CHAPTER 2

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2-1 Basic Concept of the Project

2-1-1 Superior Plan

"Action Plan for Rehabilitation and Reconstruction of Post-Earthquake Areas in West Sumatera Province 2009-2011"

The Action Plan was formulated by BAPPENAS.

The general strategy for the post-earthquake recovery in West Sumatera province is established with observance to: (1) Social, economic and cultural conditions of the community; (2) Environmental conservation and disaster risk reduction; (3) Benefits and effectiveness of the assistance for the natural disaster victims; and (4) Coverage in 12 disaster affected districts/municipalities in West Sumatera.

With the approach '**build back better**', in accordance with Government Regulation No. 22/2008 on Funding and Management of Disaster Assistance, the source of funding for disaster management is the joint responsibilities of the central and local governments.

The reconstruction phase shall be performed within 6-24 months overlapping with the rehabilitation activity, with the objectives of restoring the system in a comprehensive manner and to integrate various development programs into the local development approach.

1. In performing rehabilitation and reconstruction, the district/municipality government shall utilize district/municipality government budget;

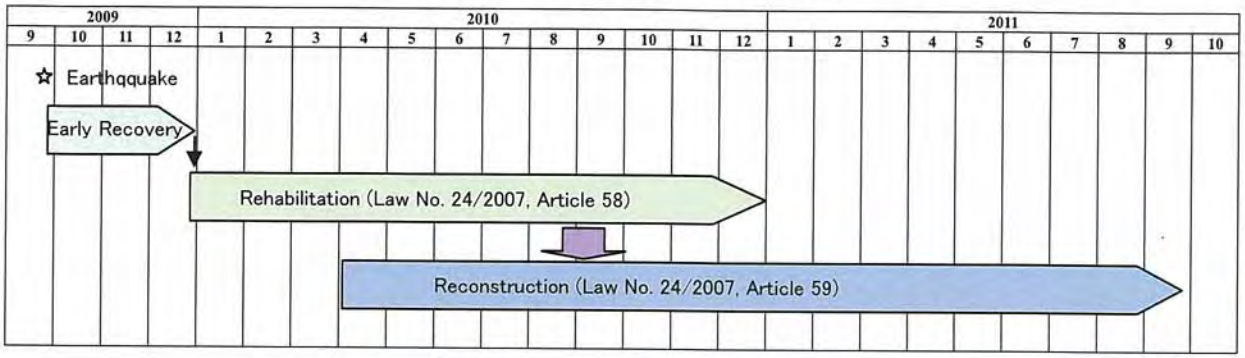
2. In the event that the local budget is insufficient, district/municipality government may request assistance from the provincial and/or central government to implement the rehabilitation and reconstruction;

3. Request for funding assistance from the district/municipality government must be made through the relevant provincial government;

4. In addition to the funding request, the district/municipality government may also request assistance from the provincial and/or central government in the form of: a) Expert Staff, b) Equipment, and c) Infrastructure development.

The JICA's Project will contribute and will be completed within the reconstruction period.

Table 2-1 Stages of the Action Plan



"Disaster Management Plan of West Sumatra Province"

The plan was developed by the Government of West Sumatra Province as part of responsibility to enact the Disaster Management Bill No.24 Year 2007. The plan was published on 30 December 2009. The vision, mission, objectives, target, policy and school related programs are shown as follows:

Table 2-2 Vision, Mission and Related Program in Disaster Management Plan of West Sumatra Province

Vision	"West Sumatra Well-Prepared, Robust and God-Defended in Facing Disaster"[1]
Mission	1. To mitigate disasters by building preparedness and infrastructure 2. To enhance community and institution capacity 3. To rehabilitate the impact of disaster in structural and non-structural methods
Objectives	1. To build a robust management system 2. To build disaster preparedness collectively 3. To prepare robust disaster management infrastructure 4. To minimize the number of casualties 5. To reform rehabilitation and reconstruction activities in order to rehabilitate the life
Target	1. Publishing of the disaster regulations for disaster management in West Sumatra Province 2. Establishment of Disaster Management Body in West Sumatra Province 3. Availability of resources that can be mobilized sinergically in disaster management 4. Development of disaster preparedness culture in community 5. Improvement of public facilities and utilities capacity in disaster management 6. Reduction of environmental vulnerability in disaster prone region 7. Implementation of rapid and accurate search and rescue 8. Availability of disaster rehabilitation plan made collectively 9. Availability of minimum standard of life for disaster affected community 10. Re-function of public facilities and utilities after disaster
Policy (part)	**1. To build the school community disaster preparedness**
Program	1. Composing curriculum of school disaster preparedness **2. Provision of facilities and infrastructure for implementation of local curriculum** 3. Conducting of culture event of disaster preparedness

[1] "SUMATERA BARAT, SIAGE, TANGGUH DAN TAWAKAL MENGHADAPI BENCANA"

2-1-2 Objectives of the Project

< Project Objectives >

The project objectives are to reconstruct damaged primary and junior high schools by the earthquake in order to restore and improve educational condition and to contribute to community based disaster risk management.

< Output of the Project>

The output of the Project is reconstruction of 6 primary schools and 3 junior high schools in Padang City and Padang-Pariaman District.

< Indicators for Project Achievement >

Indicators for the project achievement will be as follows:

- ◊ Increase of the number of students studying in safe and adequate facilities
- ◊ Increase of the number of primary schools with rooms which can function as center for community based disaster risk management activities where community people will be able to take shelter

2-2 Selection of Target Schools

2-2-1 Criteria for Selection of the Target Schools

The followings are the criteria for selection of the target schools.

- ➢ Government school with the land owned by the government
- ➢ Extensively damaged by the earthquake
- ➢ Availability of flat land of a sufficient size for the construction of a new building
- ➢ No reconstruction plan by the government or another donor
- ➢ Access to the site by vehicle for the transportation of construction materials
- ➢ No risk for natural hazard such as land slide and flood
- ➢ Higher risk for earthquake damages
- ➢ Existence of a local PTA for maintenance
- ➢ Standard size of school on major road as **model school**

2-2-2 Selected Target Schools

Based on the site reconnaissance, the following schools were selected as target schools:

SMPN7 Padang	Padang City	Full reconstruction
SMPN25 Padang	Padang City	Full reconstruction
SDN02 V Koto Timur	Padang-Pariaman District	Full reconstruction
SDN08 2 x 11 Enam Linkung	Padang-Pariaman District	Full reconstruction
SDN03 V Koto Kampung Dalam	Padang-Pariaman District	Full reconstruction
SDN07 Sungai Geringging	Padang-Pariaman District	Full reconstruction
SMPN1 Enam Linkung	Padang-Pariaman District	Partial reconstruction
SDN05 Batang Gasan	Padang-Pariaman District	Full reconstruction
SDN01 Enam Linkung	Padang-Pariaman District	Full reconstruction

