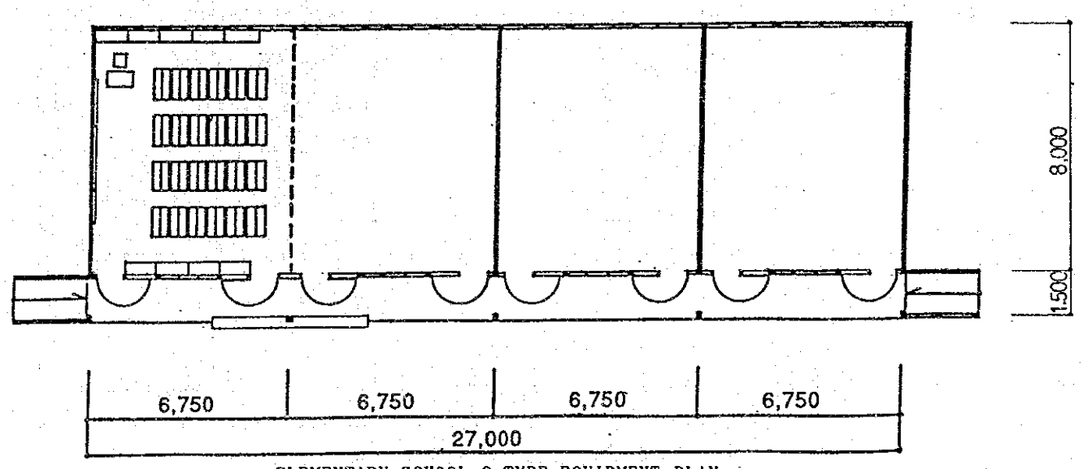
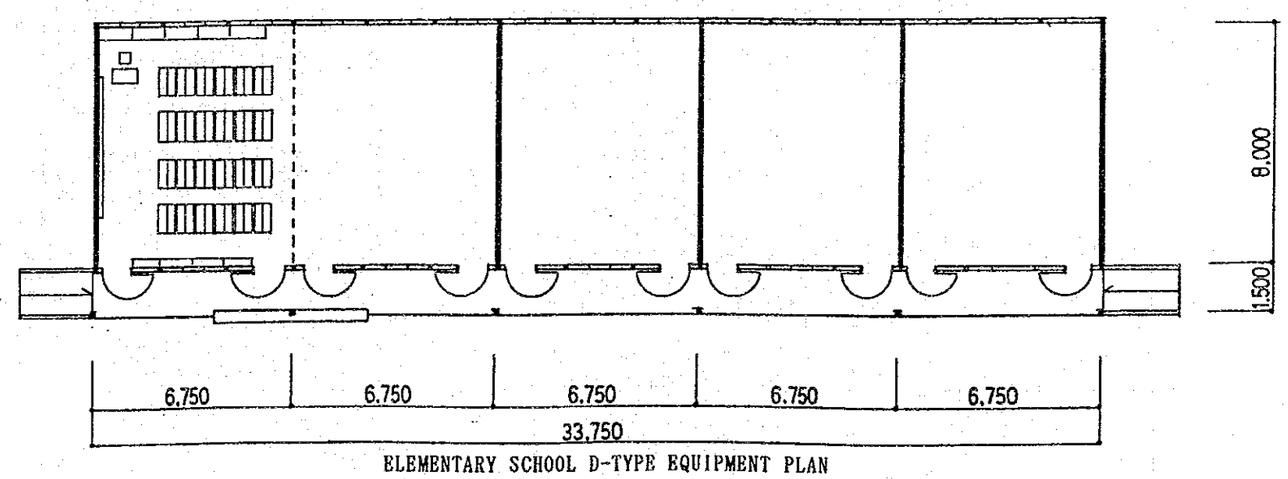


