CHAPTER 3. OUTLINE OF THE PROJECT

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3-1 Objective of the Project

The original request by the Government of the Philippines' calls for the construction -- using typhoon-resistant prefabricated structures -- of 360 primary and secondary schools throughout the country that were either totally or partially destroyed by typhoons in 1987. Among the 360 schools, 72 schools in the Bicol Region (Region V) that were most urgently needed were planned in the Phase I construction project and were completed in March 1990. As a continuous project, 69 schools in the Eastern Visayas Region (Region VIII) were selected for the Phase II construction project.

The construction of these educational facilities will significantly contribute to the country's education improvement program. As a result, the improvement of the school attendance rate will raise the educational level of the people and thereby contribute to the country's development. The construction on the many new schoolbuildings in various parts of the country will provide rural people with employment opportunities and will help to activate rural industries.

3-2 Study and Examination on the Request

3-2-1 Evaluation of the Appropriateness and Necessity of the Project

The Government of the Philippines has been making every effort to promote the education and manpower development program and to improve educational situations. However, primary and secondary school facilities has chronical shortages and, presently, many school age children cannot receive an education. In addition to these adverse situations, the classroom shortage has become more serious due to the typhoon damages cause since 1984.

The implementation of the Project will contribute greatly to the

improvement of present classroom shortage problems. With the new typhoon-resistant schoolbuildings, it will be possible to provide stable education without being interrupted by natural calamities, such as typhoons.

The project's new schoolbuildings will accommodate 11,160 students in 279 claassrooms -- 40 students in each classroom. Thus, the implementation of the project will contribute greatly to increase the opportunities for children to attend schools.

In view of the point outlined above, the implementation of the Project is indispensable for the improvement of the educational situations in the Philippines and will have a great effect in promoting the development of the country. Therefore, it is considered to be appropriate and extremely worthwhile to carry out the Project with grant aid from the Government of Japan.

3-2-2 Evaluation of Project Implementation and Management Plan

It is required that the necessary personnel and money be secured for the management and maintenance of the Project's school facilities. As the prime objective of the Project is to rebuild typhoon damaged schoolbuildings, it is considered that the present personnel and budgetary funds of the Eastern Visayas Region will be sufficient to take care of the Project's school facilities.

It is believed that the Eastern Visayas Region has a capability to recruit the additional teachers necessary to handle the increase in the number of students because its budgetary funds increased 1.31% during the 1987-1989 period. It is therefore considered that the Project's school facilities will be satisfactorily managed and maintained by the Eastern Visayas Region once Project construction is completed.

The management and maintenance of school facilities in the Eastern Visayas Region is conducted by the Eastern Visayas regional office of

DPWH. Funds for the management and maintenance work are allocated to DECS. Since 1980, DECS secures to major funds for maintenance and repair the Maintenance and Other Operating Expenditures (MOOE) for minor repairs and the Capital Outlay (CO) for major repairs/construction work which is being implemented annually. Repairs to and construction of school facilities in each region is conducted by the regional office of DPWH with funds from DECS.

When repairs or maintenance are needed at school facilities, school head request the regional office of DECS to do the work. After the regional office evaluates the necessity to comply with the schools' requests, they submit an appropriate report to DECS central office. DECS central office then informs DPWH central office and the Department of Budgetand Management (DBM) of the cost of the repair or maintenance work. DBM evaluates DECS's request and determines the amount to be budgeted. Based on the budgeted amount, DECS central office allocates funds to each school. The Engineering Districts of DPWH selects the contractors who will perform the repair and maintenance work at the schools. The contractors work directly under the supervision of DECS and DPWH.

Table 3-1 shows Annual Management and Maintenance Costs Actually Spent by DECS' Region Ⅷ Regional Office During 1987 to 1989.

Table 3-1 Annual Management and Maintenance Costs Actually Spent by DECS's Region Ⅷ Regional Office During 1987 to 1989

(Unit: 1,000 pesos)

Year	Amount
1987	817
1988	906
1989	1,046

The Government of the Philippines has the capability to make preparations for the Project and has set aside a special budgetary fund for Project use. For example, the Government provided approximately 370,000 pesos for the preparation of the Phase I schoolbuilding construction project and 1.038 million pesos for the Phase I construction work undertaken by their side. It is anticipated that the Government of the Philippines will provide the same type of budgetary funds for the Phase II Project.

The budgeted amount for DECS's Region VIII regional office is shown in Table 3-2. The budgetary fund allocated for the Phase I project related costs and the funds for the Phase I construction work undertaken by the Philippines side are shown in Table 3-3 and 3-4.
A flow chart showing the school facilities' management and maintenance work is provided in Fig 3-1.

Table 3-2 The budgeted amount for DECS's Region VII regional office

1986	496,454
1987	772,466
1988	N/A
1989	1,186,835
1990	1,208,831

(Unit: 1,000 pesos)

Table 3-4 The funds for the Phase I construction work undertaken for the Philippine side

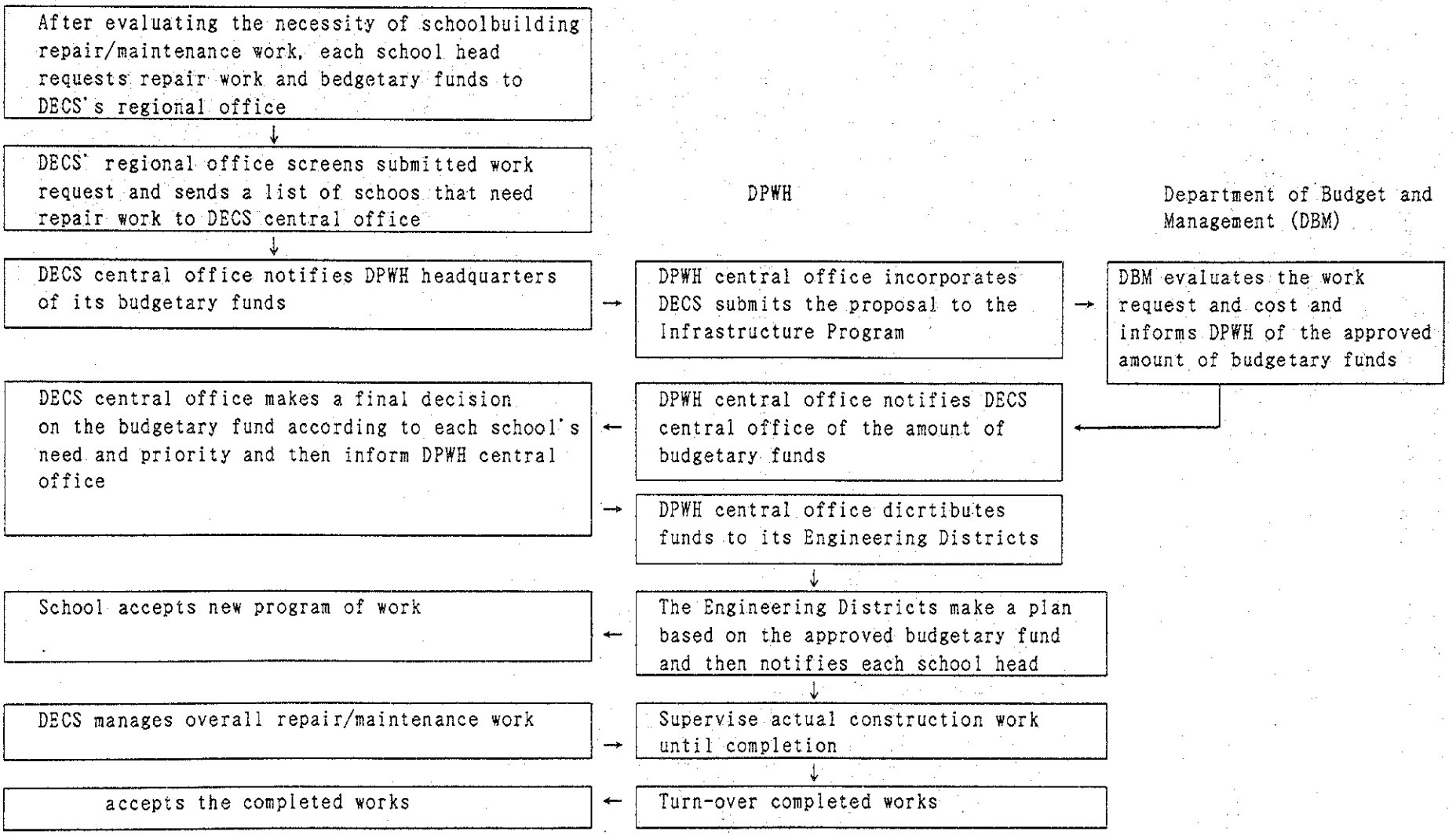
(Unit: 1,000 pesos)

Year / Purpose	1989	1990
Personal Services	396.6	167.2
Maint. & Other Operating Expenses	599.2	422.9
Site preparation Site development	8,822.1	0
Sub Total	9,790.9	590.1
Grand Total	10,381	

Table 3-3 The budgetary fund allocated for the Phase I project related costs

Position	No.	Salary Range	Monthly Basic Salary	Premium (20%)	Monthly Cost of Living	Basic Pay Allowance (30%)	Total	Total Requirments for this year	Monthly
Senior Development Project Coordinator	1	14	3,969	806	500	1,207	6,482	71,302	11
Project Evaluation Officer	1	10	2,670	555	550	805	4,580	60,380	11
Project Evaluation Assistant	1	8	2,188	462	650	-	3,300	36,300	11
Clerk II	1	3	1,470	305	700	-	2,475	27,225	11
*Honoraria (9 meetings)									
Project Advisory Group:									
DECS Assistant Secretary	1						500	4,500	
DECS Undersecretary	2						500	9,000	
DECS Region Directors	2						500	9,000	
(a) DECS									
(b) DPWH									
Undersecretary of DLG	1						500	4,500	
Undersecretary of DPWH	1						500	4,500	
*Central Project Coordinating Group									
Supervisor	2						1,000	22,000	11
Supervisor	2						1,000	22,000	11
*Regional Project Coordinating Group									
Senior Staff Members	3						1,000	33,000	11
Senior Staff Members	2						1,000	22,000	11
Staff Members	7						700	53,900	11
								369,607	

Fig. 3-1 Flow Chart of School Facilities' Management and Maintenance Work
DECS (MOOE, CO)



3-2-3 Examination of the Relationship Between the Project and Other Similar Projects and Foreign Grant Aid Programs

The budget allocation necessary to restore the school facilities damaged by the 1987 typhoons was estimated to be approximately 20 million pesos. This was a great setback for the Government of the Philippines' school building program for public primary and secondary shcools.

For this reason, the Government requested grant aid for foreign countries to undertake a part of the construction plan. Thus, 40% of the plan will be covered by Japanese Aid, the Asian Development Bank (ADB) and the United States Agency for International Developement will finance part of the plan, and the rest will be undertaken by the Philippines Government at its own expense.

A basic principle of the Project is not to include any school in the Project that receives any other foreign aid. During the field survey period, it was found that five schools among those originally selected for the Project are going to receive foregin aid (ESF and ADB). These five schools were eliminated from the Project.

Tables 3-5 and 3-6 lists the foreign financial aid to be provided for the secondary schoolbuilding project. Financial aid from ADB to Region Ⅷ and to school facilities damaged by typhoon Sisang are shown in Tables 3-7 and 3-8 respectively.

Table 3-5 New National Secondary School Construction Plan to be Built with Financial Aid from the Asian Development Bank (ADB) and Economic Support Fund (ESF)

(Unit: number of schools)

Aid Organization / Region	ADB (1989)	ESF (1987)
NCR	6	8
CAR	4	1
Region I	12	7
Region II	10	8
Region III	17	—
Region IV	19	8
Region V	9	8
Region VI	12	9
Region VII	12	7
Region VIII	13	4
Region IX	12	8
Region X	10	8
Region XI	12	9
Region XII	7	8
Total	155	93

Table 3-6 Foreign Financial aid from ADB to be privided for the secondary school-buildings project (1989-1992)

Region	Year	1989	1990	1991	1992	Total
N C R	Target	7	14	14	12	47
	Actual	7	—	—	—	
C A R	Target	4	3	3	0	10
	Actual	4	2	—	—	
Region I	Target	12	9	9	7	37
	Actual	12	3	—	—	
Region II	Target	10	6	6	4	26
	Actual	10	—	—	—	
Region III	Target	17	19	19	17	72
	Actual	17	—	—	—	
Region IV	Target	19	22	22	18	81
	Actual	19	1	—	—	
Region V	Target	7	19	17	14	59
	Actual	7	—	—	—	
Region VI	Target	12	17	15	14	58
	Actual	12	1	—	—	
Region VII	Target	12	19	17	15	63
	Actual	12	4	—	—	
Region VIII	Target	13	14	12	12	51
	Actual	13	8	—	—	
Region IX	Target	12	11	11	9	43
	Actual	12	—	—	—	
Region X	Target	10	12	12	10	44
	Actual	10	2	8	8	
Region X I	Target	12	15	13	13	53
	Actual	12	—	—	—	
Region X II	Target	7	9	7	6	29
	Actual	7	4	—	—	
Grand Total	Target	154	189	187	151	673
	Actual	154	25	8	8	

Target: As of 15 September, 1989

Actual: As of 15 December, 1989

Table 3-7 Schools in Region Ⅷ that are Expecting to Receive Financial Aid from ADB

	Division		School Name
1989	1	Samar	PINABACDAO BHS
	2	Leyte	MAC ARTHUR BHS
	3	Leyte	KANANGA BHS
	4	Leyte	MATAG-OB BHS
	5	Southern Leyte	CONSOLACION BHS
	6	Southern Leyte	ICHON BHS
	7	Northern Samar	PAMBUJAN BHS
	8	Northern Samar	MAWO BHS
	9	Samar	GANDARA MHS
	10	Leyte	BAYBAY BHS
	11	Leyte	HINGATUNGAN BHS
	12	Leyte	LIBHU BHS
	13	Leyte	PINTUYAN BHS
1990	14	Northern Samar	LAOANGAN BHS
	15	Tacloban	SAGKAHAN BHS
	16	Leyte	LOMONON BHS
	17	Lyete	PASTRANA BHS
	18	Leyte	DAMULAAN BHS
	19	Ormoc	SAN JOSE BHS
	20	Ormoc	IPIL BHS

Table 3-8 Financial Aid from the Asian Development Bank (ADB)for Repairing/ Reconstructing schools Damaged by Typhonn "Sisang" in Region Ⅳ V, Ⅷ (1990) (Unit:1,000 pesos)

Aid from ADB	Expenditure of the Philippines Government	Total
82,060	21,814	103,874

In addition to the Project, the Japanese Government provided grant aid such as the Youth Reeduction Plan (1986). The Philippine Government is highly appreciating the grant aid provided by the Japanese Government; the aid has contributed substantially to the improvement of education in the Philippines.

3-3 Project Description

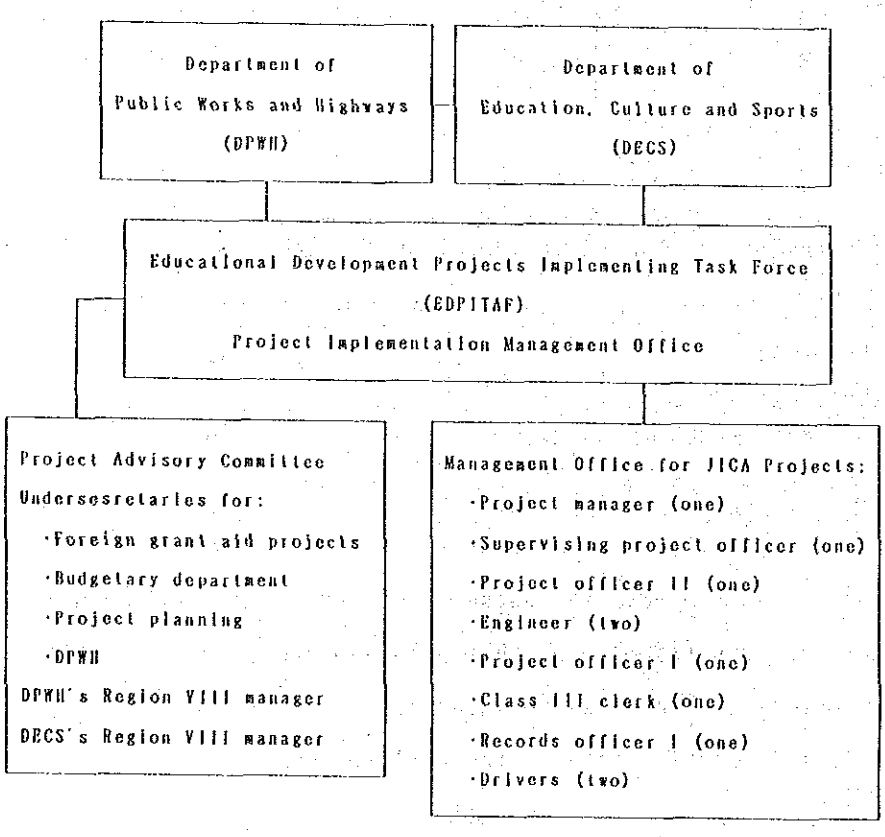
3-3-1 Executing Agency and Operational Structure

EDPITAF will undertake the Project with cooperation from DECS and DPWH. The organizational chart is provided in Fig. 3-2.

EDPITAF will establish a Project Advisory Committee comprised of an undersecretary who will be in charge of foreign grant aid project, an undersecretary who will be responsible for the budgetary department, an undersecreatry responsible for project planning, an undersecretary of DPWH, a manager from DECS, and a manager from DPWH.