Table 2-3 Condition of Target Schools

Site No.	Area	Name of School	Approximate Site Area (m2)	Primary School/Junior High School	Number of Student						Percentage of girl students (%)	Number of classroom before earthquake	Number of teachers	Landownership	PTA / School Committee	Maximum height of flood	Community Population
					2005	2006	2007	2008	2009 (before earthquake)	2009 (after earthquake)							
PA21	Padang City	SMPN7 Padang	4,200	J	905	826	782	713	654	654	59.6	18	76	Gov.	OK	30cm	9,020
PA22	Padang City	SMPN25 Padang	4,470	J	800	817	818	795	798	782	49.5	21	66	Gov.	OK	No	7,530
PP21	Padang-Pariaman District	SDN02 V Koto Timur	1,540	P	133	144	159	157	155	160	42.5	6	8	Gov.	OK	No	3,070
PP22	Padang-Pariaman District	SDN08 2 x 11 Enam Lingkung	2,260	P	197	198	197	196	191	191	46.6	6	9	Gov.	OK	No	3,500
PP23	Padang-Pariaman District	SDN03 V Koto Kampung Dalam	1,250	P	155	158	150	155	146	146	54.1	6	9	Gov.	OK	No	640
PP24	Padang-Pariaman District	SDN07 Sungai Geringging	7,500	P	226	214	221	213	229	229	51.5	6	10	Gov.	OK	No	2,100
PP25	Padang-Pariaman District	SMPN1 Enam Lingkung	800	J	614	685	632	644	641	641	51.0	19	49	Gov.	OK	No	4,300
PP26	Padang-Pariaman District	SDN05 Batang Gasan	880	P	101	98	99	93	90	90	42.2	6	6	Gov.	OK	No	5,020
PP27	Padang-Pariaman District	SDN01 Enam Lingkung	9,650	P	182	179	179	176	176	146	54.1	6	10	Gov.	OK	No	4,880
Total					3,313	3,319	3,237	3,142	3,080	3,039		94	243				40,060

Table 2-4 Infrastructure Condition of Target Schools

Site No.	Area	Name of School	Approximate Site Area (m2)	Primary School/Junior High School	Maximum height of flood	Infrastructure				
						Road Access for transportation	Running water (or Well)	Gutter (Drainage)	Toilet before earthquake	Electricity (VA)
PA21	Padang City	SMPN7 Padang	4,200	J	30cm	OK	PDAM	No	Exist	A
PA22	Padang City	SMPN25 Padang	4,470	J	No	OK	No	No	Exist	A
PP21	Padang-Pariaman District	SDN02 V Koto Timur	1,540	P	No	OK	PDAM	No	Exist	450
PP22	Padang-Pariaman District	SDN08 2 x 11 Enam Lingkung	2,260	P	No	OK	PDAM	No	Exist	450
PP23	Padang-Pariaman District	SDN03 V Koto Kampung Dalam	1,250	P	No	OK	PDAM	No	Exist	450
PP24	Padang-Pariaman District	SDN07 Sungai Geringging	7,500	P	No	OK	PDAM	Ok	Exist	900
PP25	Padang-Pariaman District	SMPN1 Enam Lingkung	800	J	No	OK	No	OK	Exist	4,800
PP26	Padang-Pariaman District	SDN05 Batang Gasan	880	P	No	OK	No	No	No	450
PP27	Padang-Pariaman District	SDN01 Enam Lingkung	9,650	P	No	OK	WELL	No	Exist	1,300

2-2-3 Design Policy

2-2-3-1 Policy regarding Natural Conditions

(1) Weather

Buildings shall be provided with the following performance characteristics in order to function under conditions of high temperature and high humidity.

- Enhance heat insulation characteristics and give high waterproofing resistance to roofs.
- Install eaves, etc. for blocking out sunlight, but also incorporate natural light into buildings.
- Secure good ventilation.
- Adopts structures able to withstand strong winds.

(2) Earthquakes

The new Earthquake regulation has almost two (2) time of base shear coefficient compare to old regulation, and has almost same value with Japanese Regulation.

- V = (CI / R) x Wt
- V = Horizontal seismic load
- C = Basic coefficient of seismic force=0.95 (in case of soft ground)
- I = Importance coefficient=1.4 (for important buildings)
- R = Response modification coefficient=5.5 (for reinforced concrete structure)
- Wt : Vertical total weight including live load of the Building

Therefore;

- CI / R= 0.95 x 1.4 / 5.5 = 0.242 → **0.3 (adopted value)**

(3) Soil Condition

Soil Conditions are categorized by (1) Mean Propagation Velocity Sliding Wave (Vs (m/sec)) (2) Mean Test Score Penetration Standard (N Value), (3) Mean Flow Less Sliding Strength (Su kPa).

Table 2-5 Soil Type

Type of Soil	□Mean Propagation Velocity Sliding Wave (Vs(m/sec)	□Mean Test Score Penetration Standard (N Value)	□Mean Flow Less Sliding Strength (Su kPa)
Hard soil	Vs >=350	N>50	Su >=100
Medium Soil	175=<Vs<350	15=<N<50	50=<Su<100
Soft soil	Vs<175	N<15	Su < 50
	Or, any profile of soft soil with total thickness more than 3.0m with PI>20, Wn>40%, and Su<25kPa		

However, practically, the testing machine for (1) and (2) are not become popular in this Country, then, actually the soil type categorized by N value so far. Although, the N value of the Project

site is 15=<N<50, at the level of under 10m from the soil surface, the soft soil stratum are found by the Soil investigation test. Therefore, Soft soil shall be applied in this design.

(4) Peak Acceleration for Base Rocks (AEB) and Soil Surface (Ao(g).

Peak Acceleration for Base Rocks (AEB) and Soil Surface (Ao(g) for Each earthquake Area is are give as following table.

Table 2-6 Peak Acceleration for Base Rocks and Soil Surface

Zone	Peak Acceleration for base rocks (AEB)	Peak Acceleration Soil Surface :Ao(g)			
		Hard Soil	Medium Soil	Soft soil	Soft soil
1	0.03	0.04	0.05	0.08	—
2	0.10	0.12	0.15	0.20	
3	0.15	0.18	0.23	0.30	
4	0.20	0.24	0.28	0.34	
5	0.25	0.28	0.32	0.36	
6	0.30	0.33	0.36	0.38	

Response Spectrum Predetermined Earthquake (Am) is given by the formula of 2.5 xAo=Am, and Corner natural frequency period (Tc) is assumed as Tc=0.5s for Hard soil, Tc=0.6s for Medium soil and Tc=1.0s for Soft soil as following table.

Table 2-7 Response Spectrum Predetermined Earthquake (Am)

Zone	(Am)			
	Hard Soil Tc=0.5s	Medium Soil Tc=0.6s	Soft soil Tc=1.0s	Soft soil
1	0.10	0.13	0.20	—
2	0.30	0.38	0.50	
3	0.45	0.55	0.75	
4	0.60	0.70	0.85	
5	0.70	0.83	0.90	
6	0.83	0.90	0.95	

Table 2-8 Corner natural frequency period (Tc) and Earthquake Response Factor (C)

Incase T<=Tc	C=Am
Incase T>Tc	C=Am x T/Tc

T=Building structure natural frequency
Tc= Corner natural frequency period
C=Basic earthquake coefficient

(5) Significance Factor (I)

Significant factor is categorized by kind of purpose and life span as following table.

Table 2-9 Significance Factor (I)

Building Category	Significance Factor (I)
General buildings such as hospital, Residential buildings, Trade and Office	1.0
Monument and Monumental Buildings	1.6
Post earthquake importance Buildings such as hospital, Clean water installation, Radio and Television Facilities.	1.4
Buildings for storing dangerous goods such as Gas oil Products, Acid, Tonic materials.	1.6
Chimneys, Towered tanks	1.5

"School building" is not described clearly in above table, however, as an important quake-residence facilities, I=1.4 shall be applied in this project.

(6) Earthquake reduction factor (R)

Earthquake reduction factor (R) is applied the value between 1.6～8.5, and R=8.5 is applied to fully ductile fame.