ELEMENTARY SCHOOL B-TYPE EQUIPMENT PLAN



ELEMENTARY SCHOOL C-TYPE EQUIPMENT PLAN



ELEMENTARY SCHOOL D-TYPE EQUIPMENT PLAN

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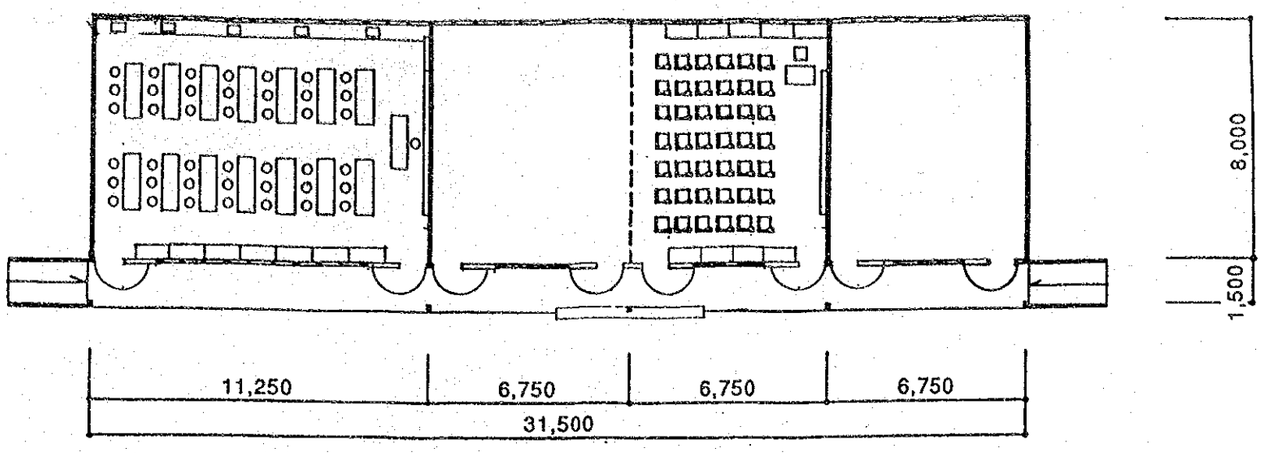
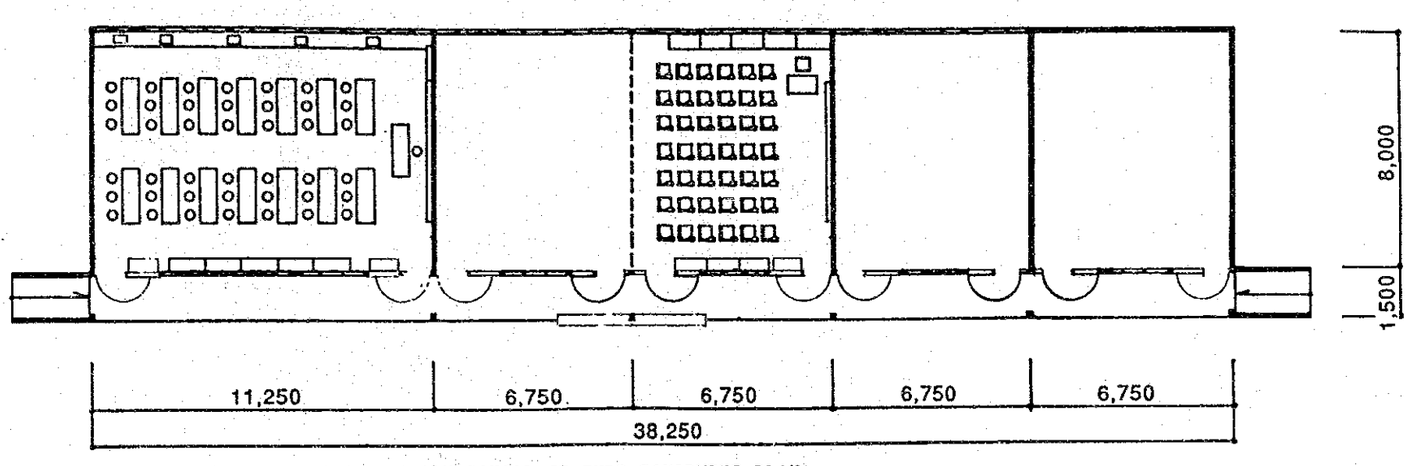
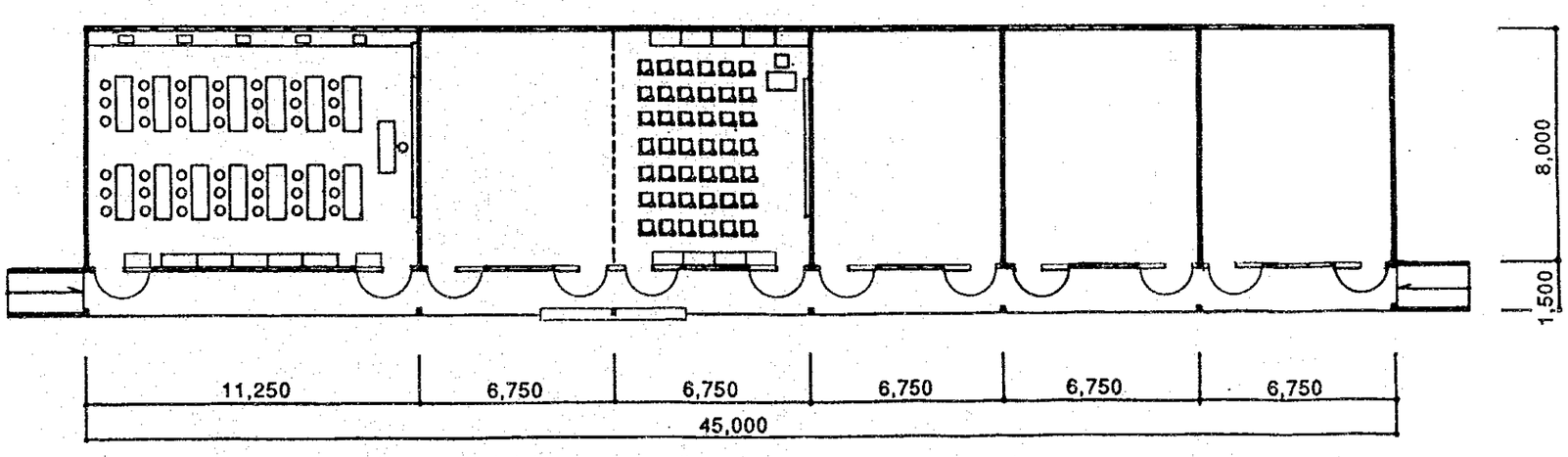