EDPITAF will also establish the Management Office for JICA projects. It will be comprised of a project manager, a supervising project officer, a project officer, an engineer, a Class Ⅲ clerk, and two drivers. The Project Management Officer will be established under the Committee and the Management Office. The Project Management Office will undertake the Project's management, and the Operations and maintenance of Project facilities once Project construction is completed.

Fig. 3-2 Project Implementation Organization



3-3-2 Criteria for the Selection of Schools in the Project

Those areas and schools having a high growth rate of school-age children or were severely damaged by typhoons Sisang and Herming in 1987 were included in the Government's School Building Program. The selection of the area and schools for the plan was made based on the following criteria:

1. A school must have sufficient space on which to build.

2. A school must be located in an area that has a large population and where the school may be used as place of refuge.

3. A school that will receive any assistance from the Calamity Fund must be excluded from the plan.

4. A school that will receive assistance from the United States Agency for International Development or from the Asian Development Bank must be excluded from the plan.

5. A school that received financial assistance in the amount of more than 300,000 pesos during the 1986-1987 period must be excluded from the plan.

The primary and secondary schools in the Eastern Visayas Region that were included in the Philippine Government's request were examined according to the above standards and, as as result, 69 schools were selected for the Phase II Project.

3-3-3 Selection of Each Project School's Building Size

The most suitable building type for each Project school is to be selected from four standard types according to the number of students, the site area, and the conditoins of the existing schoolbuilding. According to claassroom necessity and the sizes of available site areas,

the two-classroom type (Type A), the three-classroom type (Type B), the four-classroom type (Type C), or the five-classroom type (Type D) may be selected.

For schools having extreme classroom shortages but have sufficient sizes of site areas, two buildings, such as the seven-classroom type (Type B plus Type C) or the eight-classroom type (Type C plus Type C, or Type B plus Type D) may be construacted. For schools having poor site conditions where site development whould be difficult, such as in rice fields, forests, marshy areas, or steep slope areas, or for schools having insufficient site areas or requiring access road construction, the two-classroom type (Type A) or the three-classroom type (Type B) are to be built.

Each Project secondary school is to have a science laboratory. A toilet conforming to Philippine standards is to be built at each Project school.

ELEMENTARY SCHOOL INFORMATION SHEET (PHASE II)

Name of school	Number of Students 1989 -90	Number of Students 1990 -91	Number of Existing Classrooms (including Temporary Classroom Science lab. and workshop)	Number of Usuable Classrooms *(1)	Number of Necessary Classrooms *(2)	Available Site Area for New Classroom Construction(m)*(3)	Power Supply	Number of Classrooms to be Provided by the Project	Building Type *(4)		Remarks (See Remark Notes below Table)
1. BAGACAY E/S	315	368	15	6	10	40 X 15	Yes	4	C	*	-
2. BAYANIHAN E/S	206	240	6	3	6	31.5 X 15	Yes	3	B	*	-
3. PALO II C/S	587	-	7	4	15	85 X 30	Yes	8	C,C	*	-
4. BALANGKAYAN E/S	575	-	19	7	14	132 x 81	No	3	B		1
5. LUPOK E/S	367	-	14	6	10	32 X 12	No	4	C		-
6. BUNGTOD E/S	122	-	6	0	4	35 X 22	No	4	C		2
7. BANAHAO E/S	126	-	7	1	4	50 X 58	No	3	B		2
8. BASEY I C/S	987	927	28	6	24	30 X 40	Yes	3	B	*	3
9. ILO E/S	179	185	6	2	5	20 X 45	Yes	3	B	*	-
10. SAN POLICARPIO E/S	504	758	15	15	19	20 X 35	Yes	4	C	*	-
11. BASEY II C/S	462	439	6	6	11	15 X 30	Yes	4	C	*	-
12. GANDARA C/S	1,061	991	20	20	25	15 X 30	Yes	4	C	*	-
13. CAWAYAN E/S	774	778	15	15	20	10 X 20	Yes	2	A	*	4
14. ALBUERA C/S	2,300	2,700	31	31	68	Unlimited	Yes	8	C,C	*	5
15. NAVAL C/S	1,426	1,500	36	34	38	Unlimited	No	3	B		-
16. KAWAYAN C/S	2,734	-	12	10	69	30 X 10	No	3	B		6
17. MACUPA E/S	525	550	10	7	14	Unlimited	No	4	C		-
18. LEMON-SAN JOAQUIN E/S	402	430	1	1	11	70 x 30	Yes	4	C	*	7
19. M.CASAUS E/S	489	500	12	9	13	Unlimited	No	4	C		-
20. BINONGTOAN E/S	507	600	13	12	15	35 X 10	Yes	3	B	*	-
21. SAN PASCUAL E/S	133	-	4	1	4	12 X 30	Yes	3	B	*	-
22. BURAUEN SOUTH C/S	762	729	17	16	19	15 X 25	Yes	3	B	*	-

SECONDARY SCHOOL INFORMATION SHEET (PHASE II)

Name of school	Number of Students 1989-90	Number of Students 1990-91	Number of Existing Classrooms (including Temporary Classroom Science lab. and Workshop)	Number of Usuable Classrooms *(1)	Number of Necessary Classrooms *(2)	Available Site Area for New Classroom Construction(m)*(3)	Power Supply	Number of Classrooms to be Provided by the Project	Building Type *(4)	Remarks (See Remark Notes below Table)
23. TANAUAN SCHOOL C/H.I	1,300	1,400	18	16	35	Unlimited	Yes	8	SB,D *	-
24. KAUSWAGAN BHS	150	183	5	2	5	100 X 17	Yes	3	SB *	-
25. JULITA BARANGAY H/S	430	504	10	1	13	15 X 40	Yes	4	SC *	8
26. ALBUERA N/S.F	792	819	16	12	21	50 X 20	Yes	4	SC *	-
27. CARIGARA MH/S	656	740	9	3	19	45 X 25	Yes	4	SC *	1
28. GRANJA-KALINAWAN BARANGAY H/S	1,318	1,432	26	3	36	Unlimited	Yes	7	SB,C *	2
29. TAFT NH/S	792	950	16	8	20	Unlimited	No	8	SC,C	-
30. DOLORES NH/S	1,831	-	36	25	46	220 X110	No	8	SC,C	-
31. LAWAAN SCHOOL C/H.I	390	632	19	12	15	62 X 10	No	4	SC	-
32. BALANGIGA N AGRICULTURAL S	573	-	17	7	15	Unlimited	No	8	SC,C	-
33. GIPORLOS N/TS	418	-	14	7	11	48 X 30	No	4	SC	-
34. MALABAG MUNICIPAL H/P	250	563	6	0	7	30 X 10	No	2	SA	7
35. BOBON BARANGAY H/S	161	-	4	0	5	45 X 14	No	4	SC	-
36. SALCEDO COMMUNITY H/S	432	550	8	3	14	43 X 12	No	5	SD	9
37. GEN.MACARTHUR N AGRICULTURAL H/S	420	-	18	6	11	Unlimited	Yes	4	SC *	-
38. BOBON SCHOOL OF FISHERIES	645	664	17	13	17	100 X100	Yes	4	SC *	-
39. WASHINGTON BARANGAY H/S	163	165	4	0	5	100 X100	No	4	SC	-
40. POLANGI BARANGAY H/S	142	160	(4)borrowed	0	4	100 X100	No	3	SB	-
41. ALEGRIA BARANGAY H/S	496	652	(28)borrowed	0	16	100 X100	Yes	3	SB *	3
42. OQUENDO BARANGAY H/S	500	520	10	10	13	100 X150	Yes	3	SB *	-
43. TRINIDAD BARANGAY H/S	434	455	5	5	12	20 X 30	Yes	3	SB *	4
44. SAN POLICARPIO BARANGAY H/S	514	481	13	9	13	30 X 50	Yes	3	SB *	-
45. TARABUCAN BARANGAY H/S	181	176	4	0	5	100 X100	Yes	3	SB *	-
46. SAMAR N AGRICULTURAL S	520	494	14	9	13	400 X350	Yes	3	SB *	-
47. BALOCAWEHAY BARANGAY H/S	567	650	9	9	17	60 X 30	Yes	3	SB *	4
48. WRIGHT VOCATIONAL S	685	690	20	12	18	30 X 50	Yes	5	SA,B *	-
49. WRIGHT COMMUNITY H/S	441	523	8	8	14	50 X200	Yes	3	SB *	-

SECONDARY SCHOOL INFORMATION SHEET (PHASE II)

Name of school	Number of Students 1989 -90	Number of Students 1990 -91	Number of Existing Classrooms (including Temporary Classroom Science lab. and Workshop)	Number of Usuable Classrooms *(1)	Number of Necessary Classrooms *(2)	Available Site Area for New Classroom Construction(m)*(3)	Power Supply	Number of Classrooms to be Provided by the Project	Building Type *(4)	Remarks (See Remark Notes below Table)
50. MONDRAGON BARANGAY H/S	283	389	9	5	10	40 X100	Yes	5	SD *	-
51. LAVEZARES AGRO-INDUSTRIAL S	1,088	1,015	6	6	26	20 X 30	Yes	3	SB *	5
52. BASEY N AGRICULTURAL S	447	540	11	11	14	30 X 50	Yes	3	SB *	-
53. CABACUNGAN BARANGAY H/S	245	280	5	0	7	30 X 15	Yes	3	SB *	10
54. TUNGA BARANGAY H/S	848	1,000	14	14	25	Unlimited	Yes	3	SB *	6
55. MARGEN BARANGAY H/S	341	375	3	2	10	50 X 24.5	Yes	8	SC,C *	-
56. BURAUEN PROVINCIAL H/S	1,057	1,557	23	18	39	50 X 30	Yes	8	SC,C *	-
57. STA.FE BARANGAY H/S	605	700	6	6	18	35 X 30	Yes	3	SB *	10
58. MAHAPLAG BARANGAY H/S	853	970	15	15	25	100 X 50	Yes	5	SD *	-
59. LUCSON PROVINCIAL H/S	140	200	4	2	5	50 X 20	No	3	SB	-
60. TABON-TABON BARANGAY H/S	383	550	5	5	14	25.5 X 51.6	Yes	3	SB *	11
61. PATOC BARANGAY H/S	259	350	4	2	9	35 X 15	No	3	SB	6
62. STA.MESA BARANGAY H/S	364	-	3	3	10	35 X 10	Yes	3	SB *	12
63. TABANGO VOCATIONAL H/S	700	800	14	14	20	100 X 50	Yes	4	SC *	-
64. BUNGA BARANGAY H/S	470	520	2	2	13	30 X 10	Yes	3	SB *	-
65. MINUHANG BARANGAY H/S	395	500	11	10	13	Unlimited	Yes	3	SB *	-
66. MATLANG BARANGAY H/S	-	500	10	9	13	40 X 50	No	4	SC	-
67. SAN MIGUEL BARANGAY H/S	557	600	8	8	15	Unlimited	Yes	4	SC *	-
68. STA.ROSA BARANGAY H/S	301	400	8	6	10	Unlimited	Yes	4	SC *	-
69. JAVIER BARANGAY H/S	542	600	11	10	15	35 X 15	Yes	3	SB *	-

*(1): Permanent classrooms that can withstand minor typhoons
*(2): Number obtained by dividing the number of students by 40 (number of students per classroom)
*(3): The available site area for new classroom construction includes the sloped areas that require site development and the areas that require the removal of the schoolbuildings destroyed by typhoons or whose foundations are old.
*(4): School to be equipped with lighting fixtures

NOTE: Refer to pages 81 and 82 for details of building types

Remark Notes

Primary Schools

1 The need for a schoolbuilding is high, but extensive site development is required. Access road construction is also required. Thus, Type B is to be built.
2 As the existing schoolbuilding is of low graade, there is a very high need for a schoolbuilding.
3 The need for a schhoolbuilding is high, but the site area is limited. Thus, Type B is to be built.
4 As the site area is limited, Type A is to be built.
5 As there is a high need for a schholbuilding, the largest type (Type C plus Type C) is to be built.
6 The need for a schoolbuilding is very high but the site area is limited because of the sloped land. Thus, Type B is to be built.
7 The need for schoolbuilding is very high but the area is limited. Thus, Type C is to be built.

Secondary Schools

1 The need for a schoolbuilding is very high but site development in the marshy area is difficult. Thus, Type C is to be built.
2 The need for a schoolbuilding is very high but site development in the rice field is difficult. Type B and Type C are to be built by arranging them in a longitudinal direction.
3 The need for a schoolbuilding is high but site development on the sloped land is difficult. Further, the school has a future building construction plan. Thus, Type B is to be built.
4 The need for a schholbuilding is high but site development in the rice field is difficult. Thus, Type B is to be built.
5 The need for a school building is very high but the site area is limited. Thus, Type B is to be built.
6 The need for a schoolbuilding is high but site development required tree cutting and is difficult. Thus, Type B is to be built.
7 The need for a schoolbuilding is very high but the area is limited. Thus, Type A is to be built.
8 The need for a schoolbuilding is very high but the area is limited. Thus, Type C is to be built.
9 The need for a schoolbuilding is high, but the site area is limited. Thus, Type D is to be built.
10 The need for a schoolbuilding is very high but the area is limited. Thus, Type B is to be built.
11 The need for a schoolbuilding is high, but extensive site development is required. Thus, Type B is to be built.
12 The need for a schoolbuilding is higth, but the site area is limited. Thus, Type B is to be built.

3-3-4 Project Area Locations and Conditions

The Project Area is in the Eastern Visayas Region that is located on Samar and Leyte islands in the Philippine archipelago. Under the Project, a total of 69 schoolbuildings (22 primary and 47 secondary schools) are to be constructed throughout this region. The Eastern Visayas Region stretches 330 km in a north-south direction and 150 km in an east-west direction. There are 139 municipalities, and 4,200 barangays in Samar and Leyte.

Samar Island is the third largest island in the Philippines; it consists of the Northern Samar, Samar, and Eastern Samar provinces. Two-thirds of the island is mountainous area. The island's transportation system and tourism are not as yet developed. Leyte Island is the country's eighth largest island. It consists of the Leyte and South Leyte provinces and the Biliran sub-province.

The major infrastructures in the Project Area include electricity and water supply facilities and sewerage facilities. Electricity in the Eastern Visayas Region is supplied by 220V power lines. Power lines will be installed to the new schoolbuildings located near existing supply lines.

46 of the 69 Project schools (about three-quarters of the total schools are presently using well water. Only 18 schools have piped water supply facilities. 5 of the 69 schools have no water supply facilities. The Philippine side will construct new wells for those schools prior to the commencement of the project. It would be virtually impossible to install electric power lines to 21 of the 69 schools. Project schools do not have sufficient sewerage facilities. Thus, septictanks will be installed to treat the sewerage. Rain and wastewater will be treated by the infiltration method.

The number of Project schools in each province is listed in Table 3-9.

Table 3-9 Number of Project Schools in Each Province

Province	Primary School	Secondary School	Total
Northern Samar	3	9	12
Eastern Samar	4	10	14
Samar	4	4	8
Leyte	9	23	32
(Biliran)	2	1	3
Southern Leyte	0	0	0
Total	22	47	69

3-3-5 Outline of Facilities and Equipment

1) Differences between the Phase I and Phase II Projects

The Philippines side requested that plan made for the Phase I project be simplified and that the unit schoolbuilding construction cost be lowered so that more schoolbuildings could be constructed. However, as the school sites under the Phase II Project in Region VIII are more widely scattered than those under thePhase I project in Region V and road conditions in Region VIII are poorer than those in Region V, the Study Team explained that it would be difficult to increase the number of project schools.

As a result, the Philippines side agreed to limit the maximum number of schools for the Phase II Project to 72. After completing the field surveys, 69 schools were finally selected for the Phase II Project.

A prime objective of the Project is to rebuild typhoon damaged schoolbuildings with typhoon-resisting structures. From an engineering viewpoint, it is impossible to further simplify typhoon-resisting structures.

Phase II Project school facilities were designed based on the

following policies:

* First priority shall be given to claassroom floor plans.

The offices and workshops included in the Phase I project were deleted from the Phase II Project. Emphasis was placed on the inclusion of more classrooms in the floor plan...classrooms are urgently needed by the Philippine side. 279 Phase II Project classrooms can accommodate 11,160 students (40 students per classroom). Phase II classrooms can accomodate 1,680 more students than Phase I classrooms.

* Local material shall be used as much as possible.

Toilet facilites (a part of each schoolbuilding in the Phase I project) are planned as independent buildings based on Philippine specifications. Interior finishing work for Phase II schoolbuilings is planned to be accomplished using materials obtained locally.

* Project school facilities shall be designed as simple as possible.

Insulation material was installed underside of the roof material used in the Phase I project but will not be used in the Phase II Project. Phase II Project schools are designed to have only one movable partition wall to convert two classrooms into a meeting room. The jalousie with a transom used in the Phase I project was deleted from the Phase II Project. Instead, a simple one piece jalousie is designed for use in Phase II.

2) Summary of Schoolbuildings

As described in Section 3-3-3 "Selection of Each Project School's building Size," the most suitable building types for each Project school is to be selected from the four standard types according to the number of students site area, and the shcoolbuilding conditions.

The outline of the four types are as follows:

· A type: 108㎡	Classrooms:	2
· B type: 162㎡	Classrooms:	3
· C type: 216㎡	Classroom:	4
· D type: 270㎡	Classroom:	5
· S type: 90㎡	Science laboratory	1
· Toilet: 25.5㎡	Toilet for males and felales:	1

3) Summary of Equipment

· Primary schools:

Classrooms
- Teachers' desks, chairs, and filling cabinets
- Students' desk-chairs(large, medium, and small types), and closets
- Blackboards, and bulletin boards

· Secondary Schools:

Classrooms
- Teachers' desks, chairs, and closets
- Students' desk-chairs, and filling cabinets
- Blackboards, bulletin boards

· Science Laborabories:
- Experimental tables, stolls and demonstration workbenches
- Student's closets
- Blackboards, bulletin boards, storage shelves, and steel shelves.