Table 2-10 Ductility parameters of Buildings of Building Structure (R)

Building Structure Performance Level	μ	R
Fully elastic frame	1.0	1.6
Partial elastic	1.5	2.4
	2.0	3.2
	2.5	4.0
	3.0	4.8
	3.5	5.6
	4.0	6.4
	4.5	7.2
	5.0	8.0
Fully ductile	5.3	8.5

However, the definition of the building structure performance level is not clearly described in above table, in case of reinforced concrete open frame, R=5.5～8.5 is given by another table.

2-2-3-2 Policy regarding Social Conditions

Population of Padang City is 857,000 and population of Padang-Pariaman District is 387,000 (2007); and most of them can not take adequate action and there is few evacuation facility in case of emergency. The reconstructed school shall be strong enough with quake-resistance and fire-proof, which should function as shelter for emergency and as a center for community based disaster risk management.

2-2-3-3 Policy regarding the Construction Situation and Utilization of Local Contractors

(1) Construction Situation in Indonesia

The construction industry of Indonesia accounts for approximately 6% of GDP and employs between 7~8% of the working population. Moreover, almost all building materials can be procured in Indonesia, and the ratio of imported products is low. Building contractors in Indonesia either belong to the Indonesian Contractors' Association (AKI: Asosiasi Kontraktor Indonesia) or the National Builders' Union of Indonesia (Gapensi: Gabungan Pelaksana Konstruksi Nasional Indonesia). This setup is similar to the one in Japan, so registration of contractors to the Ministry of Public Works is only granted following review by the CSDB (Construction Industry Development Committee). At registration, each company is ranked according to its capital, capacity, experience and owned equipment, etc..

Table 2-11 Ranking of Construction Operators in Indonesia

Group	Rank	Scale of Works	
Large	B (Besar)	10 billion rupiah or more	(Around 125 million))
Medium	M1 (Menengah 1)	3~10 billion rupiah	(Around 24~125 million)
	M2 (Menengah 2)	1~3 billion rupiah	(Around 12.5~24 million)
Small	K1 (Kecil 1)	0.4~1 billion rupiah	(Around 5~12.5 million)
	K2 (Kecil 2)	0.1~0.4 billion rupiah	(Around 1.25~5 million)
	K3 (Kecil 3)	100 million rupiah or less	(Around 1.25)

(Source: Indonesia Yearbook 2006)

Apart from the semipublic construction companies (Caria) and some major private sector corporations, around 80% of registered contractors are minor concerns belonging to the M group or smaller. Most companies are very small possessing a minimum of 15~20 employees in the M group and 5 employees in the K group. Companies largely depend on temporary workers from the regions.

Table 2-12 Number of Companies Affiliated with the Indonesian Contractors' Association

Year	1996	1997	1998	1999	2000	2001	2002
Affiliated companies	135	134	134	138	119	129	124

(Source: Indonesia Yearbook 2006)

(2) Policy regarding utilization of local contractors

The basic policy for the Project is that local contractors will be utilized subject to quality control and schedule management by the Japanese consultant.

(3) Condition of local consultants

The history of engineering consultants in Indonesia is relatively short. Starting from state-operated consultants based on government agent engineers from around the start of the 1970s, numerous state and private sector consultant firms have since been established. The Indonesian Consultants Association (Inkindo: Ikatan Nasional Konsultan Indonesia) is the main consultant industrial group, and the engineering department of this belongs to the FIDIC (Federation of International Consulting Engineers). However, one of the problems confronting the consulting sector in Indonesia is the absolute shortage in the number of engineers.

2-2-3-4 Policy regarding Operation and Maintenance Capacity

As the project is to reconstruct the damaged schools, it should be possible to operate and maintain them based on the same setups as before. The government and local communities provided the human resources and funding for operation and maintenance before the disaster without any problem.

2-2-3-5 Policy regarding Setting of Facilities Grades

Facilities comprising the same type and grade of those damaged in the disaster shall be planned. However, the scale and scope of facilities shall be set at levels sufficient to restore pre-disaster functions.

2-2-3-6 Policy regarding Environment

Materials containing asbestos shall not be used or procured in the Project facilities. Moreover, when demolishing and dismantling facilities and equipment that contain asbestos, measures shall be taken to prevent asbestos from flying off.
Concerning sanitary sewage drainage, septic tanks with relevant capacity shall be installed and treated effluent shall be percolated or discharged.

2-2-3-7 Policy regarding Construction Schedule

The plan for construction schedule will be made based on the works done by local contractors.

2-2-3-8 Policy regarding Procurement Method

Local materials and equipment shall be used.

2-2-4 Outline Plan

2-2-4-1 Design Conditions

(1) Applicable regulations and standards

Design shall be implemented in accordance with the following Indonesian criteria and regulations as well as Japanese standards.

1) Indonesian building design standards

- Tata Cara Perhitungan Struktur beton untuk Bangunan Gedung
  (SNI 03-2847-2002) (design of reinforced concrete buildings)
- Tada Cara Perencanaan Kethanan Gempa untuk Bangunan Gedung
  (SNI 03-1726-2003)
- Pedoman Perencanaan Pembebanan untuk Rumah dan Gedung
  (SKBI-1.3.53.1987, UDC; 624.042)
- Pedoman Perencanaan Ketahanan Gumpa untuk Rumah dan Gedung
  (SKBI-1.3.53.1987, UDC;699.841)
- Petunjuk Perencanaan Beton Burtulang dan Struktur Dinding Burtulang untuk Rumah dan Gedung
  (SKBI-2.3.53.1987, UDC;693.55;6, 693.25)

2) Japanese building design standards

- Architectural Institute of Japan structural calculation guidelines
- Architectural Institute of Japan reinforced concrete structural calculation guidelines
- Architectural Institute of Japan load criteria
- Architectural Institute of Japan basic structural design guidelines for buildings
- Japan Society of Soil Mechanics and Foundation Engineering geological survey method

(2) Design Load

Design load is classified into, ① fixed load, ② live load and ③ short-term horizontal force (seismic load and wind load). ① Fixed load arises from the actual weight of the building frame and finishing materials, etc. ② Live load is determined according to the purpose of use of the building. Since the facilities here comprise offices and accommodation facilities, the following live loads have been adopted upon referring to criteria of the Architectural Institute of Japan.

Table 2-13 List of Live Loads

Purpose of use	Design Region		
	Beams Load for floor design	Structural frame Load for foundation design	For calculation of horizontal load during earthquake
Classrooms and corridors	250 (kg/m^2)	225 (kg/m^2)	125 (kg/m^2)
Laboratory	300 (kg/m^2)	225 (kg/m^2)	125 (kg/m^2)
Library	400 (kg/m^2)	360 (kg/m^2)	200 (kg/m^2)
Roofs (Steel sheet)	0 (kg/m^2)	0 (kg/m^2)	0 (kg/m^2)
Roof (Flat RC)	200 (kg/m^2)	150 (kg/m^2)	60 (kg/m^2)

According to criteria of the Architectural Institute of Japan, the live load for design of structural frames (pillars and girders) and foundations is smaller than that for beam and floor design in consideration of load dispersion. Live load for steel sheet roof shall not be taken into account. As for ③ short-term horizontal force (seismic load and wind load), since seismic load is clearly greater than wind load in this case, the horizontal force during earthquakes shall be adopted in the Project. Simultaneous action of seismic and wind load shall not be adopted because it would entail excessive design.