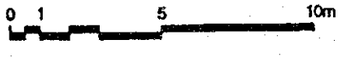
SECONDARY SCHOOL SB-TYPE EQUIPMENT PLAN



SECONDARY SCHOOL SC-TYPE EQUIPMENT PLAN



SECONDARY SCHOOL SD-TYPE EQUIPMENT PLAN



4-4 Project Implementation Plan

4-4-1 Implementation Method

A peculiarity of the Project is the construction of school facilities at widely scattered sites in Regions I and III that stretches some 400 km in a north-south direction and 150 km in an east-west direction during a very short period of time. The construction plan must be able to meet this peculiarity.

The main points for Project construction are as follows:

1) Two schools will be set up as the Project's model schools. One will be in San Fernando and the other will be in Palayan City.

   The group-leader class engineers who will carry out the Project construction at each site will be provided with on-the-job training in the following subjects:

   I. The accurate foundation concrete placing method and the method for fixing prefabricated material by anchor bolts. Both of these methods are important in the building of typhoon-resistant schoolbuildings.

   II. Training in prefabricated structure construction methods and finishing methods will be conducted for fourteen days by engineers dispatched from Japan. Actual job experience coupled with the use of the construction manual will be of great value to the engineers for understanding the features of the prefabricated construction method.

2) As construction work will be conducted at various sites simultaneously, the supervisors shall communicate with each other frequently so that the plan can be carried out smoothly.

3) Regarding the construction materials and equipment to be procured in Japan, adequate quality control and inspection should be carried out in Japan to prevent troubles from arising at the construction sites.

4) To guide Philippine contractors in making the technology transfer of prefabricated structure construction techniques.

5) The schedule for the foundation construction work should be set by taking into account the arrival dates of the prefabricated material at the sites.

6) The maintenance of security and the prevention of theft within the construction sites throughout the entire construction period is of utmost importance.

7) As the existing electric power supply to the Project sites is inadequate, small generators will be used. Most of the schools have a water supply. As Project water usage will be small, water for construction purposes will be stored in drum cans or drawn by hand pumps.

8) To ensure the success of Project construction, it will be absolutely necessary to maintain close cooperation with the local contractors. The clarification of the roles of a prime contractor and the subcontractors, and the establishment of an appropriate staff plan should be made for the smooth progress of the construction work.

As described in Section 4-1 (Basic Design Policies), it will be necessary to fully utilize local consultants and contractors, and dispatched specialists from Japan. The construction management by the Philippine side will be carried out by EDPITAF with the cooperation of DECS's local offices as explained in the previous sections of this report concerning the Executing Agency and Operational Structure.

4-4-2 Construction Management System

As the seventy-five Project schools are scattered throughout the area of Region I and Region III, it is important to have adequate management of the construction schedule and quality control.

The consultant firm and construction contractor should establish the Project construction headquarters in Manila. Each region shall be divided into five construction areas. A construction base should be established in each region to supervise construction work in the areas (Region I's construction base in San Fernando and Region III's construction base in San

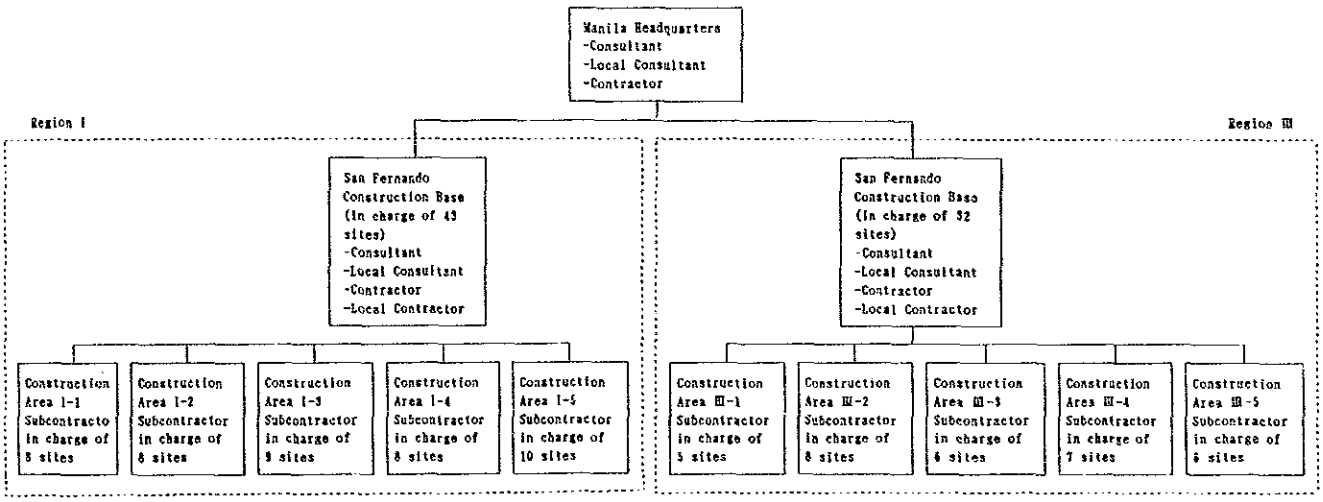
Fernando. There is San Fernando in Region I and Region III).