3-3-6 Maintenance Plan

The management and maintenance of school facilities are carried out by DPWH Eastern Visayas office.

After the completion of schoolbuilding construction, it will be necessary to secure the personnel and budgets necessary for facility management and maintenance. As the Project was drawn up as a part of the Government of the Philippines' construction plan, the staffing plan and the management and maintenance plan were included in the government's initial plan.

As the Project covers the reconstruction of typhoon damaged schoolbuildings, it will be possible to manage and maintain Project facilities with the present staff and budgets as described in the section 3-2-2 Evluation of Project Implementation and Management Plan.

Major Project facilities were so planned as to require the minimum amount of maintenance work. This, in turn, will be reflected in lower maintenance and management costs. However, periodic maintenance work is essential for the upkeep of the locally procured wooden jalousies, colored floor materials, and plywood wall bases.

The estimated operation, management and maintenance costs for one schoolbuilding are as shown in Table 3-10.

essential for the upkeep of the locally procured wooden jalousies, colored floor materials, and plywood wall bases.

The estimated operation, management and maintenance costs for one schoolbuilding are as shown in Table 3-10.

Table 3-10 Operation, Managerment and Maintenance Costs for One Schoolbuilding (C Type)

Item	Material Costs (pesos)	Labor Costs (pesos)	Maintenance Frequency	Remarks
Wooden Jalousies	1,690	850	Once every other year	Recommended to paint once every two years to prolong jalousie life
Floor (color-crete)	—	320	Once a month	To maintain color texture, monthly waxing is required.
Plywood wall base painting	660	320	Once every five years	Basically, the wall is maintenance free; it will necessaary to paint stains and smudges.
Painting of elevated water tank support	150	100	Once every other year	Special cares shall be given to schools located close to the sea coast.
Pump	18,000		Once every seven year	Unit required replacement at seven year intervals.

CHAPTER 4. BASIC DESIGN

CHAPTER 4. BASIC DESIGN

4-1 Basic Design Policies

From the view point of the Project's peculiarity in that many schoolbuildings must be constructed in a short period of time, Project construction procedures, in addtion to the examination construction methods during the Basic Design stage, is a very important subject for the Project. Project schoolbuildings will accommodate those students who are unable to attend existing schools because of overcrowding. Thus, in addtion to ordinary design criteria for schoolbuilding design, the relationship between existing schoolbuildings and Project facilities and the special attention that must be given to Project construction to prevent interference with present school activities have to be taken into consideration for the Basic Design.

The following basic design policies were established based on the contents of the Philippine Government's request and on the series of discussions held with the Philippine officials concerned during the field survey period:

(1) The design must be prepared with emphasis placed on typhoon-resistant capability:

The Philippines suffers from the effects of typhoons every year. The school facilities in the Eastern Visayas Region --- the Project Area -- were, in particular, severely damaged by typhoons. The shoolbuildings under this Project will be used as places of refuge by area residents. Thus, the buildings must be designed as typhoon-resistant structures that will be durable for many years. There is no necessity of high-grade quality nor elaborate decorative designs.

(2) Examination of the Natural Environment and Meteorological Conditions

As a general principle, the schoolbuildings shall be designed to have large openings for natural ventilation purposes. Eaves that are long, but strong enough to withstand typhoons, shall be installed on buildings in order to provide protection against the strong westering sun.

Open corridors with roofs should be to built offer students and teachers shelter as they move from classroom to classroom on rainy days. The corridors will be designed so as to prevent the entry of raindrop splashes, mud, and dirt. Some schoolbuidings will be built near beaches. Possible salt damage must be taken into consideration at designing these buildings. During the field survey period, schoolbuildings were found to have termite damage. During the design stage, antitermite treatment of wooden structure must be considered.

The avarage annual precipitation in the Eastern Visayas Region is 3,220 to 3,660 mm. In this area, it will be necessary to consider taking measures against possible flooding --- elevated building foundations must be designed.

As a general principle, natural lighting must be fully utilized. Electric lighting will only be used on occasions when classes are conducted during dark, rainy days. Obtaining the 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 lighting efficiency.

(3) Examination of Social Factors

The schoolbuildings will not only be used for classrooms; they will also be used for other purposes, such as area resident's meeing places, places for taking refuge during calamities, etc. Therefore, in order to create larger spaces, movable partitions

Therefore, in order to create larger spaces, movable partitions must be designed for installation between classrooms. Some schools hold classes in double shifts. If possible, electrical supply facilities for providing lighting should be installed in these schoolbuildings by taking into account the probability that shift classes and residents' meeting will be held in the evenings.

(4) Examination of Local Contractors' Technical Level and the Use of Local Contractors:

In the Philippines, there are a number of construction workers available. However, it would be necessary to dispatch specialists from Japanese manufacturers to supervise the construction of prefabricated structures. 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.

For Project construction, it would be necessary to secure a sufficient number of skilled laborers for each construction stage. The technical levels of local contractors and consultants are high. Thus, it is possible to use local contractors for building construction and finishing work. If technical manuals are provided, local consultants will be able to assist in supervising construction work.

(5) Examination of the Quality of Local Materials and Procurement:

Except for the prefabricated materials required for maintaining the typhoon resisting capabilities of Project buildings, Project use materials and equipment shall be procured locally for the sake of easy maintenance and management of school facilities after Project completion. Most of the necessary materials and equipment are available in Tacloban City. Some items that are required to be of higher grade or that are needed in greater

quantities than available in Tacloban will be procured in Manila.

(6) The design shall be emphasized uniformity of construction work:

A distinctive point of the Project is that schoolbuiling for 69 primary and secondary must be constructed, within a one year period, although they are scattered throughout the 330 km (north-south direction) by 150 km (east-west direction) Eastern Visayas Region. Therefore, the uniformity of construction work will be the most important factor for Project implementation. The design must be made by emphasizing on the uniformity of construction work in order to complete all of the schoolbuildings having the same quality within a one year period.

(7) The disign must be made to suit various situations in the Philippines:

The building design shall be made based on the school facility design standards of the Philippines and by taking into consideration of Filippino way of living. The Philippines is situated in the tropical climate zone. The average annual temperature is from 26 to 27℃. This must be taken into account in determining the type of ventilation and the type of insulation to be used in the buildings.

(8) Examination of Equipment and Material Transportation:

By taking into account the ranges of allowable loads of the bridges located in the mountainous and rural areas, and by giving consideration to the insufficient infrastructures in these areas, the structure units to be manufactured at the factories must be designed to weigh less than 300 kg per unit in order to fit into a coutainer. By doing so, the material can be transported relatively easily.

(9) Consideration Given to Handicapped Student Safety and Conveniences:

It is natural for students to occasionally run in school corridors. To prevent student from injuring themselves, round-shaped columns must be used for corridor structure. For the sake of safety, the use of independent columns in classrooms should be avoided if possible. As specified in Philippine law (BATAS PAMBANSA BILANG 344: Accessibility Law), school facilities are for equal use by all students; therefore, consideration shall be given to the installation of sloped accesses and specially designed toilets as conveniences for handicapped students.

(10) Examination of the Project from the Viewpoint of Maintenance and Management:

The Project's building plan must provide for a simple and economical maintenance and management system, ie., a maintenance free building design by taking into consideration the Philippine Government's financial difficulties.

At Project sites where existing utility facilities, such as a power supply facility, are no adaptable to Project school-buildings, or at sites having no power supply at all, lighting fixtures will not be installed and conventional natural lighting shall be utilized.

(11) Examination of the Construction Method:

To meet the urgent need for implementing the Project, it will be necessary to adopt a unit systematized prefabrication method that will enable to construct 69 schoolbuilding within one year.

(12) Examination from the Viewpoint of Construction:

For construction, consideration must be given to avoiding any

disturbance that might interfere with the school activities in the existing schoolbuildings. Special attention must be given to ensure the safety of the students. When building materials are delivered to the construction site, care must be taken as not to create noise or dust.

4-2 Study and Examination on Design Criterion

By taking into account the number of students, the size of each Project school, the degree of classroom needs, and shape of the lot, the most adequate building will be selected from four standard types. If the degree of a school's classroom need is high and the school has a sufficiently large lot, two buildings must be built.

Using the prefabrication construction method, the optimazation of the smallest building element unit will result in the lowering of construction costs, shortening of the construction period, and simplification of the construction work. For the Project, a room size of 8m x 6.25m (54㎡) was decided upon by considering the number of students to be accommodated in one classroom and the arrangement of furniture in the classroom. The size of the science laboratory was decided upon as being 11.25m x 8m (90㎡) by taking into account the number of students in one class, the furniture arrangement, and the nature of the class. Toilets were not designed to be typhoon-resisting prefabricated structure. DPWH's design standard were adopted for the toilet design. The sizes of the male and female toilets were decided upon as being 11.875㎡ and 13.625㎡ respectively.

The features of each Project schoolbuilding are shown in Tables 4-1 and 4-2.

Table 4-1 Features of Project Primary Schoolbuildings

Building Type	Name of Room	No. of Units	Area(㎡)	Remarks
· Primary School Type A	Classrooms Toilet (Male) Toilet (Female)	2 1 1	108 11.875 13.625	40 students per room
Subtotal			133.5㎡	For 1 school
Total			133.5㎡	1 school 80 students
· Primary School Type B	Classrooms Toilet (Male) Toilet (Female)	3 1 1	162 11.875 13.625	40 students per room
Subtotal			187.5㎡	For 1 school
Total			1,875.0㎡	10 schools 1,200 students
· Primary School Type C	Classrooms Toilet (Male) Toilet (Female)	4 1 1	216 11.875 13.625	40 students per room
Subtotal			241.5㎡	For 1 school
Total			2,173.5㎡	9 schools 1,440 students
· Primary School Type C,C	Classrooms Toilet (Male) Toilet (Female)	8 1 1	432 11.875 13.625	40 students per room
subtotal			457.5㎡	For 1 school
Total			915.0㎡	2 schools 640 students
Total Floor Area of Primary Schools:			5,097.0㎡	22 schools 3,360 students

Table 4-2 Features of Project Secondary Schoolbuildings

Building Type	Name of Room	No. of Units	Area(㎡)	Remarks
· Secondary School Type SA	Classrooms Science Lab Toilet (Male) Toilet (Female)	2 1 1 1	108 90 11.875 13.625	42 students per room
Subtotal			223.5㎡	For 1 school
Total			223.5㎡	1 school 84 students
· Secondary School Type SB	Classrooms Science Lab Toilet (Male) Toilet (Female)	3 1 1 1	162 90 11.875 13.625	42 students per room
Subtotal			277.5㎡	For 1 school
Total			6,105㎡	22 school 2,772 students

Table 4-2 (Cont'd)

Building Type	Name of Room	No. of Units	Area(m²)	Remarks
· Secondary School Type SC	Classrooms	4	216	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			331.5m²	For 1 school
Total			4,309.5m²	13 schools 2,184 students
· Secondary School Type SD	Classrooms	5	270	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			385.5m²	For 1 school
Total			1,156.5m²	3 schools 630 students
· Secondary School Type SB,A	Classrooms	5	270	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			385.5m²	For 1 school
Total			385.5m²	1 school 210 students
· Secondary School Type SB,C	Classrooms	7	378	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			493.5m²	For 1 school
Total			493.5m²	1 school 294 students
· Secondary School Type SB,D	Classrooms	8	432	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			547.5m²	For 1 school
Total			547.5m²	1 school 336 students
· Secondary School Type SC,C	Classrooms	8	432	42 students per room
	Science Lab	1	90	
	Toilet (Male)	1	11.875	
	Toilet (Female)	1	13.625	
Subtotal			547.5m²	For 1 school
Total			2,737.5m²	5 schools 1,680 students
Total Floor area of Secondary Schools:			15,958.5m²	47 schools 8,190 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 arragement plan shall be made by taking into consideration the people's moving line between the new building and the existing facilities.

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

3) The new buildings longitudinal direction shall be decided upon by taken into account the preveiling wind direction in order to utilize the wind natural ventilation. The building shall be arranged by considering the distance from existing building in order to allow drafts to blow between the new and existing building and to avoid wind force concentration during typoon 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 installation of economical facilities and the electrical supply line.

6) Different types of structures shall not be arranged continuously. The toilet facility shall be built separate from the prefabticated main structure. New facilities shall be arranged so that they will be functional together with existing facilities.

4-3-2 Architectual Design

a. Floor Plan

When the prefabricated unit construction method is used, the setting of the module is very important matter for reducing construction costs and time. DECS's school construction manual specifies that the size of one classroom shall be 6m by 8m. The Japanese standard is almost the same. It is reasonable, then, to adopt DECS's standard for the Project. The minimum unit size of the module for Project buildingsw as decided upon as being 2.25 m wide, classrooms as 8m x 6.75m (2.25m x3 each), and science laboratories as 8m x 11.25m.

The toilets that are to be built based on Philippine standard shall be arranged so that they are separated from prefabricated main structure. Taking into account of the problems, the toilets will be located away from other buildings. Science laboratories shall be so arranged to keep water supply and drain pipe installation work to a minimum. All Project buildings shall be arranged from the viewpoint of overall schoolbuilding use.

Judging from the Project site areas' population, the number of students, the environmental conditions, and the conditions of the existing buildings, floor plans for the four basic buildings and the science laboratory are to be prepared. Each school's arrangement plan shall be made to suit the needs of the school and area conditions by using these floor plans. An open corridor was arranged to allow teachers and students to move easily between classrooms and offices.

The comparison of Project facility features to those having Philippine standards are listed in Table 4-3.

Table 4-3 Comparison of Project Facility Features to Those Having Philippine Standards.

	Name of Room	Philippine Standard	Project Facility Standard	Difference
PRIMARAY SCHOOL	Classroom	1.2㎡/student (minimum requirement)* but actual figure is 1.17㎡/student	1.35㎡/student (40 student/ class)	·Typhoon-resisting capability ·Unit area per student was increased to meet possible future inrease of students per class-room. ·Sliding partition is adopted to permit combining two class-rooms into one meeting 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: ·One handicapped person use. ·One urinal (4 persons use). ·One sink with pail. Female Toilet: ·One handicapped person use. ·Two toilet bowls. ·One sink with pail.	·Adopted Philippine Standard, but added handicapped person use toilet units
	Corridor	No rule exist for outside corridor. 2.0 m 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 one sink unit for experiment
	Toilet	Same as primary school standards	Same as Primary school standars	Same as Philippine Standards, but added handicapped person use toilet units
	Corridor	Same as primary school standards	Same as Primary school standars	Similar to Philippine Standards

Source: The Present Situation of Educational Facilities in the Phillipines and Future Issues.

* The minimum requirement of unit classroom area for one student in the Philippines is 1.2㎡ for primary schools and 1.4㎡ for secondary schools. However, the unit classroom area for one student of the RP-us Bayanihan type school building, that is one of the Phillipine standard, is 1.17㎡ for primary schools and 1.11㎡ for secondary schools.

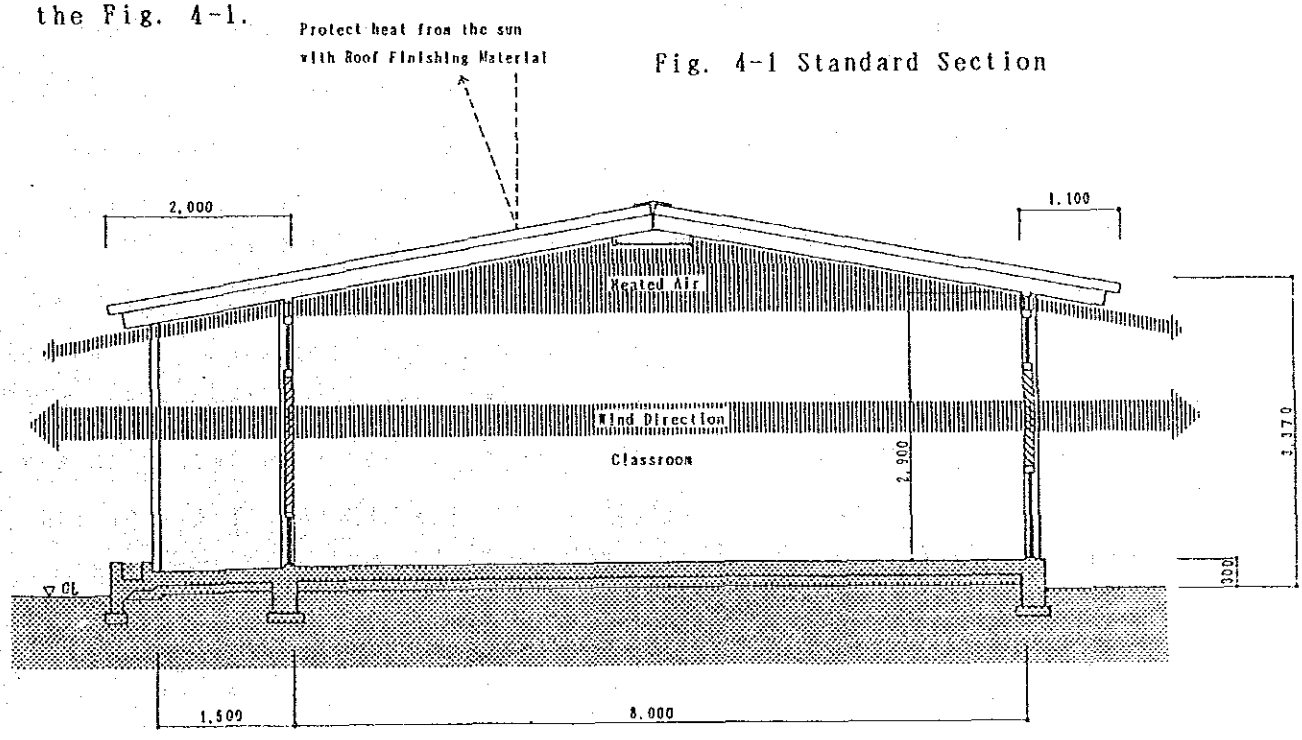
b. Section Plan

Basically, the section plan for Phase II Project buildings was made similar to that for Phase I project buildings. Due to the simplification of the window design, however, the height of the lowest portions of the ceilings of Phase II Project buildings was decided upon as being 2.9m (for the Phase I project it was 3.0m).