(3) Used materials

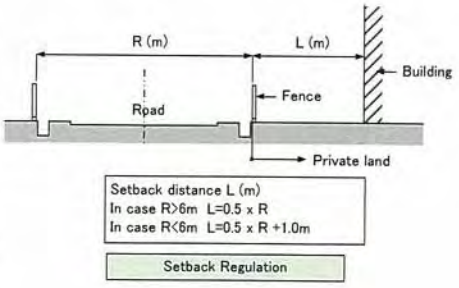
Materials can be easily obtained in markets in West Sumatra Province. Care shall be taken to adopted appropriate design strength in line with the scale of buildings, and there shall be no utilization of special high-strength concrete and reinforcing bars, etc.

Adopted concrete strength	For structural frame design	For concrete slab on grade and concrete sub-slab
	K250 (250kg/cm^2)	K150 (150kg/cm^2)

Adopted reinforcing bars	Deformed reinforcing bars	Round bars
	BJD 42 Yield point strength (4200kg/cm^2)	BJTP24 (2400kg/cm^2) Yield point strength (2400kg/cm^2)

(4) City Planning Regulations

Since Padang City has building regulations on designated roads, buildings surrounded with walls should be constructed basically half of the width of the front road away from the site boundary. There is mitigation of set back. Porch or veranda without walls and staircases are exceptions.



2-2-4-2 Design Policy

The buildings are designed with consideration of rationality and cost reduction of the followings:

- Setting standard types of simple grid planning
- Using the above standard types as much as possible
- Using reinforced concrete structure in viewpoint of cost, earthquake-resistance, fire-resistance and locality
- Considering natural ventilation and heat insulation for tropical hot and humid condition
- Using common finishing (such as mortar - paint for walls and ceramic tile for floor)
- Considering surrounding conditions and view from the road
- Considering the handicapped as far as feasible
- Considering flow of students and teachers
- Considering layout and grouping of functions
- Considering use for community cooperation and community based disaster risk management activities

2-2-4-3 Design Concept

The design concept is as follows:

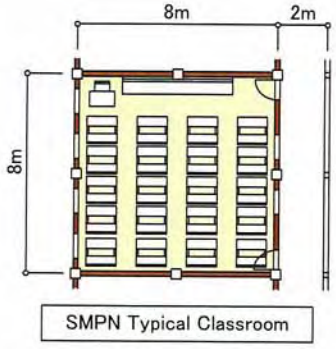
- Quake resistant structure for safety of students and for evacuation of the community; to be model or prototype for safe school
- In Padang City, three-story building with flat roof for evacuation of students and community in case of tsunami
- Separating the block for classrooms and the block for teachers' room and special classrooms for standardization
- Providing "Community Cooperation Room" for common use of various community activities in particular community based disaster management activities;
  To Community Cooperation Room, storage for food and water against emergency, battery or small generator etc. will be attached.
  With Community Cooperation Room, healthcare room (UKS), head teacher's room (information center) and toilet will be grouped considering use in case of emergency.

2-2-4-4 Design Outline

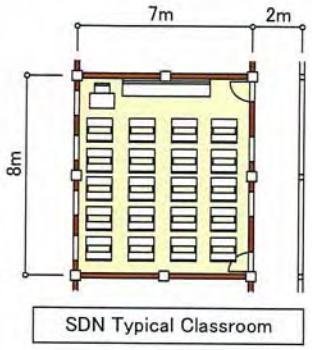
(1) Classroom

The size of the classroom will be as follows:

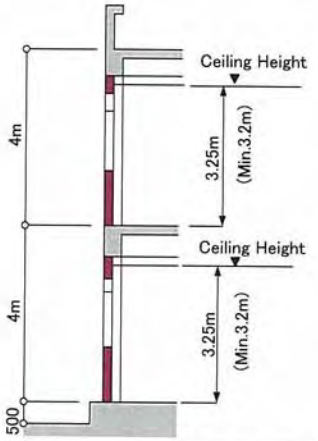
- Primary school: 7m x 8m ($56m^2$), 40 students/classroom, $1.4m^2$/student
- Junior high school: 8m x 8m ($64m^2$), 40 students/classroom, $1.6m^2$/student



SMPN Typical Classroom



SDN Typical Classroom



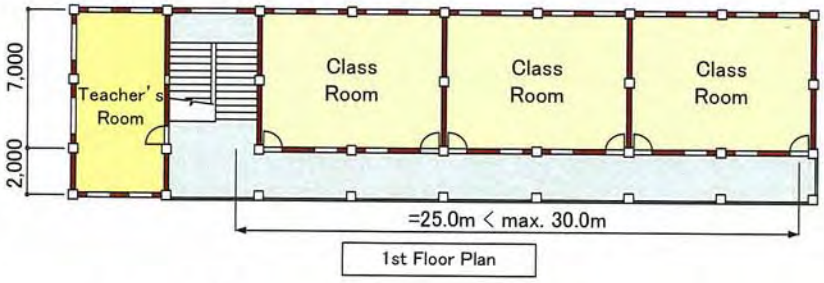
SDN/SMPN Typical Section

(2) School Building

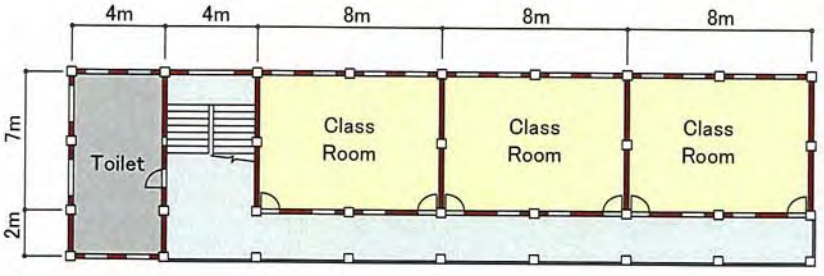
The plan of typical classroom building of primary school is as follows:

The distance between the staircase and the most distant door shall be not more than 30m. In case of the typical plan, the maximum distance between the staircase and the classroom door is 25m and less than 30m.

The width of the staircase shall be not less than 1.2m. In the typical plan, the width of the staircase is about 1.8m and more than 1.2m. The height of handrail shall be 0.9 ~ 1.0m.

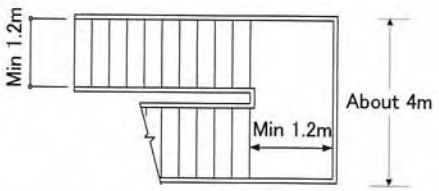


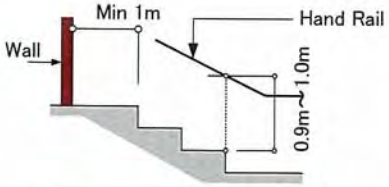
1st Floor Plan



Ground Floor Plan

SDN・Model of the Classroom Building



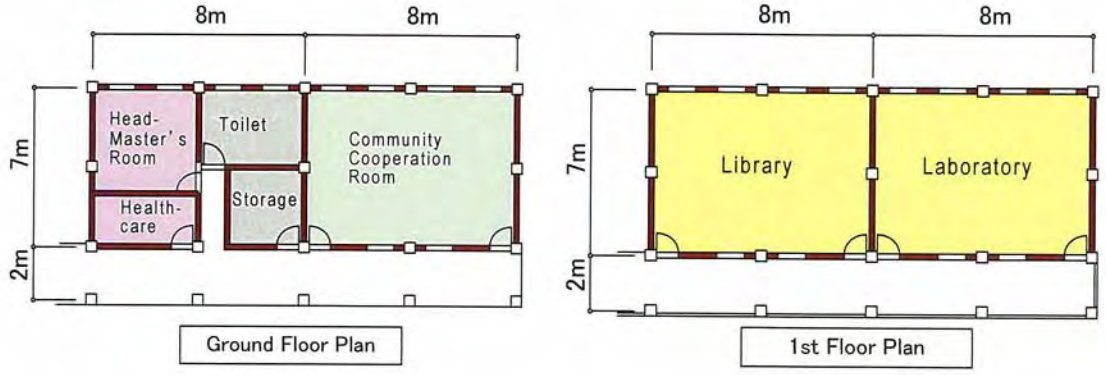


Min. Requirement for Stair

The plan of typical administration building is as follows:

To Community Cooperation Room, storage for food and water against emergency, battery or small generator etc. will be attached. With Community Cooperation Room, healthcare room (UKS), head teacher's room (information center) and toilet will be grouped considering use in case of emergency.