To assist the construction base at both San Fernando's, a construction sub base will be set up in Laoag City (Region I) and in Palayan City (Region III) to direct the construction.

By having those construction management bases, smooth delivery of equipment and materials to each site can be made and the periodic close construction management by consultants, construction contractors and local engineers will be possible.

The Project construction management organization chart is shown in Table 4-7.

Table 4-7 Project Construction Management Organization Chart



4-4-3 Equipment and Material Procurement Plan

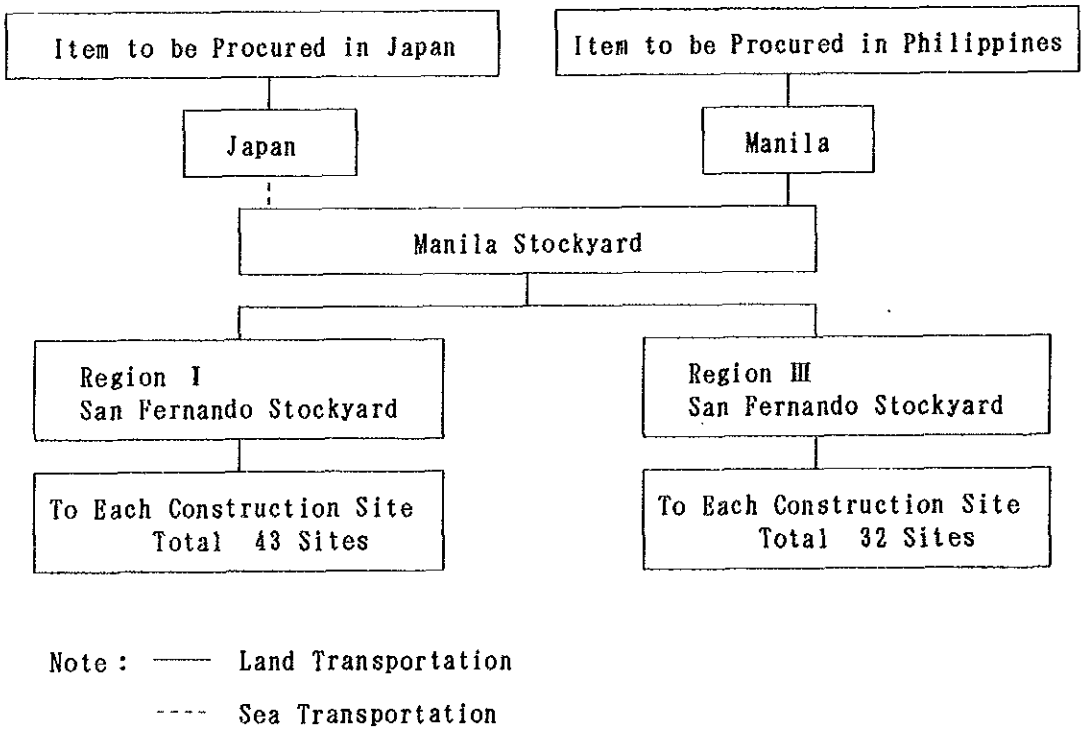
(1) Equipment and Material Procurement Policies

The prefabricated materials needed to secure the Project's typhoon-resisting capabilities will be procured in Japan. Since there are no technical problems concerning local construction materials, such as reinforcing bars, cement, gravel, concrete blocks, etc., and utility fixtures and furniture, they will be procured locally for the sake of easy maintenance and management of school facilities after project completion. Most of these materials and equipment can be procured in each Region. Items requiring to be of higher grade, or are needed in larger quantities than available in each Region, will be obtained in Manila.

There is a sufficient work force available in the Philippines. For work requiring special techniques, such as assembling prefabricated steel materials, it will be necessary to dispatch the special engineers from Japan.

The transportation plan for procured equipment and materials is shown in Table 4-8.