By taking into consideration the tropical climate of the Philippines, building section plans were made by adopting the graded ceiling in order to keep the thick air stratum as high as possible above the classroom. All roofs will be built by the unit construction method using prefabricated unit materials manufactured in Japanese factories in order to assure their strength against typhoons.

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

Fig. 4-1 Standard Section



c. Structural Plan

1. Basic Requirements

For use in the Phase II Project, the Philippine side requested that the structure plan used in the Phase I project be simplified and that the construction cost be lowered. Careful consideration shall be given to the simplification of the typhoon-resisting structure type building which is the prime purpose of Project schoolbuildings. As a result of investigations, the structure plan used in Phase I was basically adopted for Phase II. The detailed portions of the structure plan were re-examined from an economical and building construction viewpoint.

The Project is to restore or rebuild schoolbuildings (69 schools) in the Eastern Visayas Region that were seriously damaged by large typhoons. The following three Phase I project aspects are specifically required in the Project's building structure plan:

(1) Typhoon-resisting capabilities

(2) Durability

(3) Short construction period

Based on the experience gained during the Phase I project, it is considered that steel-frame prefabricated panel structures are the most suitable for meeting the above requirments.

The panel units are fabricated with factory made steel frames. The panel units made in Japan will be shipped to each Project site and will then be assembled at the site to make a permanent structure. Using this method, construction quality control and short construction period can be accomplished. In view of the above concept, the structure plan was made to ensure the typhoon-resisting capabilies and durability of the buildings as follows:

2. Design Policies

a) Design Loads and External Forces

Basically, the Philippine National Structural Code for Buildings was used to determine the design loads for Project buildings. From the viewpoint of typhoon-resistance 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 Building Design Load Manual and its Explanation", a Japan Society of Architects publication, specifies the external force factors for local wind forces. The Philippine Code does not specify and local wind force for building design. However, the design load condition of the Japanese Code was adopted for the Project.

Example of typhoon damages to buildings are shown in the "The *Building Damages in Hachijo Island Caused by Typhoon No.13, 1975*" published by the Japan Society of Architects. The typhoons that caused extensive damages in the Eastern Visayas Region in 1987 were about the same scale as Typhoon No.13. Many similarities were found between the above record and the recorded damages in the Philippines. Therefore, the design loads for Project buildings were decided upon after careful examination of the above publication.

b) Building Structure Plan

As described above, project buildings must have enough strength to support fixed loads, live loads on roofs, wind forces, and seismic loads. The ways in which building structures will resist each load are described bolow;

(1) Vertical external forces (fixed loads, live loads on roofs, and uplift wind forces on roofs) will be taken by the prefabricated

module unites (8m x 2.25m 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 -- planks and the fixed-partition walls, and the rigid frames of each module unit.

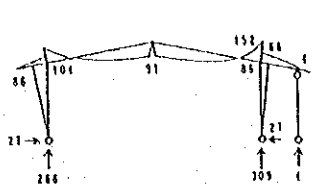
(3) Beam direction horizontal external forces (wind forces and seismic forces) will be taken by the rigidity of the wall panels. In general, the beam direction of steel frame structures is the weaker structure direction against horizontal external forces. Vertical bracings are used to take care of the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

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

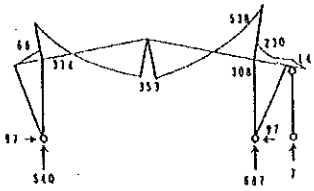
Mat foundations will be constructed around the buildings. The thickness and reinforcement of the foundations will be decided upon to suit the condition of each Project school site.

Because of the wind's large lifting force and the large column pull force caused by an overturning moment acting on Project schoolbuildings, special attention shall be paid to the method for fixing structures to foundations.

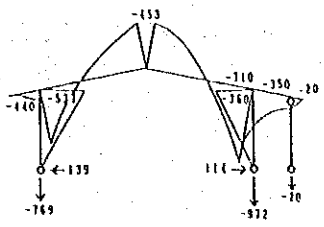
The results of the rigid frame structure's stress analyses against longitudinal direction horizontal external forces are shown below.



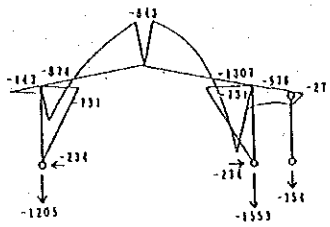
Fixed load



Roof Area Live Load



Wind Load
(Open Windward and Leevard)



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 structure members.

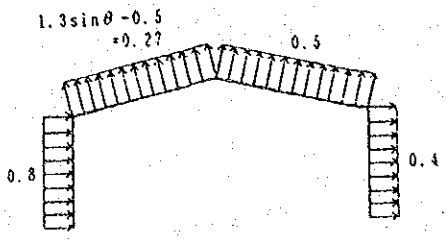
· Eve Edges and Hoods:

During the field survey period, in particular, many damaged eave edges and hoods observed. Special attention must be paid when designing these building parts because they will receive the impact of 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.

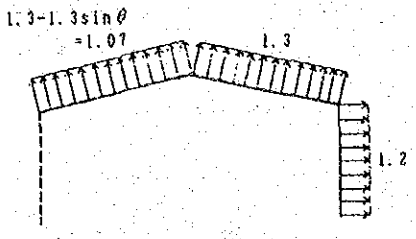
The installation of these members shall be taken in to consideration in the detailed design of Project buildings.

· Wall panel's Strength Against External Forces

"The building Damages in Hachijo Islang Caused by Typhoon No.13, 1975" reported on the damaged buildings whose roofs were completely blown away by the lifting wind force 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 the complete destruction of the building. Thus, it is necessary to pay special attention to wall panel strength against external forces. Since it is planned to utilize removable wooden jalousies -- to be made in the Philippines -- the details of window joints must be carefully exmined.

· 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

Lighting fixtures and outlets were installed in all Phase I project schools. For the Phase II project, however, lighting fixtures and outlets will only be installed in those schools already having power supply systems compatible with Project facilities.

In order to allow simple maintenance and management after Project completion, it was decided to install local available single type fluorescent lighting fixtures.

The designed number of fluorescent lighting fixtures, switches, and outlets for each room are shown below:

Name of Room	Number of Fluorescent Lighting Fixtures	Number of Switches	Number of Outlets
Classroom	4	1	2
Science Laboratory	6	2	4
Toilet (Male)	2	1	0
Toilet (Female)	2	1	0

(2) Water Supply Facility Plan

For the Phase I project, only the gravity flow water supply method was adopted for toilet facilities. For the Phase II Project, however, an improved water supuply method is planned because some of the Project schools are located either in mountainous areas or in areas having inadequate water suupply facilities or insufficient water supplies.

It is planned to pump pipe-supply water or well water into 4m high elevated water tanks either by using electric powered or manual pumps. The water will then be supplied to the science laboratory sinks by gravity flow.

As a general principle, the Philippine method of collecting and storing rainwater for toilet facility use will be adopted. However, the system is improved upon to allow gravity flow for dry season use.

NOTE: The rainwater collected in a tank is removed by a bucket. The bucket water is then poured directly into a pail for use.

Water supply facility items include the following:

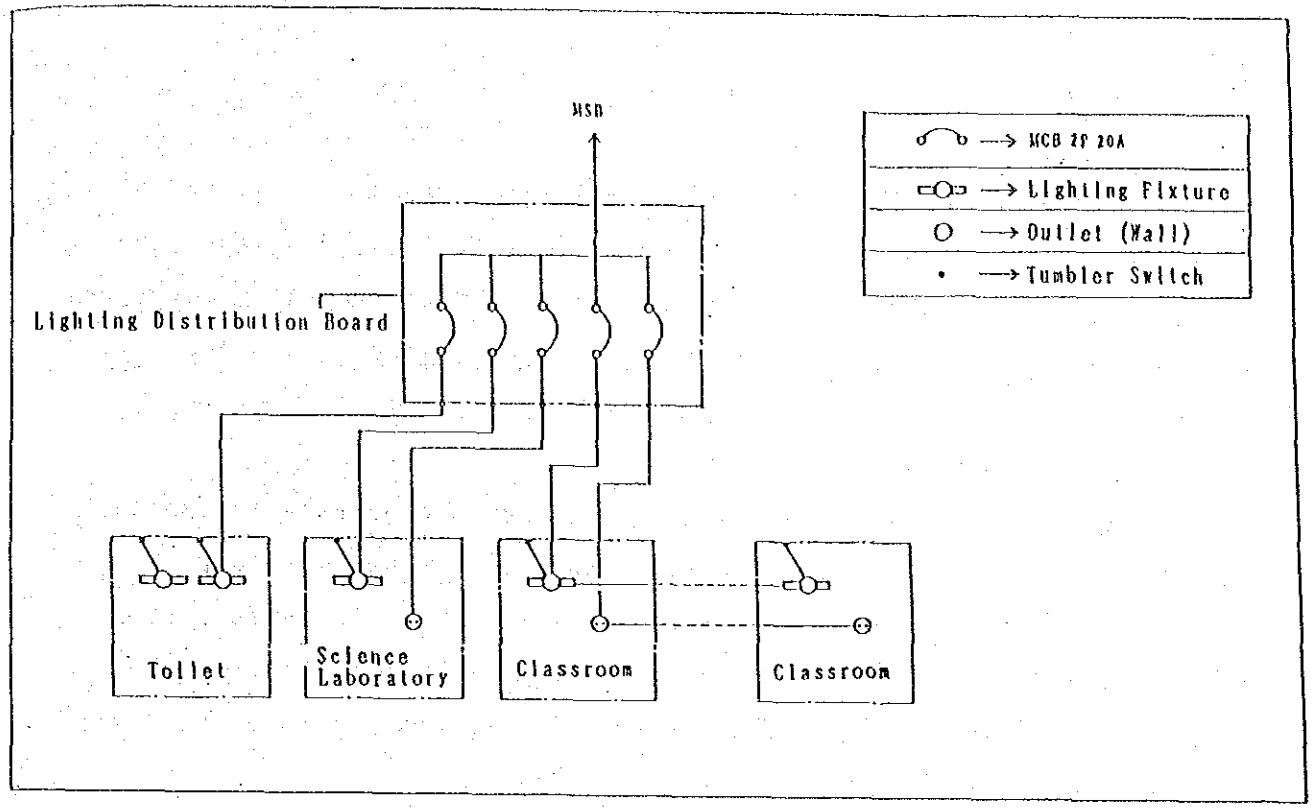
- Elevated tanks: F.R.P. tanks, 2.0m^3 capacity
- Supporting structures for Elevated tanks: Steel angle bar frames
- Pumps: Hand pumps (booster pumps)
- Piping material PVC pipe

(3) Sewerage Facility Plan

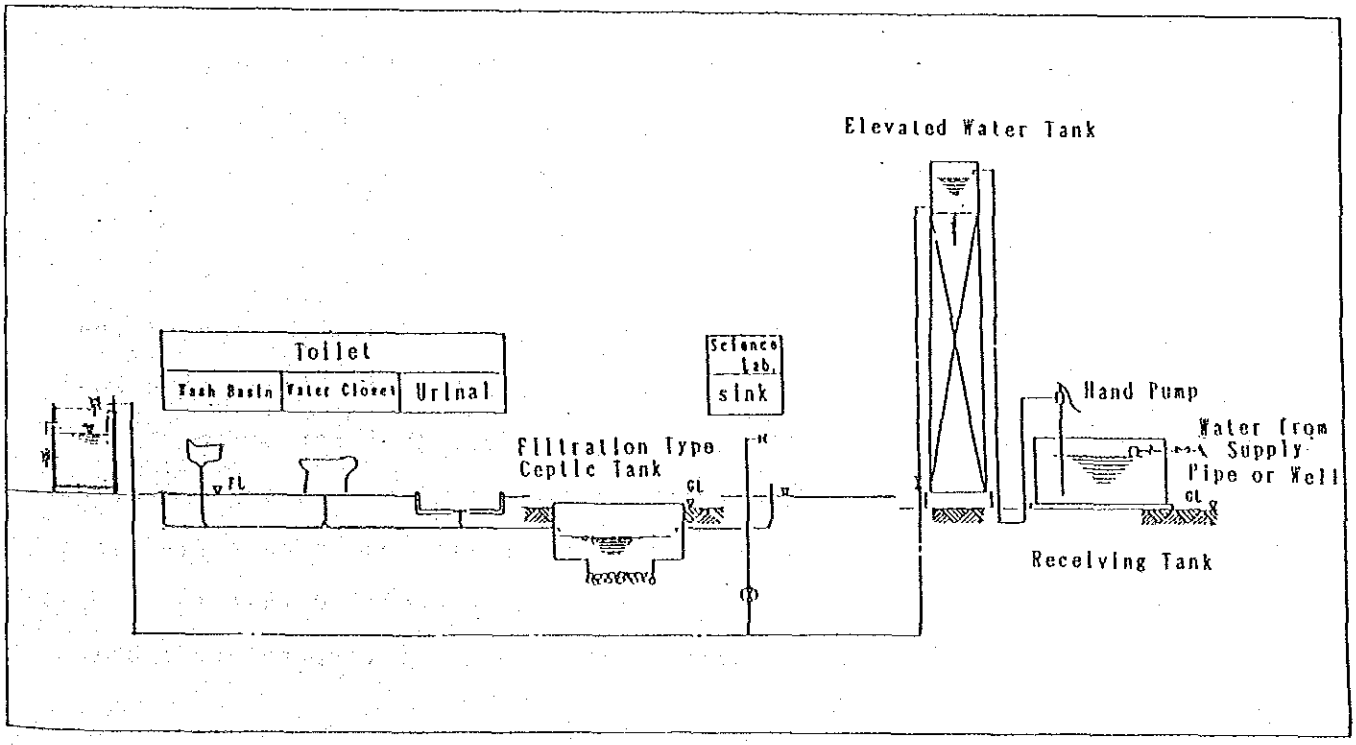
It will be necessary to install sewage treatment facilities for sewerage from wash basins, urinals, and water closets of the toilets, and waste water from the sink in the science laboratories. It was design to treat to sewerage and waste water by simple infiltration type septic tanks.

Sewerate facility items include the following:

- Water closets: Western type
- Urinals: Multiple unit type
- Wash basins: China
- Piping material: PVC pipe
- Septic tanks: Infiltration type. Made of reinforced concrete (partially made of CB)



Lighting and Outlet Wiring Diagram



Water Supply and Sewerage System Diagram

c. Main Building Material Plan

1. Basic Requirements

The Philippine side requested that local plywood or concrete block walls be installed in Phase II Project buildings instead of the long sandwiched insulation panel walls that were used in the Phase I project so that building construction costs will be lower and more school-buildings can be constructed.

As the objective of the Project is to restore or rebuild typhoon damaged schoolbuildings within a short period of time, the long sandwiched insulation panel walls that were used in the Phase I project were adoped for the Project. In order to meet the Philippine side's desire as much as possible, local materials are planned to be used for the interior finish work of Project buildings.

2. Major Materials to be Used

a) Structure Material

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

b) Roof Material

Most of the schools in the Philippines are roofed with zinc plated sheets. Unfortunately, most of the roofs are corroded. Thus, aluminum-zinc alloy plated steel sheets that have stronger anti-corrosion resistance than zinc plated steel sheets were selected. Also, un-coated aluminum-zinc alloy plated steel sheets have better sunshine reflecting capability than zinc plated steel sheets. It is expected that the selected roof material will be helpful in preventing temperature rises in the rooms.

c) Windows

Sliding glass window, that are used extensively in Japan, are very rarely found in Philippine primary and secondary schoolbuildings. Instead of sliding glass windows, wooden jalousies are most commonly used. Wooden jalousies are unique, ingenious contrivance of the Philippines that utilizes the merits of non-shattering, easily maintainable and manageable wood and yet allows effective natural ventilation. Therefore, it was decided to use wooden jalousies for the schoolbuildings; they are suitable for the Philippine environment.

d) Walls

It was decided to use long-sized insulation sandwich panesl for wall material by taking into account their high insulating qualities.

3. Finish Work

EXTERIOR	PHILIPPINE METHOD	THIS PROJECT'S METHOD	REASON FOR ADOPTION
Roofs	Zinc plated corrugated steel sheets	Aluminum-zinc alloy plated steel sheets	Storonger anti-corrosion resistance
Roof edges	No underlay, O. S. finish	Waterproof plywood, S.O.P. coating	Easy maintenance and adoption of local 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	Concrete block made (inside, and outside tank tops are to be waterproof mortar steel trowel finish)	Durability and easy maintenance

INTERIOR	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	Parition 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 100 mm tiled tops (science laboratories only) Dadoes -- CHB mortar, E.P. coating	Easy maintenance and accurate finish work
Male and Female Toilets			
Floors	Mortar, steel trowel finish	Mortar, steel trowel finish	Easy maintenance
Walls	Concrete blocks, V.P. laying	Concrete blocks, V.P. laying	Easy maintenance
Ceiling	No ceiling, O.S. finish	No ceiling, O.S. finish	Easy maintenance

4-3-3 Equipment Plan

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

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

For the science laboratories, three-person type tables were decided upon. One workbench -- to be used for the 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, storong equipment, and elaborate equipment was avoided.