On the First Floor, library and laboratory will be located. Tap water will be equipped in the laboratory.



(3) Facilities structure and outline finishing

The structure and outline finishing of facilities are as follows:

[Elementary and, junior high schools and health centers]

- Structure : Reinforced concrete structure
- Roof structure : Steel truss and aluminium-zinc alloy coated steel sheet or Concrete floor with leveling mortar and asphalt waterproofing

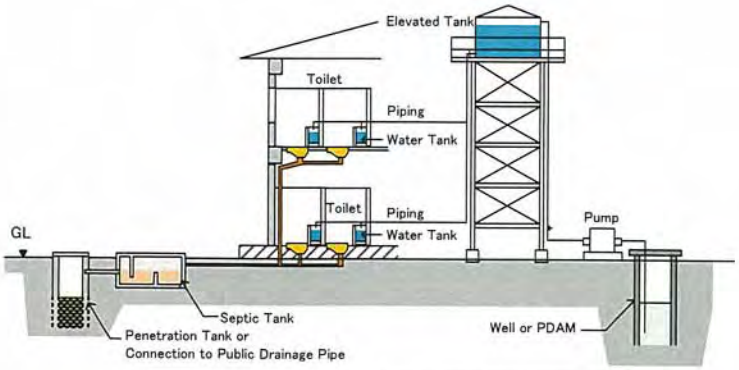
Table 2-14 Finishing

Room	Floor	Walls	Ceiling
Classroom / Teachers' Room / Library / Laboratory etc.	Ceramic tile	Mortar trowel and paint finish	Gypsum board
Toilet	Ceramic tile	Mortar trowel and paint finish	Gypsum board
External Finish	Ceramic tile or mortal trowel finish	Mortar trowel and paint finish	-

Toilet

Toilet sewage shall be treated in septic tanks and be directly fed to percolation pits and percolated underground.

Small open water tank shall be provided for each booth in order to enable flush toilets.



Water Supply and Sewerage System

Electric equipment

Power lines	Power shall be drawn in from existing overhead lines (low voltage) on frontal roads to lead-in columns and conveyed to distribution panels inside buildings.
Lighting equipment	Electric lights shall basically be installed in each room and the required light intensity shall be secured.
Outlets	Basically every room will be equipped with electrical outlets. In computer/IT room, sufficient number of outlet will be set out.

Telephone equipment

For the schools in Padang City, one telephone line (the existing line) shall be drawn in and outlet will be installed in the headmaster's room.

2-2-4-5 Structural Plan

(1) Basic policy

The facilities targeted by this emergency reconstruction assistance are broadly divided into three types: ① buildings that have been completely destroyed, ② buildings that retain their original form but have badly damaged skeletons and are in a dangerous state, and ③ buildings that appear to have only light damage on the surface but are badly damaged in parts. Concerning ① and ②, since it would clearly be dangerous not to totally rebuild, these shall be demolished and then reconstructed. As for type ③, it is thought that dangerous cracks have occurred in main structural members, there is settling of underground foundations and there are numerous areas of structural damage to finishing materials. Accordingly, it is thought that implementing only partial reinforcements would create major risk and not guarantee structural safety in the event of future earthquakes; moreover, taking into consideration the mental security of children and teachers and securing of safe learning environments, all damaged buildings shall be removed and replaced with new structures.

(3) Important points to consider in earthquake-proof design in the Project

Importance of underground tie beam

In Indonesia, usually the size of underground tie beams is designed small and the size of columns is big comparatively. In this case, stress will be concentrated to the joints of the first floor beams and columns.

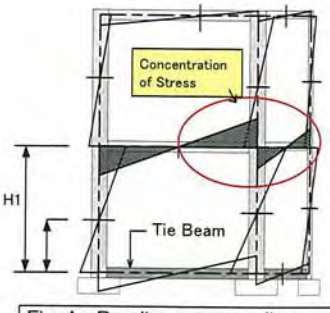


Fig-A: Bending moment diagram in case of Big size Column and Small size Tie Beam

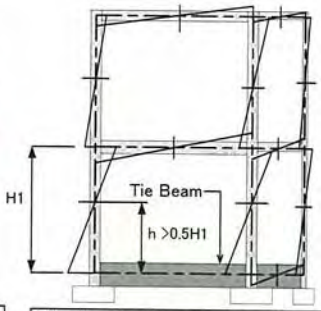
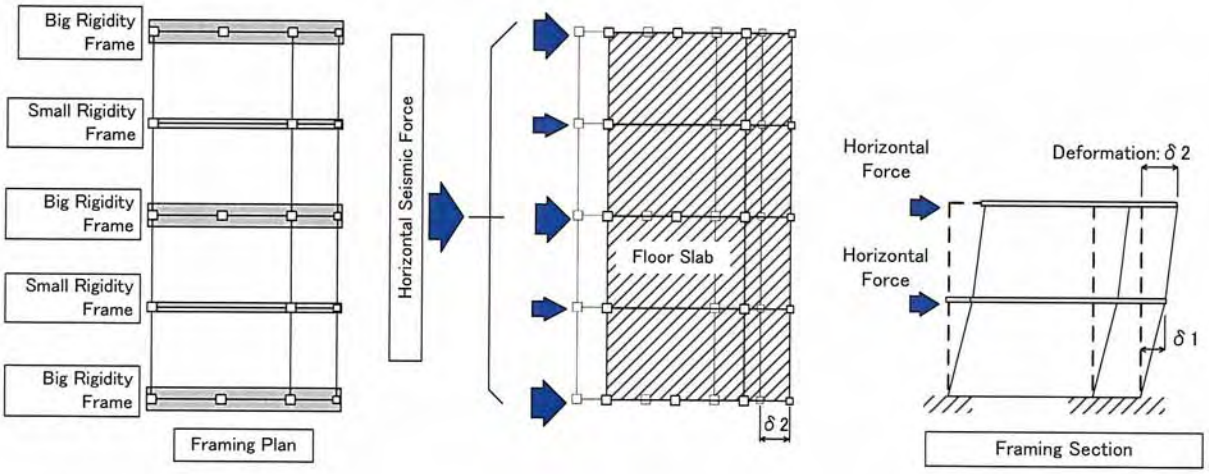


Fig-B: Bending moment diagram in case of appropriate column size and Big Tie Beam

The stress should be well distributed and balanced structural design will be considered for the project. In this project, bigger size underground beams and appropriate size columns will be designed in order to avoid concentration of stress, while the deformation of building will be smaller.