Table 4-8 Transportation Plan for Procured Equipment and Materials



(2) Sea Transportation Plan

By taking into account the factory manufacturing process in Japan and the progress of the foundation construction work in the Philippines, a sea transportation plan of almost 14,000 m^3 of prefabricated frames shall be drawn up to provide smooth construction progress during each construction stage.

It is planned to disembark the prefabricated construction material procured in Japan at Manila International Port. The port has been used since the Phase I project and the 5,000 to 8,000 ton class ship planned on being used for the Project will have no problems in entering.

(3) Inland Transportation Plan

The material and equipment disembarked at the Manila International Port will be transported to the Manila stockyard for temporary storage by heavy vehicles. Although the main highway is in good condition, there are problems concerning access roads and the allowable loads and widths of bridges. The failure of a bridge during the rainy season may affect the Project's construction schedule. Various means of transportation, such as using manual labor to carry uncrated materials and equipment should therefore by employed. In particular, a planned route may be hindered by volcanic mud flow. Thus, it is important to confirm a safe alternative route.

To prevent damage during transportation, compact sized wooden crates of from 700 kg to 3 tons should be used. Load heights should be limited to 2 m because many of the roads are unpaved and the power lines crossing over the roads are very low.

(4) Material and Equipment Storage Plan

The prefabricated construction materials that are disembarked at the Manila International Port will be inspected by customs and kept in a bonded warehouse for a short period of time. They will then be directly transported by land to each Project site in Region I and Region III. Equipment and materials procured in each region and in Manila will also be stored in these stockyards for later delivery to each Project site depending upon the progress of construction work.

4-4-4 Implementation Schedule

1) Project Construction Boundaries

The construction boundaries to be undertaken by the Japanese and Philippine sides are shown in Table 4-9.

Table 4-9 Project Construction Boundaries to be Undertaken by the Japanese and Philippine Sides

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 schoolbuildings 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 Projects.		○
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.		○

2) Implementation Schedule

The preparation of the Project Implementation schedule will be made based on the premise that the measures to be taken by the Philippine and Japanese governments will be carried out smoothly in accordance with procedures established by the Grant Aid Program of the Government of Japan.

Project implementation will start when the Exchange of Notes for the Project is signed by both governments. The preparation of the detailed design, the tendering for the construction work, the fabrication of building frames, the shipping of materials, and the facility construction work will then follow in five steps.

* Detailed Design:

After the confirmation of the consultant contract agreement by the Government of Japan, the consultant will prepare the tender documents based on the Basic Design Study Report. The specifications and detailed items for Project facilities should be decided upon as a result of discussions to be held with the actual users (or their representatives) of Project facilities.

As for the boundaries between the measures to be undertaken by the Philippine and Japanese governments for the Project under the Grant Aid Program of the Government of Japan, they should be clarified during the early stage of the detailed design period based on the Exchange of Notes.

Both governments will take the necessary steps to promote the forming of the organization structure of the Project's implementation agency, and to secure the necessary funds for the Project to meet the requirements of the Grant Aid Program which is based on the single fiscal year system. It will take approximately two months to prepare the detailed design.

* Tendering for Project Construction Work

The tender period is that time which is required for tender announcement, pre-qualification evaluation of tenders, tender opening, and tender evaluation prior to reaching contract agreement.
The methods for tendering and for reaching contract agreement should be

carefully decided upon after discussions are held with representatives from both governments. There will be an approximately 40 day tender period.

* Fabrication and Transportation of Frame Structures

The preparation of the detailed drawings will commence immediately after the contract agreement is reached. After the completion and approval of the detailed drawings, the frame structures for Project schoolbuildings will be fabricated at manufacturing plants. After the construction contract agreement is negotiated, it will take at least five months to effect the first shipment of frames. The ship transporting the frames will depart from the Port of Yokohama and will sail to Manila.

The shipping time from the manufacturing plant to the Project sites (this includes the time for effecting land transportation and obtaining custom clearance) will take from 20 to 30 days.