The following equipment is to be provided under the Project:

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 filling 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 filling cabinet	1
	· Student's desk-chairs	42
	· Student's closets	8
	· Blackboard	1
	· Bulletin board	1
Science Laboratories	· Experiment tables	14
	· Student's closets	5
	· Demonstration workbench	1
	· Stools	43
	· Blackboard	1
	· Bulletin board	1
	· Storage shelve	1
	· Steel shelve	1

Table 4-6 List of fuirniture for Each Schoolbuilding Type

Primary Schools

(1 of 3)

Furniture	A Type Two Classrooms (1 school)		B Type Three Classrooms (10 schools)		C Type Four Classrooms (9 schools)		C.C Type Eight Classrooms (2 schools)		For All Primary Schools
	For one school	1 school	For one school	10 schools	For one school	9 schools	For one school	2 schools	
Teccher's desk	2	2	3	30	4	36	8	16	84
Teacher's chair	2	2	3	30	4	36	8	16	84
Teacher's filling cabinet	2	2	3	30	4	36	8	16	84
Student's chair (Large)	16	16	24	240	32	288	64	128	672
Student's chair (medium)	16	16	24	240	32	288	64	128	672
Student's chair (small)	16	16	24	240	32	288	64	128	672
Armchair									
Student's closet	16	16	24	240	32	288	64	128	672
Workbench									
Experiment Table									
Stool									
Blackboard	2	2	3	30	4	36	8	16	84
Bulletin board	2	2	3	30	4	36	8	16	84
Storage shelf									
Steel shelf									

Secondary Schools (2 of 3)

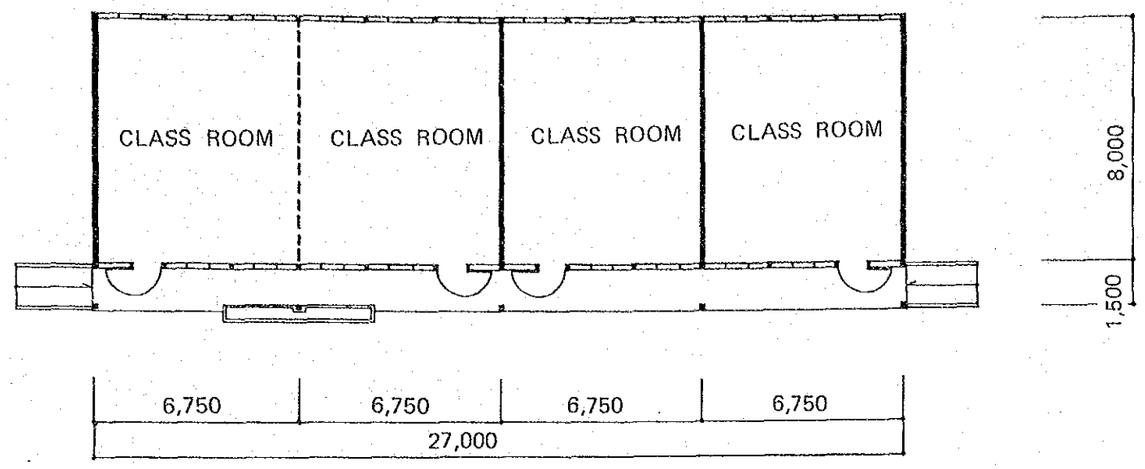
Furniture	SA Type Two Classrooms (1 school)		SB Type Three Classrooms (22 schools)		SB, A Type Five Classrooms (1 school)		SB, C Type Seven Classrooms (1 school)	
	For one school	1 school	For one school	22 schools	For one school	1 school	For one school	1 school
Teccher's desk	2	2	3	66	5	5	7	7
Teacher's chair	2	2	3	66	5	5	7	7
Teacher's filling cabinet	2	2	3	66	5	5	7	7
Student's chair (Large)								
Student's chair (medium)								
Student's chair (small)								
Armchair	84	84	126	2,772	210	210	294	294
Student's closet	21	21	29	638	45	45	61	61
Workbench	14	14	14	308	14	14	14	14
Experiment Table	1	1	1	22	1	1	1	1
Stool	43	43	43	946	43	43	43	43
Blackboard	3	3	4	88	6	6	8	8
Bulletin board	3	3	4	88	6	6	8	8
Storage shelf	1	1	1	22	1	1	1	1
Steel shelf	1	1	1	22	1	1	1	1

Secondary Schools (3 of 3)

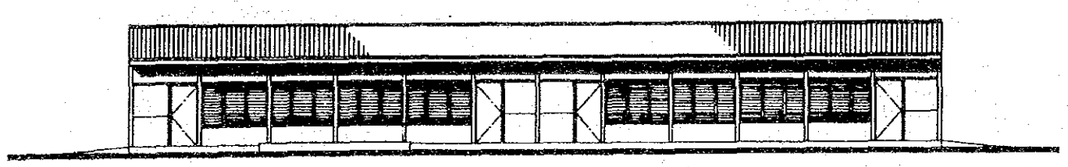
Furniture	SB, D Type Eight Classrooms (1 school)		SC Type Four Classrooms (13 schools)		SC, C Type Eight Classrooms (5 schools)		SD Type Five Classrooms (3 schools)		Total of Secondary Schools	Total of All Project Schools
	For one school	1 school	For one school	13 schools	For one school	5 schools	For one school	1 school		
Teccher's desk	8	8	4	52	8	40	5	15	198	279
Teacher's chair	8	8	4	52	8	40	5	15	198	279
Teacher's filling cabinet	8	8	4	52	8	40	5	15	198	279
Student's chair (Large)										672
Student's chair (medium)										672
Student's chair (small)										672
Armchair	336	336	168	2,184	336	1,680	210	630	8,190	8,190
Student's closet	69	69	37	481	69	345	45	135	1,795	2,467
Workbench	14	14	14	182	14	70	14	42	658	658
Experiment Table	1	1	1	13	1	5	1	3	47	47
Stool	43	43	43	559	43	215	43	129	2,021	2,021
Blackboard	9	9	5	65	9	45	6	18	242	326
Bulletin board	9	9	5	65	9	45	6	18	242	326
Storage shelf	1	1	1	13	1	5	1	3	47	47
Steel shelf	1	1	1	13	1	5	1	3	47	47

4-3-4 Basic Design Drawings

01.	Type	C	Plan ·Elevation ·Section
02.	Type	A· B· C, C	Plan
03.	Type	SC	Plan ·Elevation ·Section
04.	Type	SA·SB·SD	Plan
05.	Type	SB, A·SB, C	Plan
06.	Type	SB, D·SC, C	Plan
07.	Type	Toilet	Plan ·Elevation ·Section
08.	Type	A·B·C, C	Equipment Plan
09.	Type	SA·SB·SD	Equipment Plan
10.	Type	SB, A·SB, C	Equipment Plan
11.	Type	SB, D·SC, C	Equipment Plan



ELEMENTARY SCHOOL C-TYPE PLAN



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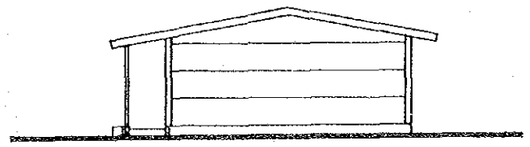

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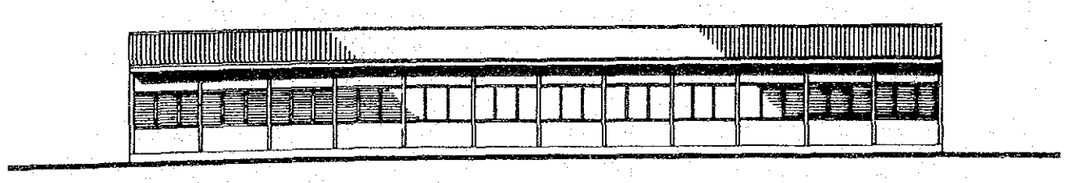

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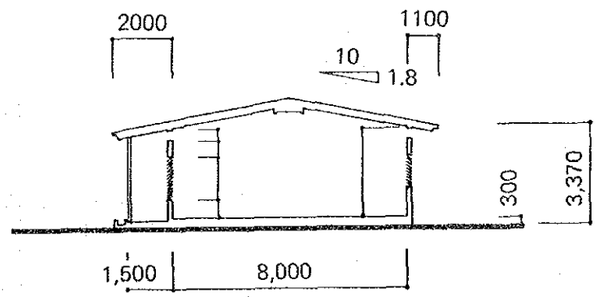

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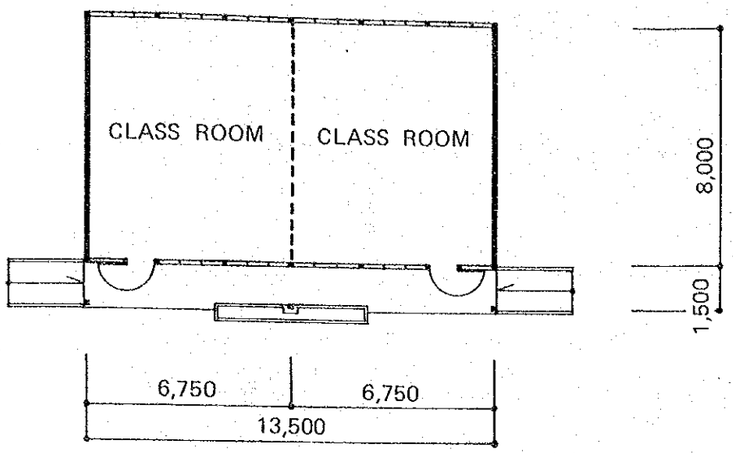

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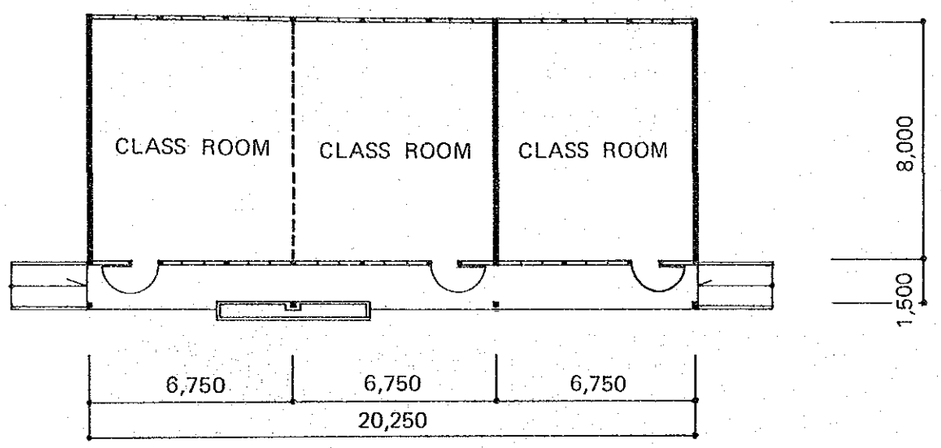

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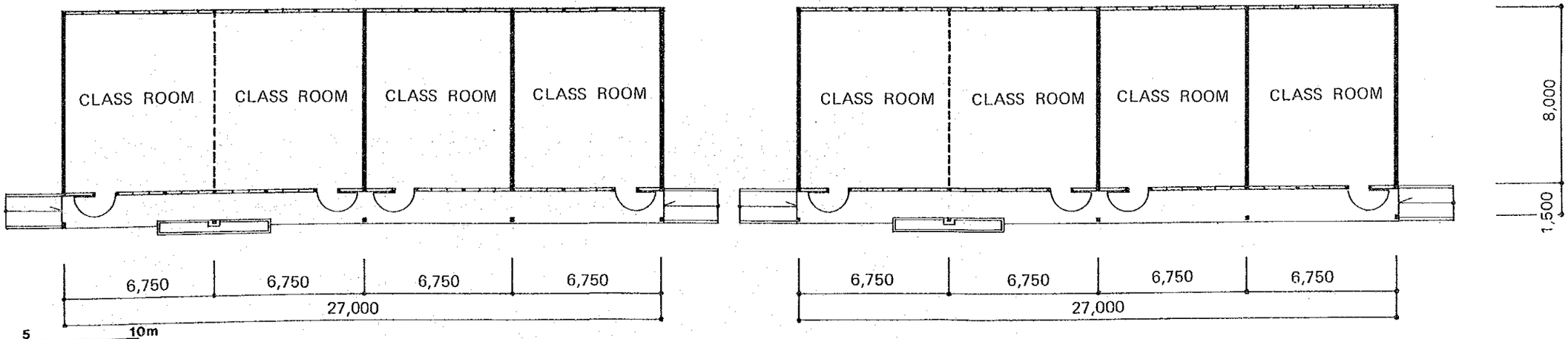
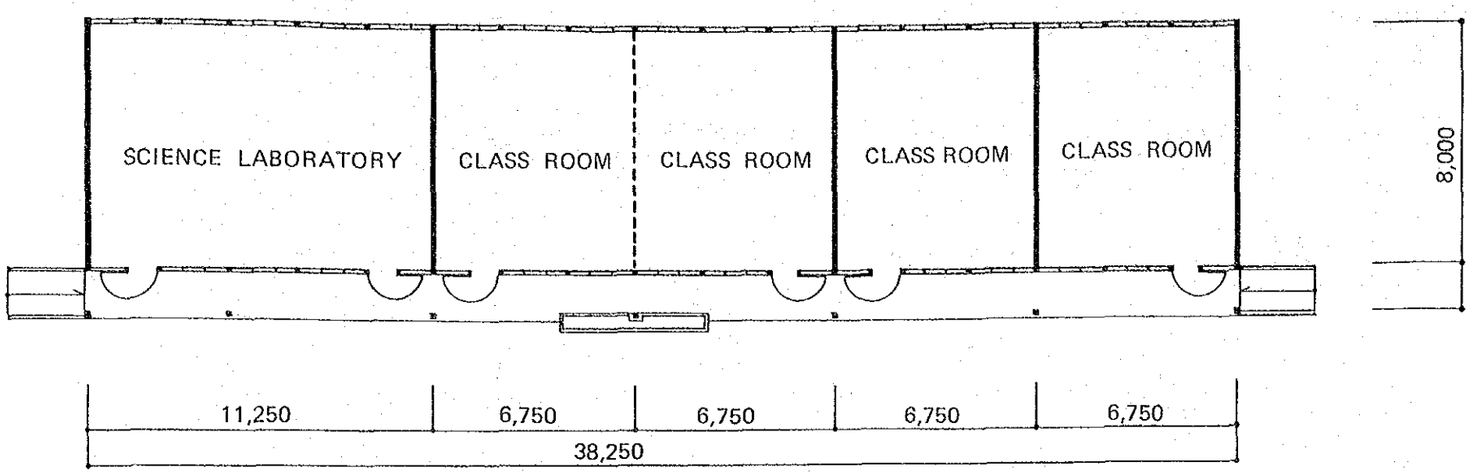
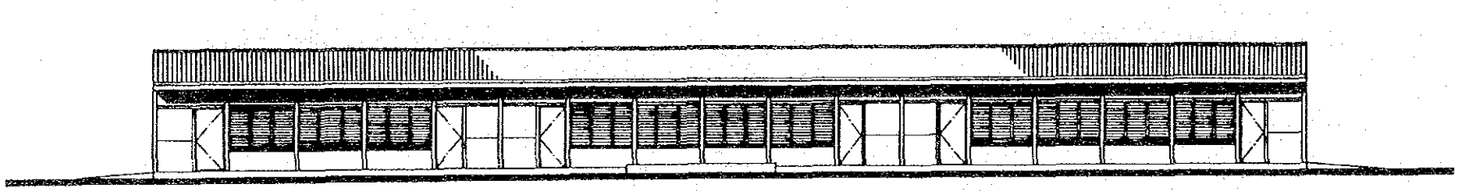


ELEMENTARY SCHOOL C,C-TYPE PLAN



SECONDARY SCHOOL SC-TYPE PLAN



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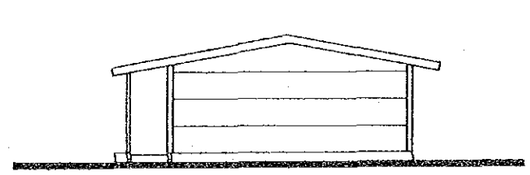

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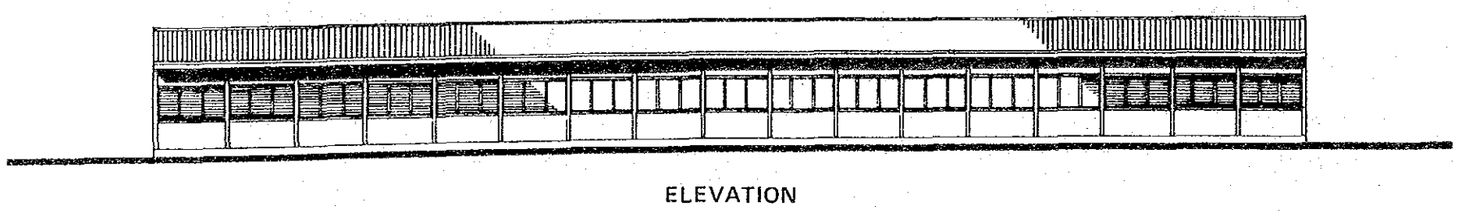

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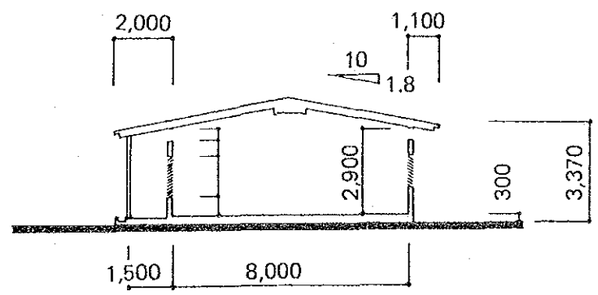