Distribution of horizontal stress

Horizontal seismic force tends to concentrate to weak points. In this project, typical design is 4m interval of rigid 4-column frame and less rigid 3-column frame. Where the deformation will be same to two different frames as all frames are fixed reinforce concrete floor slab, rigid 4-column frame should bear bigger stress. The structural design will consider the balance vertical load and horizontal force distribution appropriately.

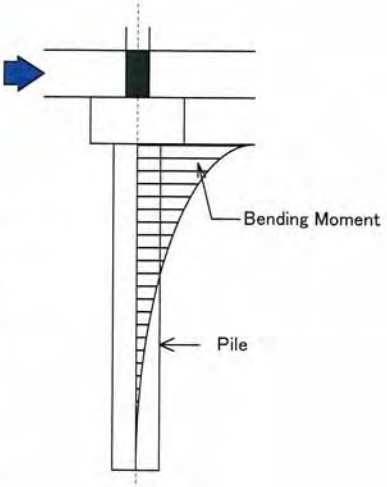


Design of piles

The safe and economical design of foundation will be made based on the result of soil investigation. In Padang City, it is anticipated that piling should be required as the ground is not so rigid and the weight of the 3-story reinforced concrete buildings are heavy.

In addition to vertical load, horizontal stress and bending moment to the head of the pile should be taken into consideration.

Piling method will be selected considering noise and vibration to the neighbors among driving method, boring method, pressed method and casing method etc.



(4) Improvement in quake resistant design in the Project

The following table shows proposed improvement in quake resistant design in the Project.

Table 2-15 Improvement in Quake Resistant Design

	Region	Existing structures, Indonesian standards	Improvements in the Project
1	Foundations	Almost all the existing low-level structures only have simple concrete foundations placed on piled stones. In this state, heavy structures cannot be supported and uneven subsidence is apt to occur; moreover, damage in the event of earthquakes will be great.	Apply reinforced concrete foundations corresponding to ground bearing force and the scale and weight of buildings.
2	Footing beams	Existing structures either do not have footing beams to connect foundations, or they are small section fragile structures. In this state, buildings do not have enough overall rigidity and major deformation will be caused by horizontal force during earthquakes.	Apply footing beams that have proper cross sectional dimensions like foundations in order to raise building rigidity, mitigate building deformation caused by horizontal force during earthquakes, and make sure that stress doesn't concentrate on the main structures of pillars and beams.
3	Pillars and beams	Pillar and beam sections are small, while some buildings only have 6 mm ordinary bars for main reinforcement. Moreover, intervals between shear reinforcement bars are too large to withstand horizontal force during earthquakes.	Implement structural analysis and arrange deformed reinforcing bars with sufficient resistance against earthquakes. Also, appropriately set the interval between shear reinforcement bars.
4	Reinforcement bars	The mutual anchorage length of main reinforcement bars in main structures such as pillars, beams and foundations is insufficient, so there is frequent cracking of joints during earthquakes.	Specify the minimum anchorage length, etc. of main reinforcement bars in each member on the standard design and specifications, and conduct full checks in works supervision.
5	Structural fame	Reinforced concrete frame structure (frame structure of pillars and beams) is not formed in some areas.	Adopt structural fames which ensure that the main structural parts of buildings, i.e. foundations, footing beams, pillars, beams and floors, possess sufficient mutual rigidity.

(5) Improvement in Reinforcement

Comparing with the minimum standards under the Japanese building standard law and Indonesian standard, the diameter of main reinforcement bars and strength of shear reinforcement bars, etc. will be designed in accordance to the stronger Japanese standard.

Table 2-16 Comparison of Indonesian Standard and Japanese Building Standard in Reinforcement

Member		Indonesian standard drawings	Minimum standard in Japanese building standard law
Pillars	Main reinforcement diameter	Normal round bars, diameter 10mm	Deformed reinforcing bars diameter 13mm or more
	Main reinforcement quantity	4-φ10 (cross sectional area =3.14cm^2) → 0.78%	0.8% or more
	Shear reinforcement	Normal round bars: diameter 6mm/interval 150mm	Normal round bars 9mmor more, interval 100mm or less
	Minimum diameter	20cm→1/187 the distance between fulcrums	1/150 the distance between fulcrums; therefore at least 25 cm is needed.
Beams	Main reinforcement	Normal round bars: diameter 10mm	Deformed reinforcing bars diameter 13mm or more
	Shear reinforcement	Normal round bars: diameter 6mm	Normal round bars: diameter 9mm or more

2-2-4-6 Planning of Each Site

<SMPN7 Padang>

The site is in urban area. Most buildings were destroyed. There were 18 classrooms and there are 654 students. The percentage of female students is high as 60%. The site is narrow and L-shaped, facing north, west and south roads. The north road is main access. The buildings are planned as 3 story structure forming □-shape.

<SMPN25 Padang>

The site is in urban area. Most buildings were destroyed. There were 21 classrooms and there are 782 students. Main access is west road and basic set back is 10m. Set back from south road is 5m. The site is long to east-west direction and two long 3-story buildings are planned in the north and the south in parallel.

<SDN02 V Koto Timur>

The site is located in the base of the mountain. It is a typical primary school. There were 6 classrooms and there are 160 students. As the site is long to east-west direction, the building is planned as I-shape while the other primary schools are designed as L-shape. There is road collapsing by landslide on the way to the site. Light trucks can pass the part though it is dangerous. This should be repaired or improved by Indonesian side.

<SDN08 2 x 11 Enam Lingkung>

The site is 80-90 m off the main road connecting Padang and Bukittinggi. There were 6 classrooms and there are 191 students. The plan is typical L-shape with combination of two 2-story buildings.

<SDN03 V Koto Kampung Dalam>

The site is in a village surrounded by houses. There were 6 classrooms and there are 146 students. The plan is typical L-shape 2-story building.

<SDN07 Sungai Geringging>

The site is located in the mountainous area and the condition of the last access road to the site is not paved and rough. There were 6 classrooms and there are 229 students. The site area is comparatively large and the planned building is 1-story.

<SMPN1 Enam Lingkung>

There were 19 classrooms and there are 641 students. As 5 classrooms will be used after rehabilitation, 14 classrooms and toilet will be constructed.

<SDN05 Batang Gasan>

There were 6 classrooms and there are 90 students. The site is very small. The typical L-shape 2-story building could be managed to be put in.

<SDN01 Enam Lingkung>

The site is next to the market and very small. There were 6 classrooms and there are 146 students. The L-shape 2-story building could be managed to be put in with smaller library and community cooperation room than the typical plan.