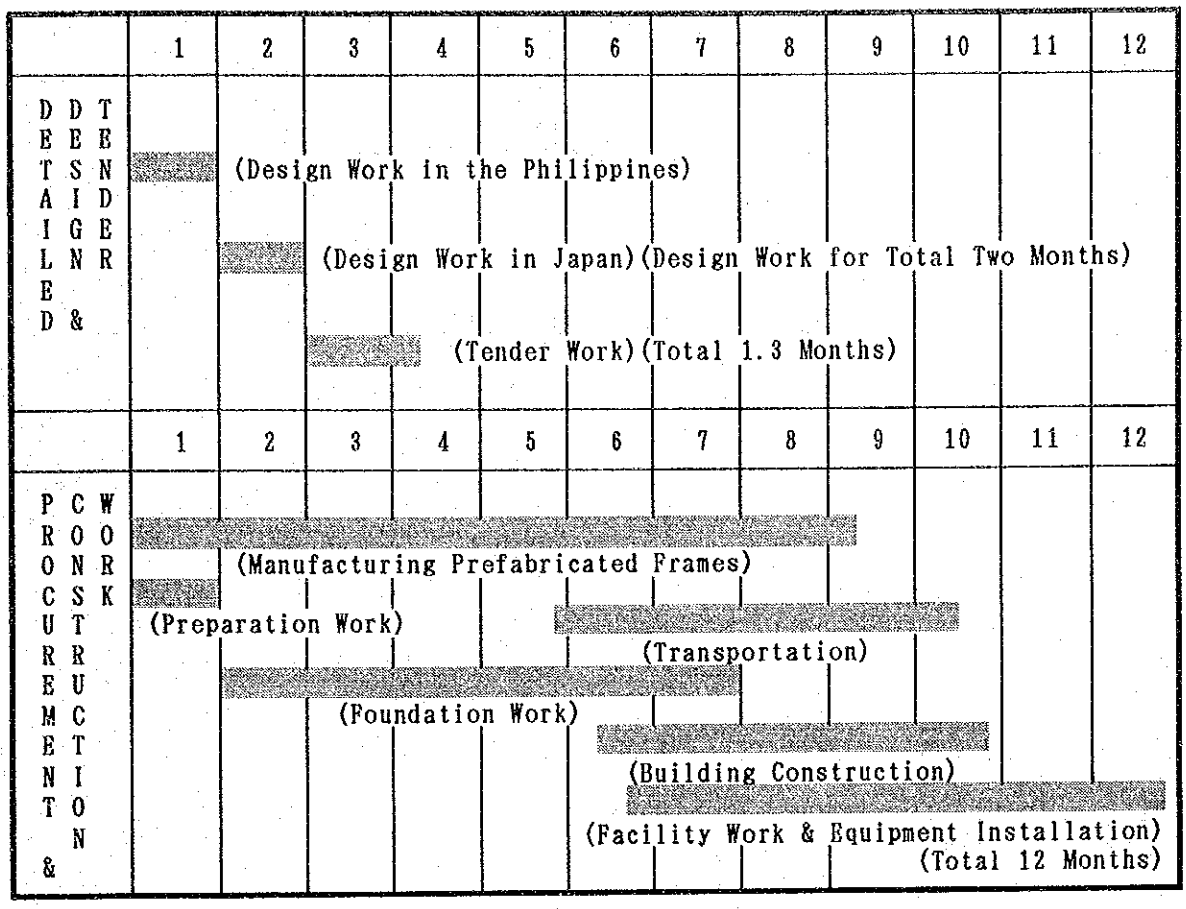
* Construction

The first material shipment will be made approximately five months after the contract agreement is signed. It would be desirable to complete the construction of most of the schoolbuilding foundations during the five month period that will be necessary to prefabricate and ship the frame structures. During this period, it would also be desirable to proceed with the construction of toilets using the Philippine method. Weather conditions permitting, the foundations can be completed in approximately four weeks per site.

In Regions I and III, it would be most desirable to complete the earth and foundation construction work during the dry season. From ten to fourteen days will be needed to erect the prefabricated frame structures per site. Once construction personnel become familiar with the job, one week per site should be sufficient to complete the erection work.

The Project implementation schedule is shown in Table 4-10.

Table 4-10 Project Implementation Schedule



4-4-5 Construction Costs to be Borne by the Philippine Side

Construction costs to be borne by the Philippine side is estimated as being pesos. The breakdown of the costs is as follows:

Land Clearance:	4,286,000 pesos
Removal of Existing Buildings:	1,633,000
Water Supply Work:	1,429,000
Power Supply Work:	2,857,000
TOTAL	10,205,000 pesos

CHAPTER 5. PROJECT EVALUATION AND CONCLUSION

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The Government of the Philippines has been promoting the education and manpower development and has been making every effort to improve the education conditions. However, the number of primary and secondary schools classrooms are still insufficient. This situation is one of the reson why some 2.61 million school-age children cannot receive an education.

In addition to the above situations, typhoons, especially the ones in 1987, inflicted heavy damage to many primary and secondary schools. And now, the lack of classrooms has become more and more of a serious problem. The construction of primary and secondary schoolbuildings is an urgent matter for the Government of the Philippines.

(1) Project Effects

Under the above-mentioned situations, including the construction of the schoolbuildings for 72 primary and secondary schools in Region V (Bicol Region) as the Phase I project, 69 primary and secondary schools in Region VIII (Eastern Visayas Region) as the Phase II project, 72 primary and secondary schools in Region II (Cagayan Valley) and Region IV (Southern Tagalog) as the Phase III Project, 72 primary and secondary schools in Region VI (Western Visayas) and Region X (Northern Mindanao) as the Phase IV Project, and 75 primary and secondary schools in Region I (Ilocos) and Region III (Central Luzon) as the Phase V Project, the five-year schoolbuilding construction plan for 360 schools located throughout the country will have the following effects:

(a) Increase Opportunities for Children to Attend School

1,064 classrooms have either been or are being built under the Phase I, II, III and IV projects. 312 classrooms are for primary schools; 752 are for secondary schools. These classrooms can accommodate 44,064 students. Under the Phase V Project, a total of 320 classrooms will be constructed: 214 of them for primary

schools and 106 for secondary schools. These classrooms will accommodate 13,012 students. As a result, 57,076 students will be able to use the classroom built under the Phase I through V projects. Thus, the Projects will represent a meaningful contribution towards increasing the opportunities for children to attend school.