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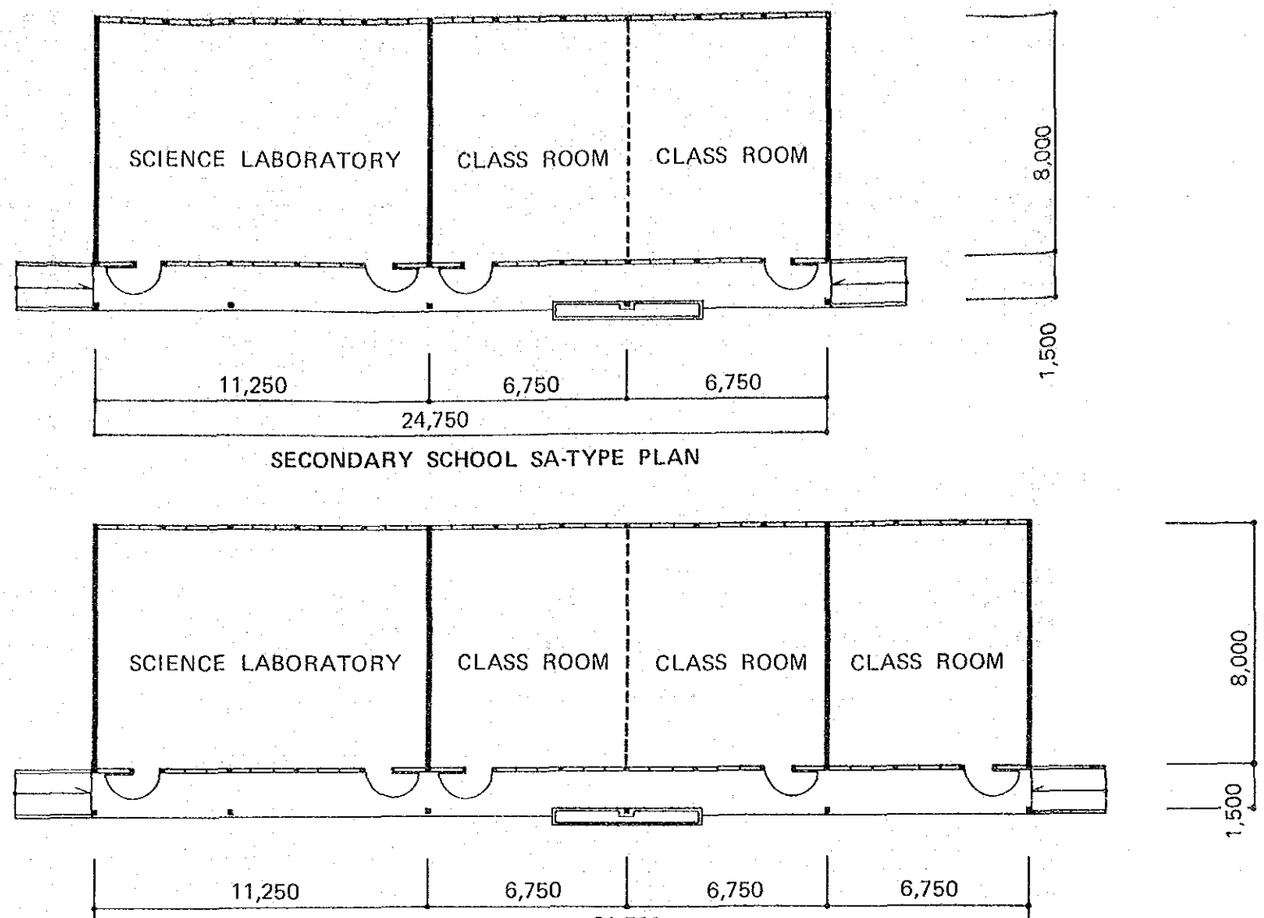
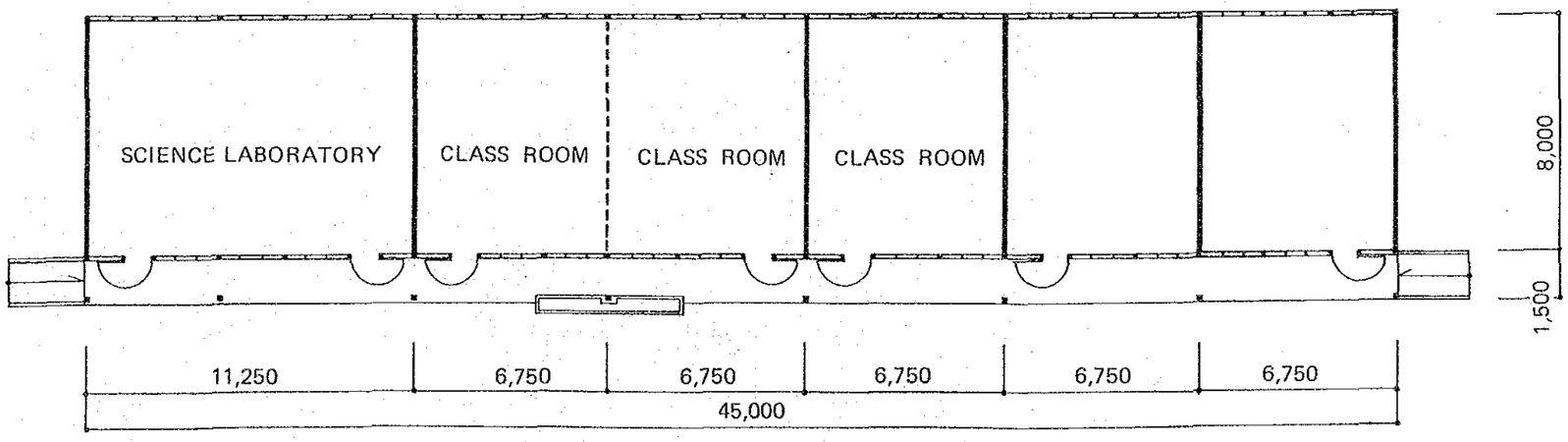


SECONDARY SCHOOL SA-TYPE PLAN

SECONDARY SCHOOL SB-TYPE PLAN



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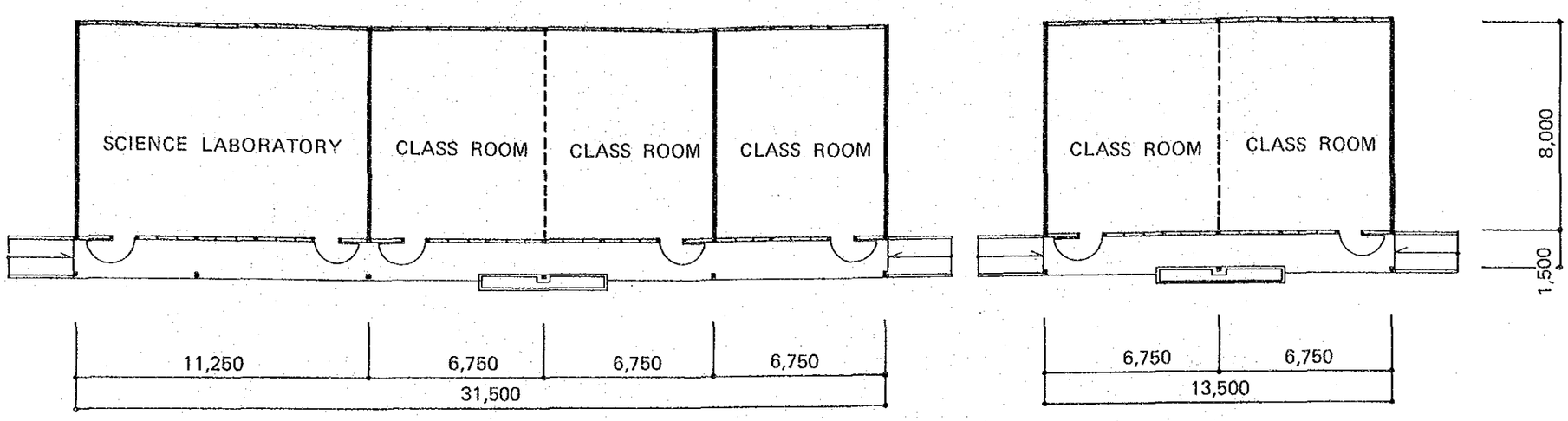

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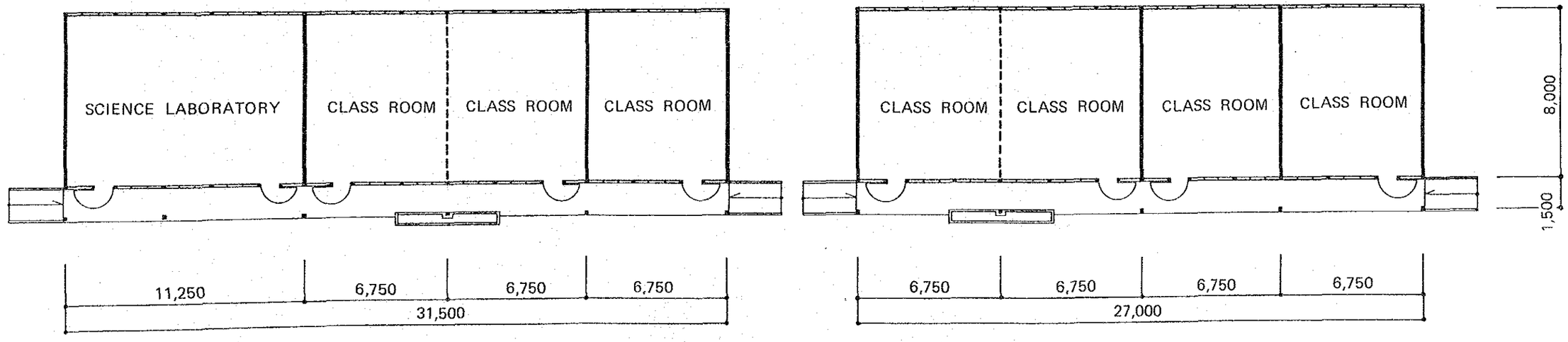

SECONDARY SCHOOL SB,C-TYPE PLAN

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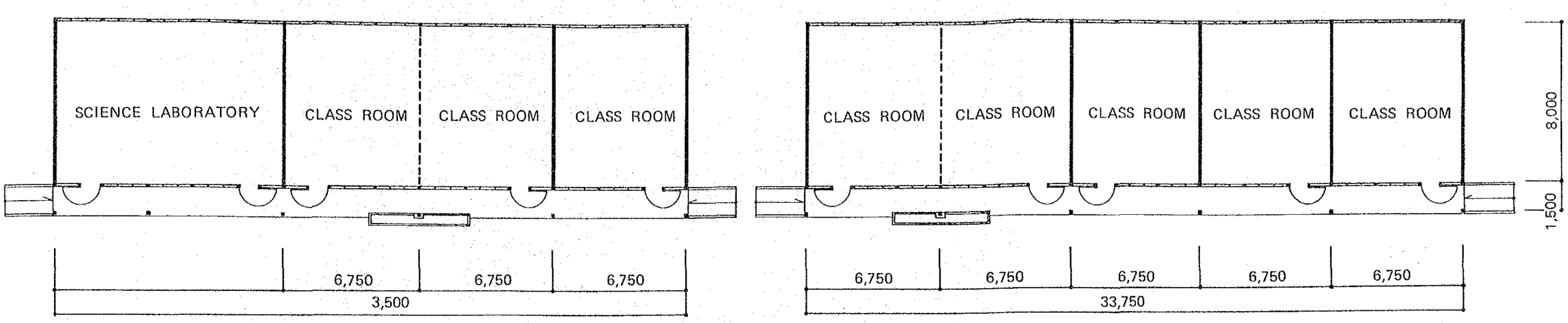
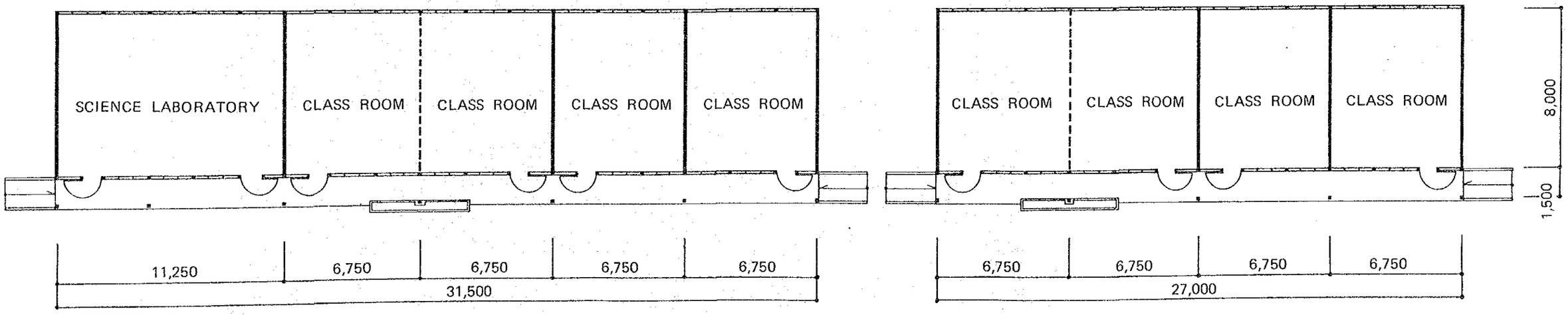


SECONDARY SCHOOL *SB,D·SC,C-TYPE



SECONDARY SCHOOL SC,C-TYPE PLAN

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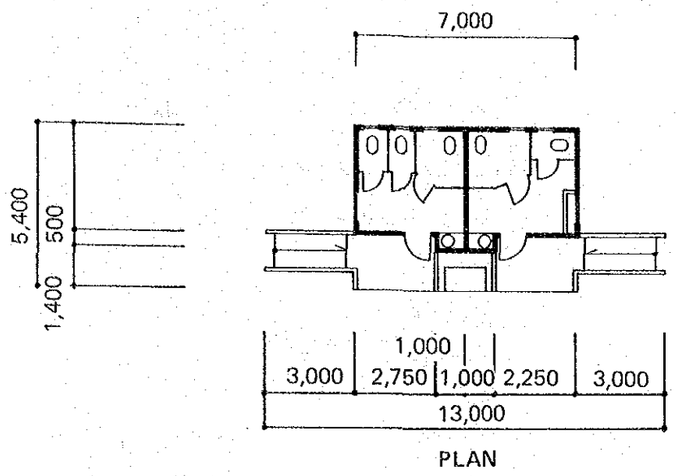
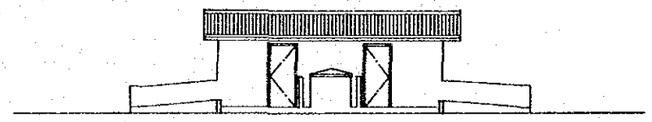


PLAN



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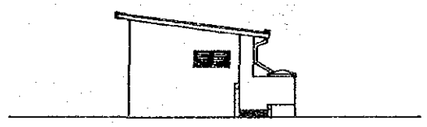

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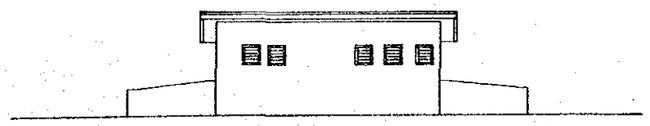

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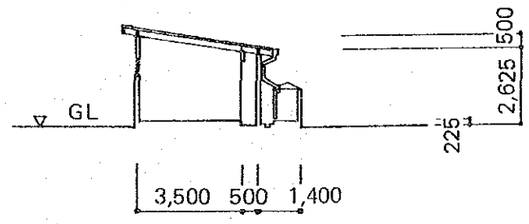