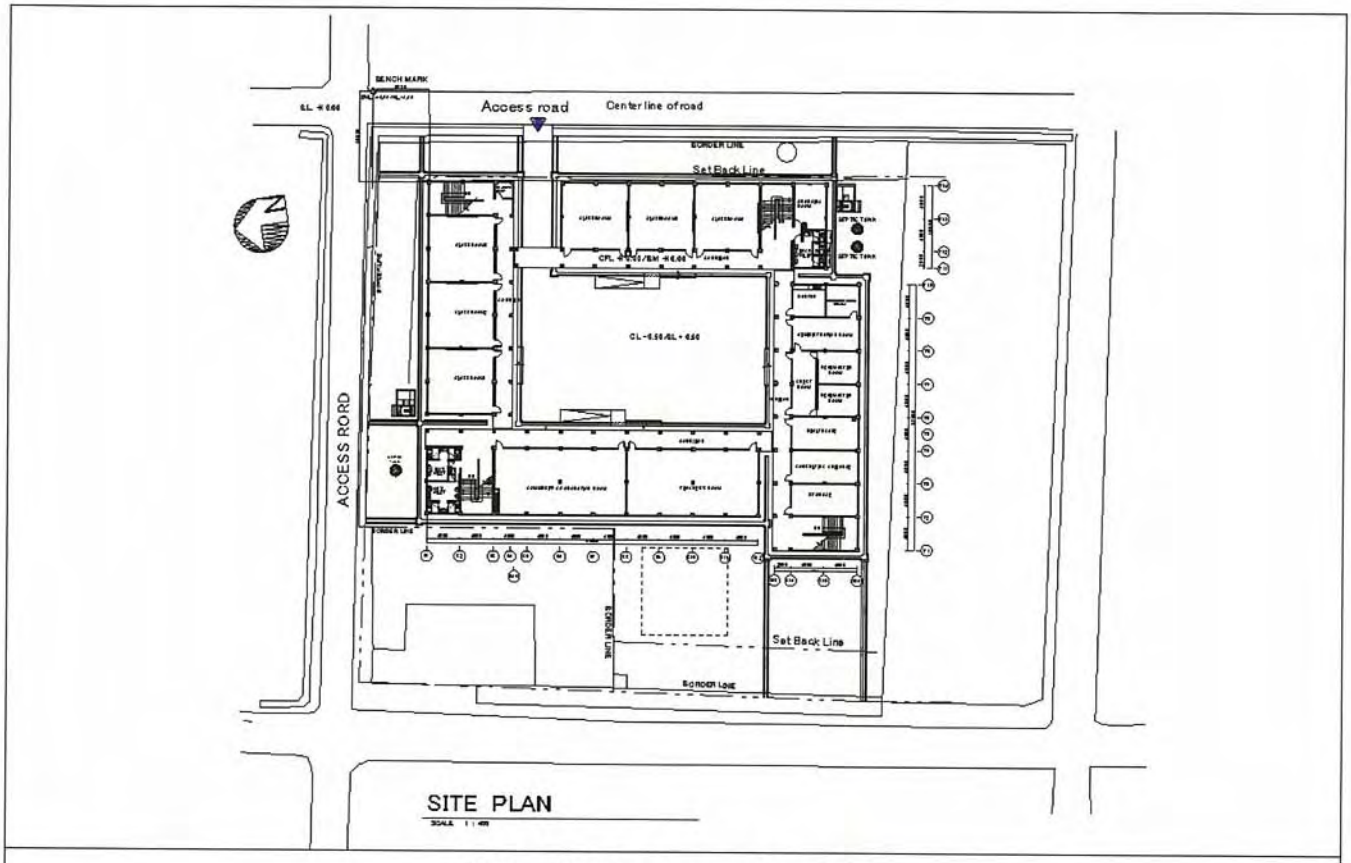
Table 2-17 Planned Rooms and Floor Area by School

No.	PA-21		PA-22		PP-21		PP-22		PP-23		PP-24		PP-25		PP-26		PP-27	
Area	Padang City				Padang-Pariaman District													
School No.	SMPN7		SMPN25		SDN02		SDN08		SDN03		SDN07		SMPN1		SDN05		SDN01	
School Name	Padang		Padang		V Koto Timur		2 x 11 Enam Lingkung		V Koto Kampung Dalam		Sungai Geringging		Enam Lingkung		Batang Gasan		Enam Lingkung	
	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space	Q.ty	Space
Classroom																		
Classroom	18	1,152m²	21	1,344m²	6	336m²	6	336m²	6	336m²	6	336m²	14	896m²	6	336m²	6	336m²
Library	1	128m²	1	128m²	1	56m²	1	56m²	1	56m²	1	56m²			1	56m²	1	28m²
Laboratory-Language/Cor	1	128m²	1	128m²														
Laboratory-Sience	1	128m²	1	128m²	1	56m²	1	56m²	1	56m²	1	56m²			1	56m²	1	56m²
Art room/Skill room	1	128m²	1	128m²														
Multipurpose room	1	64m²	1	64m²														
Office																		
Headmaster room	1	20m²	1	20m²	1	12m²	1	12m²	1	12m²	1	12m²			1	12m²	1	12m²
Vice Headmaster room	1	15m²	1	15m²														
Teacher's room	1	64m²	1	96m²	1	32m²	1	32m²	1	32m²	1	32m²			1	32m²	1	32m²
Administration room	1	32m²	1	32m²														
Guest room	1	29m²	1	29m²														
Others																		
Storage	2	64m²	4	128m²														
Reproduction room	1	12m²	1	12m²														
Janitor & Pantry	1	12m²	1	12m²														
Toilet-Gents/Ladys	1	40m²	1	40m²	1	10m²	1	10m²	1	10m²	1	10m²			1	10m²	1	10m²
Toilet-Boys/Girls	4	86m²	5	118m²	1	32m²	1	32m²	1	32m²	1	12m²	1	30m²	1	32m²	1	32m²
Changing room	3	66m²	3	66m²									2	43m²				
Counsulting Guidance	1	32m²	1	32m²														
Healthcare	1	32m²	1	32m²	1	12m²	1	12m²	1	12m²	1	12m²			1	12m²	1	12m²
Community Corperation ro	1	64m²	1	64m²	1	56m²	1	56m²	1	56m²	1	56m²			1	56m²	1	28m²
Gard Post	1	10m²	1	10m²														
Corridor/Stair/Othres		1,154m²		1,420m²		262m²		271m²		271m²		211m²		392m²		271m²		255m²
	3,460.0m²		4,046.0m²		864.0m²		872.8m²		872.8m²		793.2m²		1,360.0m²		872.8m²		800.8m²	