(b) Contribution to Area Residents

The Project's school facilities will not only be used for classroom purposes (including classes that will be conducted in two or three shifts) but also as places of refuge for area residents during the periods of natural calamities and as meeting places. This additional use of the Project's school facilities will be a beneficial contribution to the area residents.

(c) Activation of Rural Economies

The construction of numerous schoolbuildings in the rural areas of the Philippines will provide employment opportunities for area residents. The local procurement of construction materials and equipment other than prefabricated building frames will make a significant contribution towards stimulating the rural economies of the Philippines.

(2) Conclusion

The chronic shortage of school facilities in the Philippines is a serious problem for the country. Furthermore, the problem has been compounded by the damage inflicted on school facilities by typhoons.

In the Medium-term Philippine Development Plan, the National Economic and Development Authority described that the improvement of school education is an important mainstay of the country's manpower resources development, and that it is of utmost importance to determine how best to improve the quality of education while, at the same time, promoting industrial development and economic

growth.

It is believed that the implementation of the Project will be indispensable for the achievement of the country's education development plan; it will greatly contribute to the promotion of the national development plan.

The Project's contents will not create schoolbuilding maintenance and management problems.

Project school facility construction will also alleviate the chronic school facility shortage thereby enabling many children to receive a proper education which, in turn, will contribute to the improvement of the country's education conditions. Therefore, it is considered to be appropriate to implement the Project under the Japanese Government's Grant Aid Program.

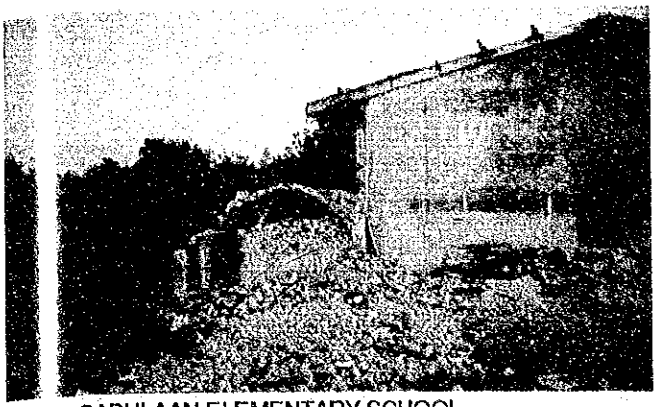
(3) Recommendations

1. The Project shall be implemented with the cooperation of both Japan and Philippines. Therefore, it will be of great importance that the construction work to be borne by the Philippine side is definitely carried out for successful Project implementation. In particular, it is necessary that site preparation and the construction of access roads to the Project sites must be completed prior to the commencement of schoolbuildings construction. Furthermore, DECS and DPWH must maintain close cooperation and establish a solid Project implementation system.

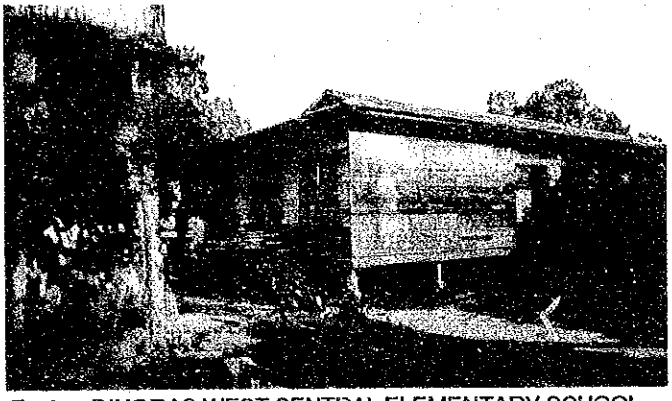
2. Even though the school facilities' major structures are designed after making a thorough examination of the principals of minimum maintenance and management costs, i.e., maintenance free facilities, it would be desirable to give more consideration to the maintenance system. For example, the students could clean the school facilities as part of the school's education program.