SECTION

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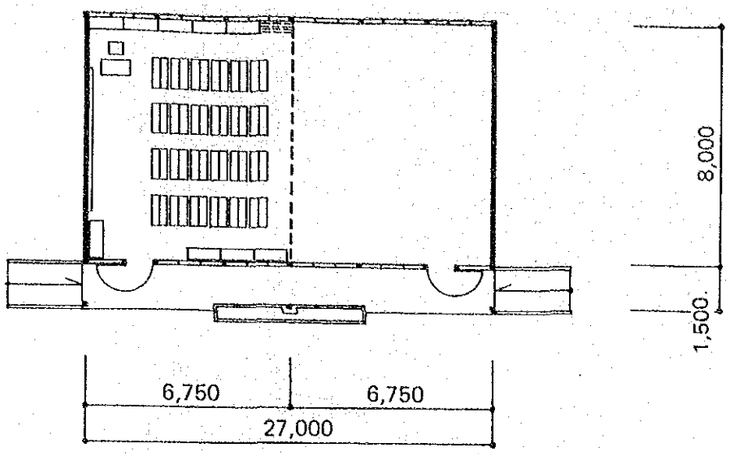
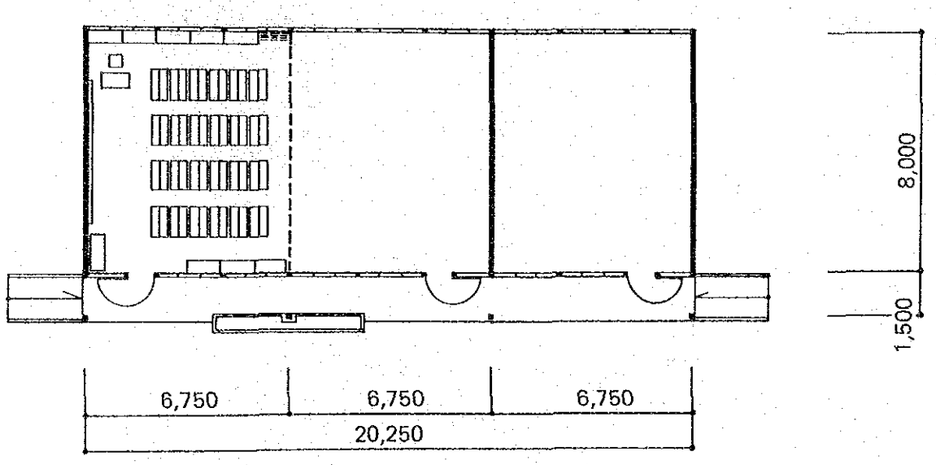
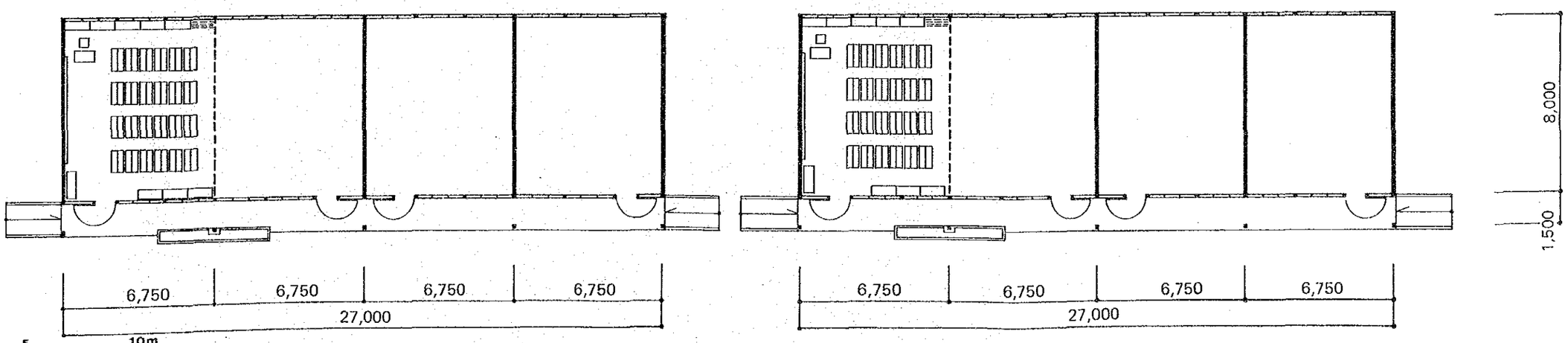


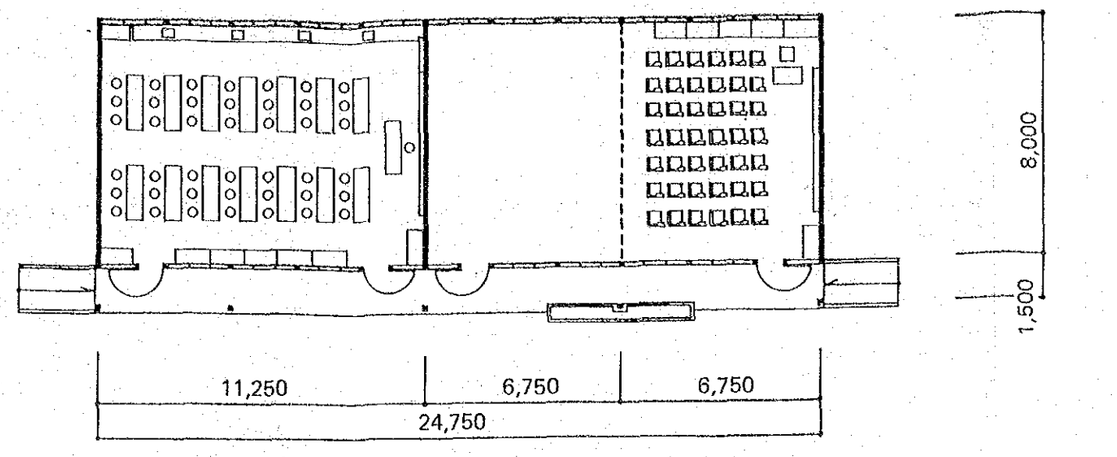
ELEMENTARY SCHOOL A-TYPE EQUIPMENT PLAN



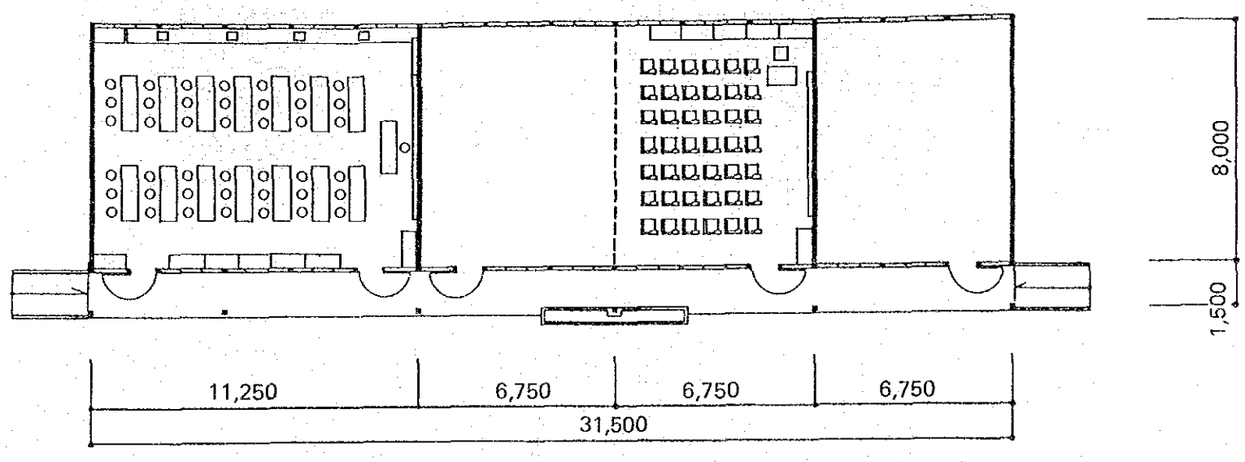
ELEMENTARY SCHOOL B-TYPE EQUIPMENT



ELEMENTARY SCHOOL C,C-TYPE EQUIPMENT PLAN



SECONDARY SCHOOL SA-TYPE EQUIPMENT PLAN



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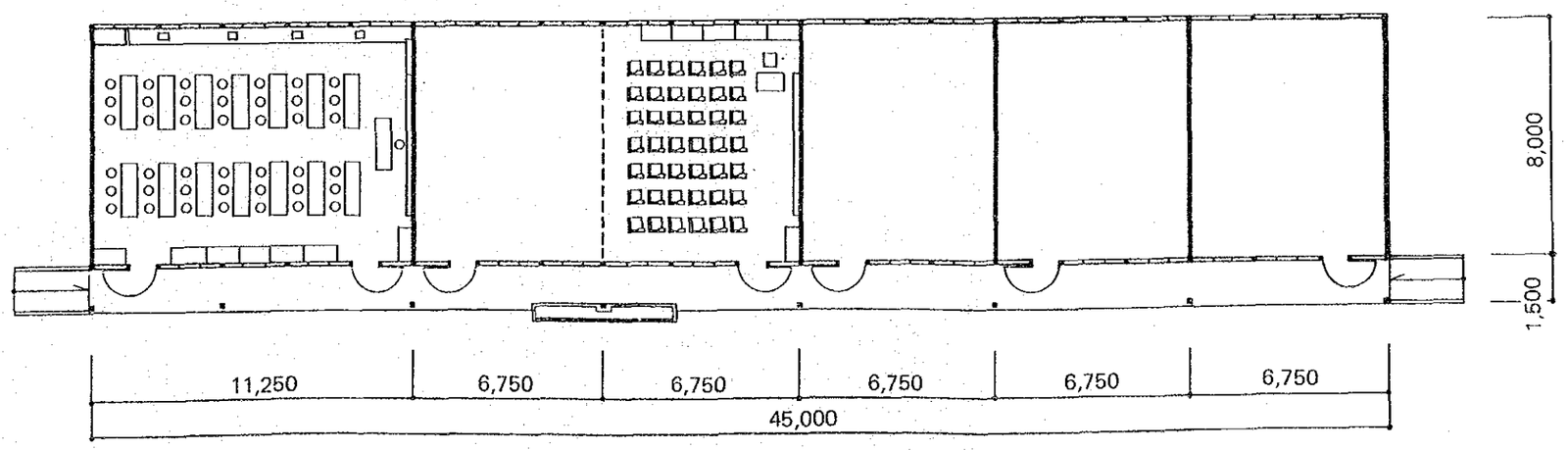
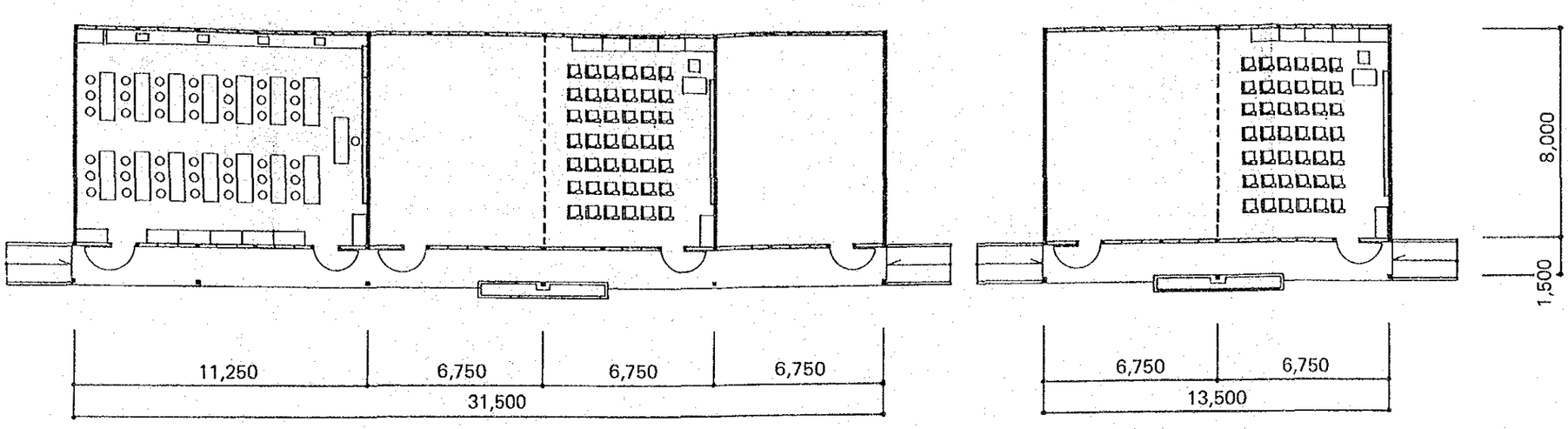
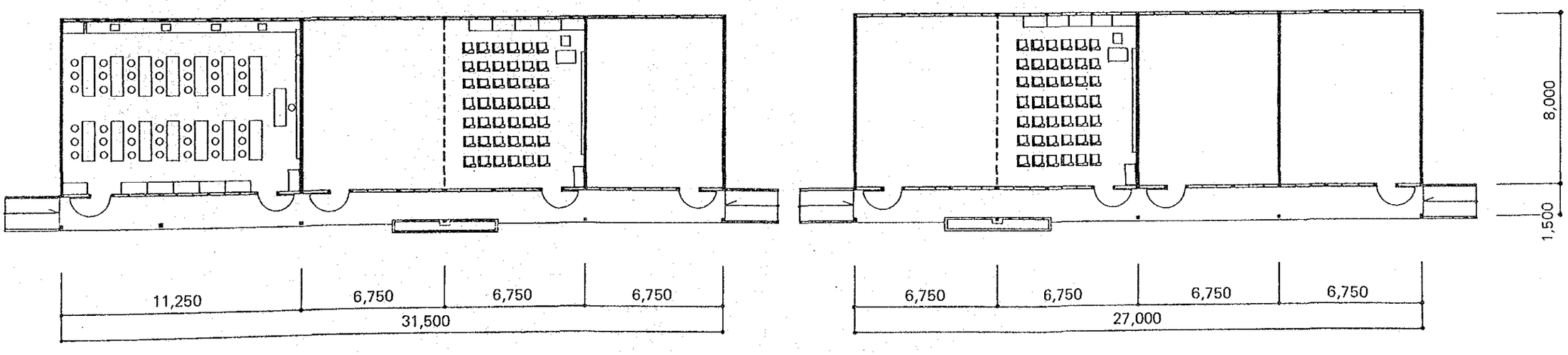


SECONDARY SCHOOL SD-TYPE EQUIPMENT PLAN

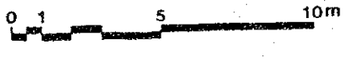
0 1 5 10m

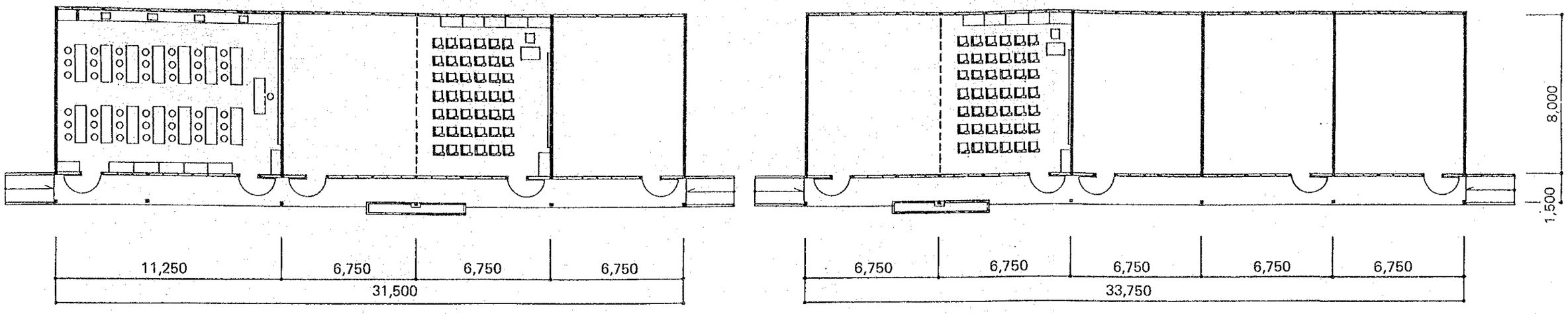


SECONDARY SCHOOL SB,A-TYPE EQUIPMENT PLAN

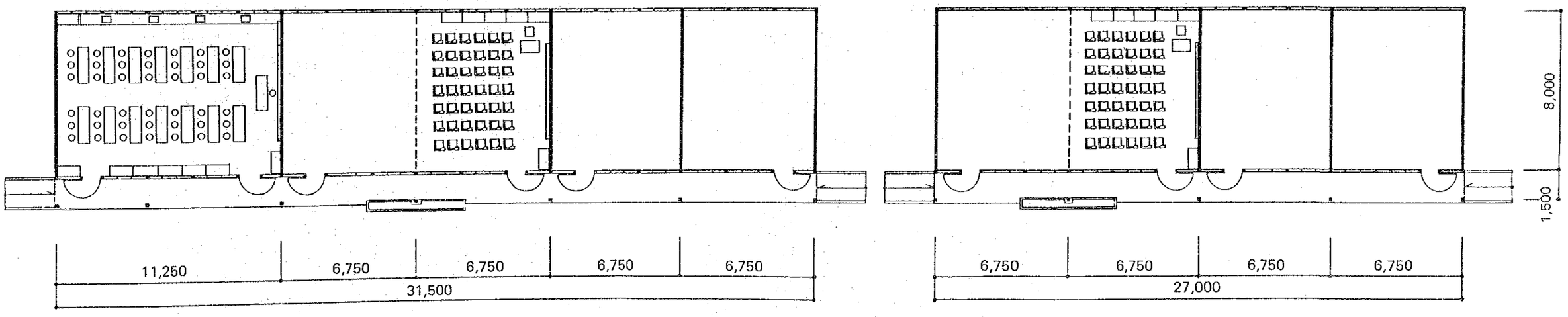


SECONDARY SCHOOL SB,C-TYPE EQUIPMENT PLAN





SECONDARY SCHOOL SB,D-TYPE EQUIPMENT PLAN



SECONDARY SCHOOL SC,C-TYPE EQUIPMENT PLAN

0 1 5 10m

4-4 Implementation Plan

4-4-1 Implementation Method

A peculiarity of the Project is the construction of facilities for 69 schools at widely scattered sites during a very short period of time. The construction plan must be made to meet this peculiarity.

1) Two schools will be set up as models (one in Tacloban, the construction base in Leyte, and the other in Calbayog, the construction base in Samar). The chief engineers, who will carry out the Project construction, will be provided with on-the-job trainning in the following subjects:

   ① The accurate foundation concrete placing method and the method for fixing prefabricated material by ancher bolts. Both of these methods are important in the building of typhoon-resistant school buildings.

   ② Training in prefabricated structure construction methods and finishing methods will be conducted by engineers dispatched for fourteen days from Japan. Actual job experience coupled with the use of the construction manual will be of value to the engineers when performing future construction work.

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

3) Regarding the construction material 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 Japanese contractors in making the technology transfer of prefabricated structure construction techniques to local contractors

and workers.

5) The schedule for the foundation construction work should be set up according to 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.

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 prime contractor and the sub-contractors, and establishment of an appropriate staff plan should make way for the smooth progress of the construction work.