APPENDICES

APPENDICES



E-0 CABULAAN ELEMENTARY SCHOOL



E-02 DINGRAS WEST CENTRAL ELEMENTARY SCHOOL

E-03 DON MARIANO MARCOS MEMORIAL ES

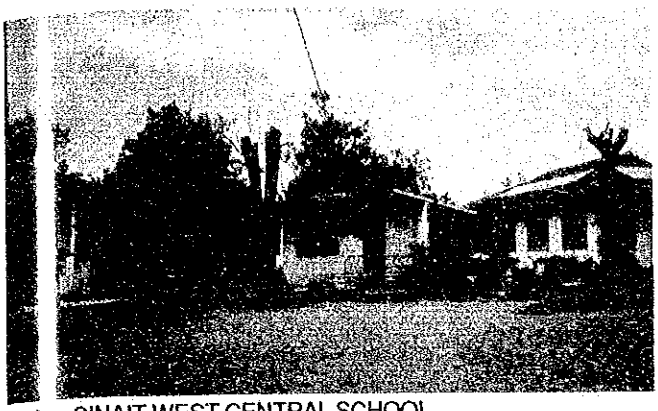
E-04 CATALINO ACOSTA MEMORIAL ES

E- PIDDING CENTRAL SCHOOL

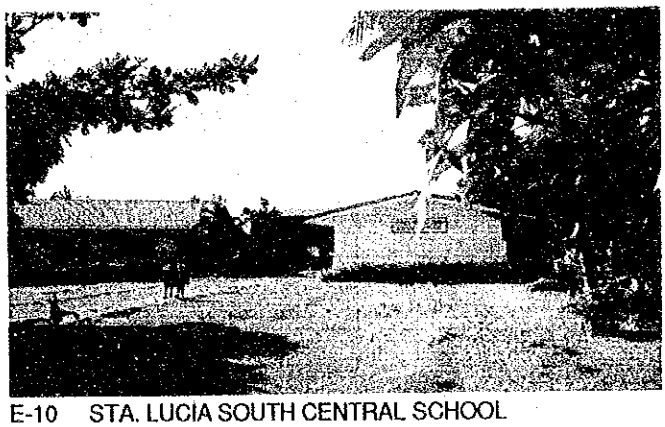
E-06 BANGUI CENTRAL SCHOOL

E-07 TAGUDIN CENTRAL SCHOOL

E-08 SULVEC ELEMENTARY SCHOOL



E-09 SINAIT WEST CENTRAL SCHOOL



E-10 STA. LUCIA SOUTH CENTRAL SCHOOL

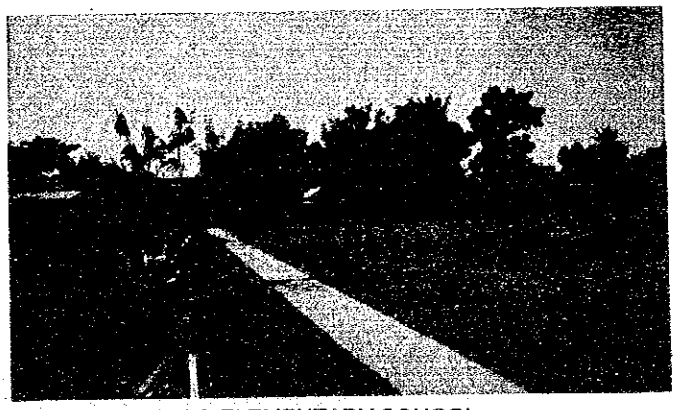
E-11 SAN JUAN SOUTH ELEMENTARY SCHOOL

E-12 MAGSINGAL NORTH CENTRAL SCHOOL

E- STO. DOMINGO NORTH ELEMENTARY SCHOOL

E-14 NAGSANGALAN ELEMENTARY SCHOOL

E-15 BANGAR ELEMENTARY SCHOOL



E-16 PARINGAO ELEMENTARY SCHOOL

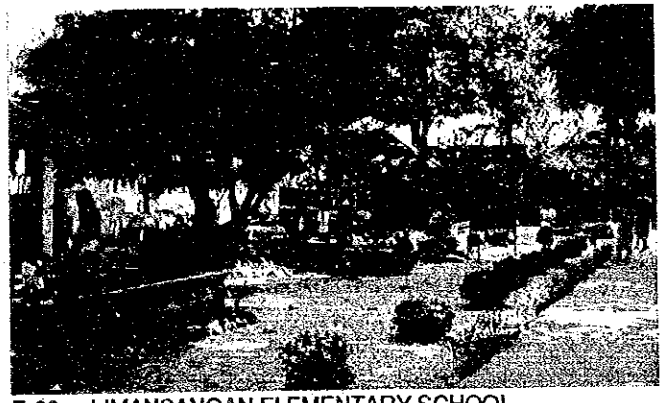
E-17 ROSARIO CENTRAL SCHOOL

E-18 SANIJUBAR ELEMENTARY SCHOOL

E-19 CALASIAO I CENTRAL SCHOOL

E-20 DON AMADEO PEREZ (ANNEX)

E-2 BARANGOBONG ELEMENTARY SCHOOL



E-22 LIMANSANGAN ELEMENTARY SCHOOL

E-23 BASISTA ELEMENTARY SCHOOL

E-24 SAN VICENTE ELEMENTARY SCHOOL