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

4-4-2 Construction and Supervision System

As the sixty-nine Project schools are located throughout the Eastern Visayas Region, it is important to have adequate construction scheduling and quality control systems.

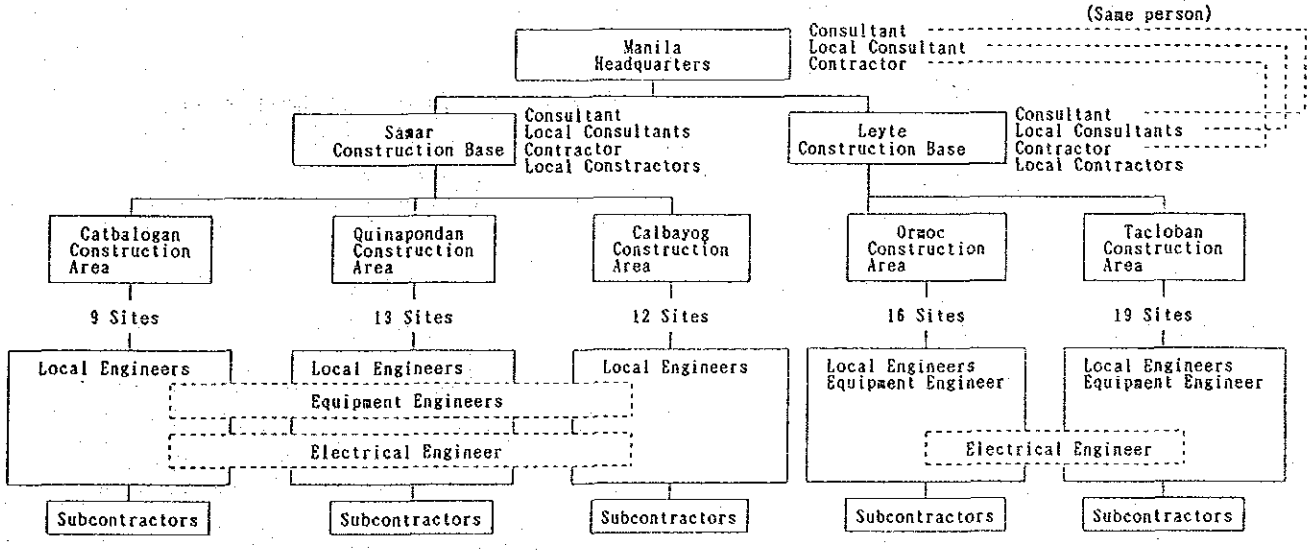
Site offices should be set up in Tacloban and Calbayog. These are

central cities in the Project areas. As far as living conditions and public order are concerned, they are satisfactory for the consultants and contractors. The offices will be responsible for the overall supervision of the Leyte and Samar regions respectively.

In addition to these two offices, a construction management office should be set up during the construction period in Quinapondan and Catbalogan on the island of Samar, and one in Ormoc on the island of leyte. By having offices in the five cities, the delivery of materials and equipment to each site and periodic communication between consultants, contractors, and local engineers will be possible.

The Project's construction management organization chart is shown in Table 4-5.

Table 4-5 Project Construction Management Organization Chart



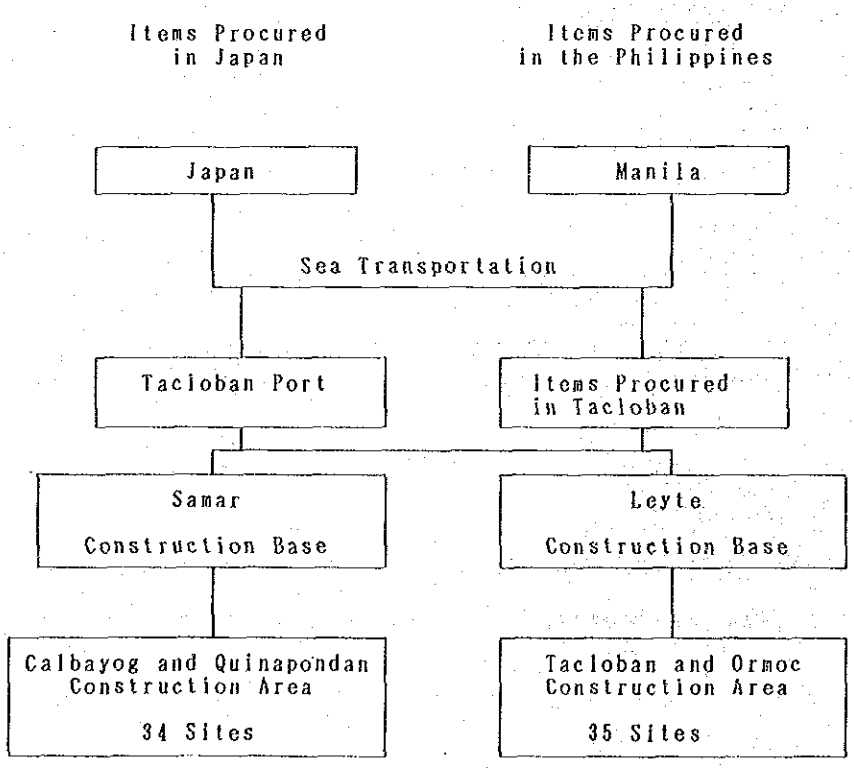
4-4-3 Procurement Plan

(1) Equipment and Material Procurement Plan

The prefabricated materials needed to secure the Project's typhoon-resisting capabilities will be procured in Japan. Other construction materials, such as reinforcing bars, cement, gravel, concrete blocks, etc., and utility fixtures and furniture 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 Tacloban. Items requiring to be of higher grade, or are needed in larger quantities than available in Tacloban, will be obtained in Manila.

These is a sufficient work force available in the Philippines. For work requiring special techniques, such as the assembling of prefabricated materials, it will be necessary to dispatch manufacturer's engineers from Japan. The transportation plan for procured equipment and materials is shown in Table 4-6.

Table 4-6 Transportation Plan for Procured Equipment and Materials



(2) Sea Transportation Plan

By taking into account the economical manufacturing process of almost 17,000 m^3 of prefabricated frames and the progress of the foundation construction work in the Philippines, a sea transportation plan shall be drawn up to provide smooth construction progress during each construction stage.

The international port of Tacloban is the only port that can be used for the Project. Harbor conditions are as follows:

Area:	36,780 m^2
Wharf length:	841 m
Total area of 3 transits:	1,728 m^2
Water depth:	-4.5 to -7.5 m
Open storage:	7,245 m^2

The 5,000 to 8,000 ton class ship planned on being used for the Project will have no problem entering this port.

(3) Inland Transportation Plan

The materials and equipment shipped from Japan to Tacloban Port will be transported to various Project sites by heavy vehicles. Although the principal highway is in good condition, there are problems concerning access roads and the allowable loads and widths of bridges. In particular, 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 be employed.

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 power lines crossing over the roads are very low.

(4) Material and Equipment Storage Plan

If the prefabricated materials and equipment procured in Manila are placed in a warehouse in Tacloban Port for a long period of time, there is a possibility that they might be stolen. Therefore, it will be necessary to set up a stockyard at the Samar construction base and the Leyte construction base during the Project's construction period. The prefabricated materials and equipment procured in Manila will be stored at these two stockyards until Project progress requires them to be delivered to the sites.

The stockyards should also be used as reinforcing bar and form fabricating plants and for storing such materials as locally procured cement.

4-4-4 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 government will transpire 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 equipment and materials, and 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 consultants 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 held with the actual users 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 government will take the necessary steps to promote the organizational 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. 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, prequalification evaluation of tenderers, tender opening,

and tender evaluation prior to reaching contract agreement.

The methods for tendering and for reaching contract agreement should be carefully decided up after discussions are held with representatives from both governments. There will be an approximately 40 day tender period.

・Fabrication and Transportation of Frame Structures:

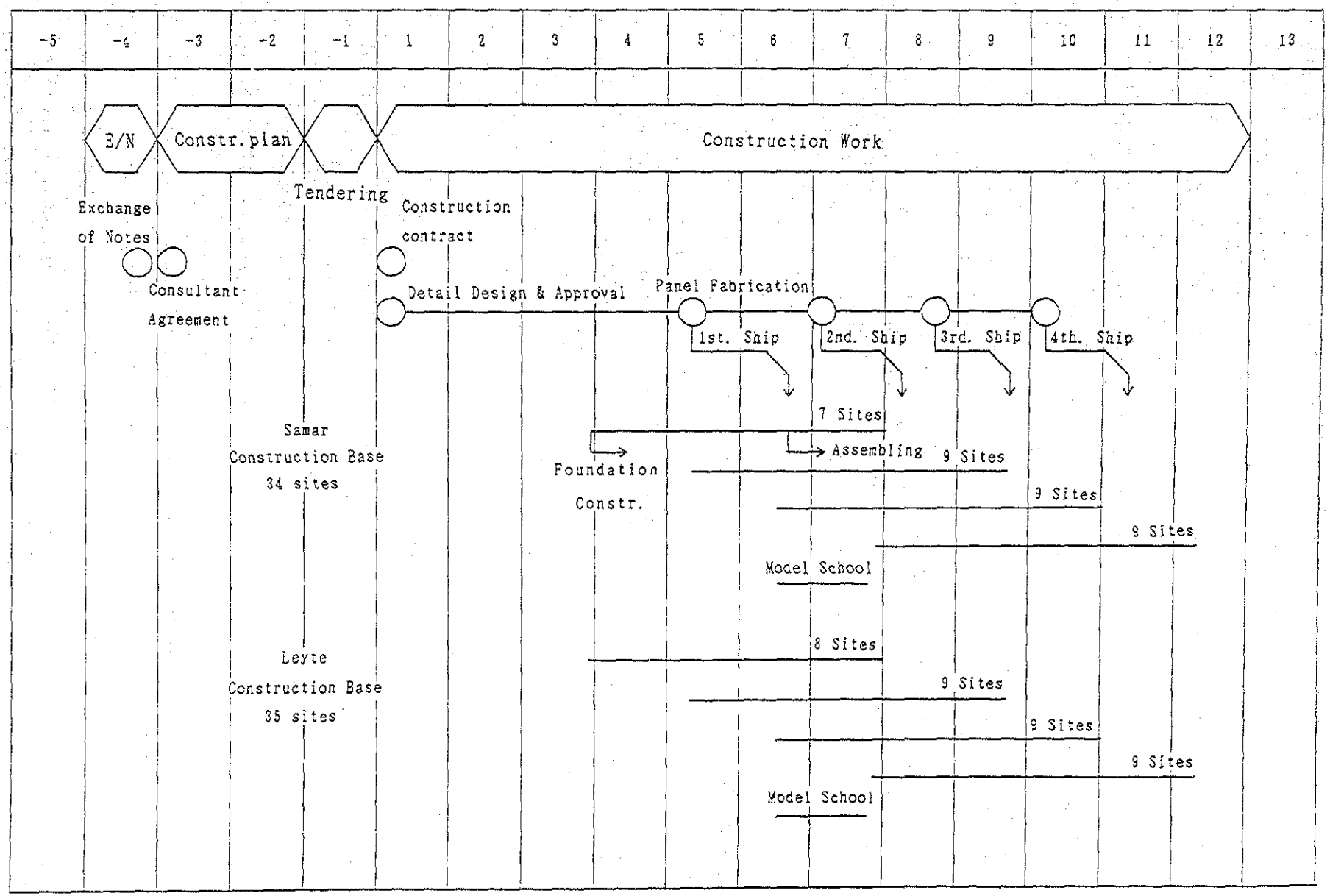
Preparation of the detailed drawings will commence immediately after the contract agreement is reached. After the completion and approval of the detailed drawings, the frame structures for Project school buildings will be fabricated at manufacturing plants. After the construction contract agreement is 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 either Manila or Tecloban. 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 school building foundations during the five month period it will take to prefabricate and ship the frame structures. Weather conditions permitting, the foundations can be completed in approximately four weeks.

In Eastern Visayas, it would be most desirable to complete the earth and foundation construction work during the dry season (March through October). From ten days to two weeks will be needed to erect the pre-fabricated frame structures. Once construction personnel become familiar with the job, one week per site should be sufficient to complete the erection work. The required construction period will be twelve months.

Table 4-7 Project Implementation Schedule



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

Project construction costs were estimated as follows:

1) Construction Costs to be Borne by the Philippine Side:

The estimated construction costs to be borne by the Philippine side are 5,011,600 Pesos

The breakdown of the estimated costs is as follows:

Land Clearance:	1,014,000 pesos
Removal of existing buildings:	92,600
Water supply work:	795,000
Power supply work:	3,110,000
Total:	5,011,600 pesos

4-4-6 Boundary of the Responsibilities for Project Construction

The boundary of the responsibilities for Project construction to be undertaken by the Japanese Govermnent and the Philippine Government is described below:

(1) Undertakings by the Japanese Government:

(A) Schoolbuilding Construction:

a) Primary Schools:
- Classrooms
- Toilets (for males and females)
- Elevated water tanks (including the installation of pressurizing pumps, if necessary)

b) Secondary Schools:
- Classrooms
- Science Laboratories
- Toilets (for males and females)
- Elevated water tanks (including the installation of pressurizing pumps, if necessary)

B) Equipment Installation

a) Primary Schools:

For classrooms:

- Teachers' desks, chairs, and filling cabinets
- Students' desk-chairs (large, medium, and small sizes) and closets
- Blackboards and bulletin boards

b) Secondary Schools:

For classrooms:

- Teachers' desks, chairs, and filling cabinets
- Students' desk-chairs, and closets
- Blackboards and bulletin boards

For Science Labolatories:

- Experiment tables, stools and demonstration workbenches
- Students closets
- Storage shelves and steel shelves
- Blackboards and bulletin boards

(2) Undertakings by the Philippine Government

1. To secure the sites for the Project.
2. To clear, level and reclaim the site prior to the commencement of the construction.
3. To undertake incidental outdoor work, such as gardning, fences, etc.
4. To construct access roads to the site prior to the commencement of construction (only in case they are not available).
5. To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities to the site when needed.
6. To obtain building, occupancy and all necessary permits for the Project with respect to the laws and regulations in the Philippines.

7. To ensure necessary budget and personnel for the proper and effective maintenance of the schoolbuildings and equipment provided under the Grant Aid.
8. To provide exemptions for taxes and all other levies and duties and to ensure prompt unloading and customs clearances at the port of disembarkation in the Philippines for the materials and the equipment provided under the Grant Aid.
9. To exempt 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.
10. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry to the Philippines and stay therein for the execution of the Project.
11. To bear commissions to the Japanese foreign exchange bank for the banking services based on the Banking Arrangement, in accordance with standard grant procedure.
12. To bear all expenses other than those to be borne by the Grant, necesary for the construction of the the school-buildings as well as for the transportation and installation of equipment.

CHAPTER 5. PROJECT EVALUATION AND CONCLUSION

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The Governmet of the Philippines has been promoting the educational and manpower development and has been making every effort to improve the educational conditions. However, the number of primary and secondary schools are still insufficient. Some 3.4 million school age children cannot receive an education.

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

(1) Project Effects

Under the above mentioned situations, the construction of the school-buildings for 72 primary and secondary schools in the Bicol Region as the Phase I project and 69 primary and secondary schools in the Easten Visayas Region as the Phase II construction of the five-year school-building construction plan for 360 schools located throughout the country will have the following effects:

(a) A total of 237 classrooms was constructed on the Phase I construction project -- 74 classrooms for primary schools and 163 classrooms for secondary schoos. By assuming that there are 40 students per classroom, the classrooms can accommodate 9,480 students. Under the Phase II Project, a total of 279 classrooms will be constructed: 84 of them for primary schools and 195 for secondary schools. These classrooms will accomodate 11,160 students. The entire five-year plan will be able to accommodate 54,440 of the country's students. Thus, the five-year plan will contribute greatly to increasing equal educational opportunities for many Filippino children.

(b) The schoolbuilding construction work at widely scattered sites

throughout the country will provide employment opportunities for the area's residents. The procurement of construction equipment and materials, except prefabrication materials, will contribute to the activation of the sluggish Philippine rural economies.

(c) Project school facilities are expected to be used not only for regular classes (including two or three-shift classes), but also for places of refuge for the ares's residents during natural calamity periods and for residents' meeting places.

(d) For the increased Project school facilities, it will be necessary to secure the proper number of teachers and workers to maintain and manage the facilities and the costs required for the facilities' maintenace and management work.

Since the Project was proposed as being a part of the Philippine Government's five-year schoolbuilding construction plan, the necessary staff and the maintenance and management for the Project facilities have already been included in the five-year plan. Furthermore, since the main objective of the Project is to rebuild typhoon-destroyed school facilities, new Project facilities will be adequately maintained and managed by the present school staff and budget.

The selections of Project facilities (other than buildings) was made based on the principles of minimum maintenance and management costs, ie., maintenance free facilities and equipment in order to allow maintenance and management work at the lowest cost.

(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 damages inflicted on scool 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 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 achivement of the country's education development plan; it will greatly contribute to the promotion of the national development plan.

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.

As the management and maintenance for the Project's school facilities has been planned within the scope of the Philippine Government's five-year building construction plan, it is judged that the amount of budgetary funds and the number of staff personnel will be surfficient to handle the job.

(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 the successful Project implementation. In particular, preparation of site and construction of the access road to Project sites must be completed prior to the commencement of construction of schoolbuildings. Furthermore, DECS and DPWH must maintain close cooperation and establish a solid Project implementation system.

② Even though school facilities' major structure are designed with a throughout examination on the principals of minimum maintenance and management cost, ie., maintenance free facilities, it would be desirable to take a maintenance system into more consideration. For instance the students would clean the school facilites as a part of the school's education program.