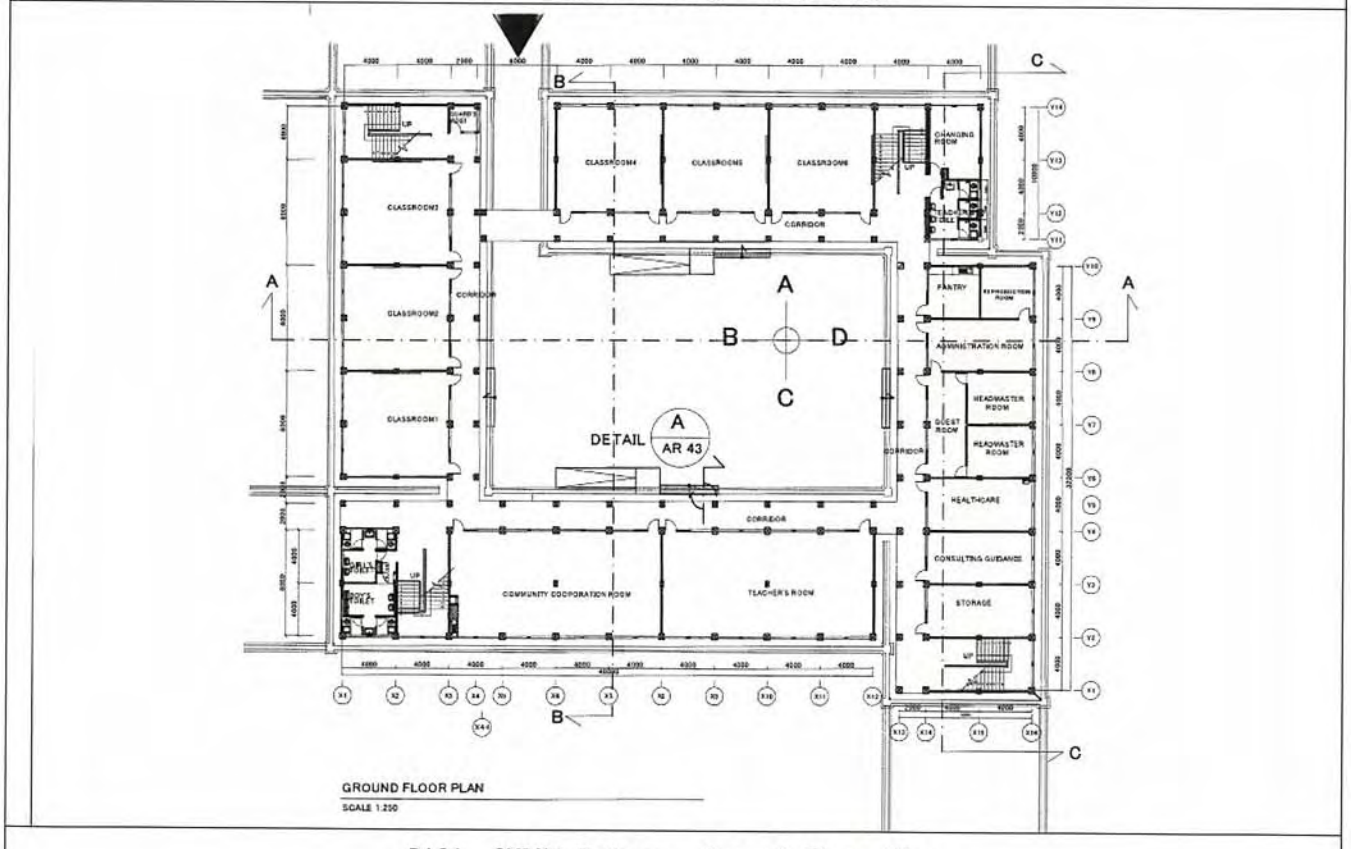
Table 2-18 Planned Floor Area by School

Site No.	Name of School		Type	Floor Area	Total Floor Area
PA-21	SMPN7	Padang	Building A 2F	848.00m2	3,460.00m2
			Building B 3F	888.00m2	
			Building C 2F	688.00m2	
			Building D 3F	1,036.00m2	
PA-22	SMPN25	Padang	Building A 3F	2,406.00m2	4,046.00m2
			Building B 3F	1,640.00m2	
PP-21	SDN02	V Koto Timur	2F	864.00m2	864.00m2
PP-22	SDN08	2 x 11 Enam Lingkung	2F	872.80m2	872.80m2
PP-23	SDN03	V Koto Kampung Dalam	2F	872.80m2	872.80m2
PP-24	SDN07	Sungai Geringging	1F	793.20m2	793.20m2
PP-25	SMPN1	Enam Lingkung	Building A 2F	1,280.00m2	1,360.00m2
			Building B 1F	80.00m2	
PP-26	SDN05	Batang Gasan	2F	872.80m2	872.80m2
PP-27	SDN01	Enam Lingkung	2F	800.80m2	800.80m2
Grand Total					13,942.40m^2

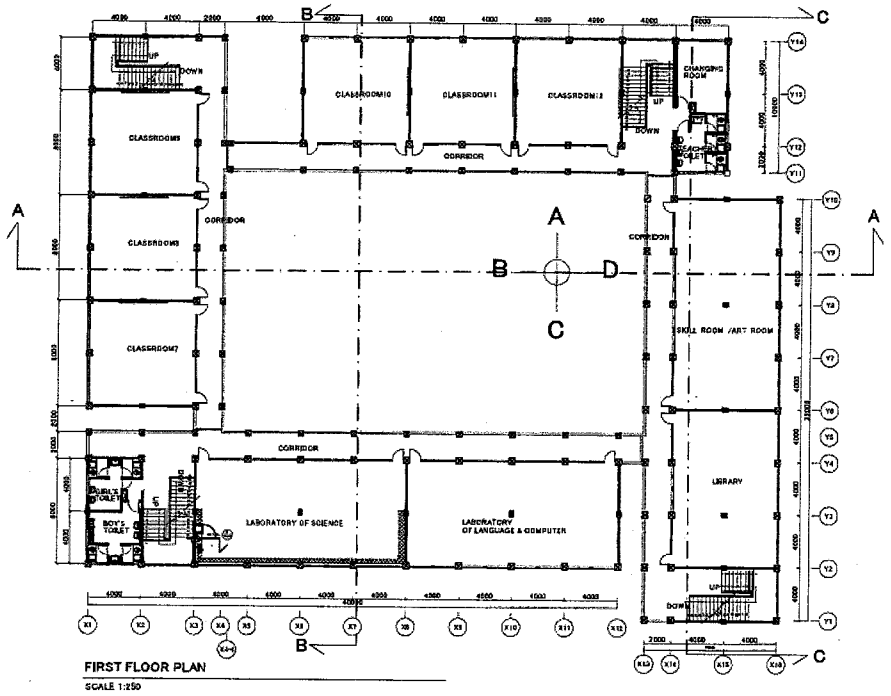
2-2-5 Outline Design Drawings



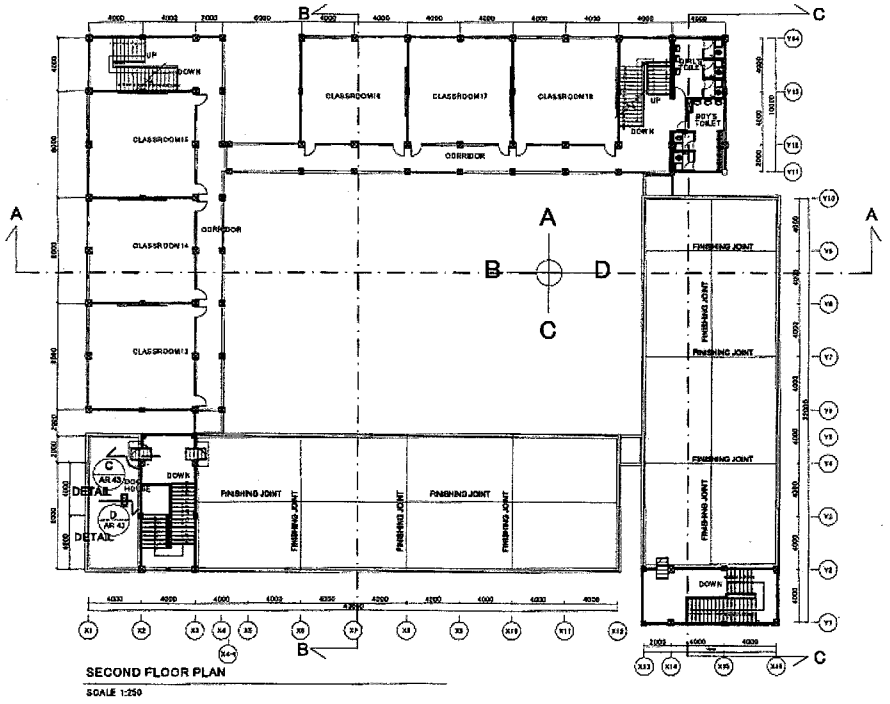
PA21 SMPN7 Padang Site Plan



PA21 SMPN7 Padang Ground Floor Plan



PA21 SMPN7 Padang 1st Floor Plan



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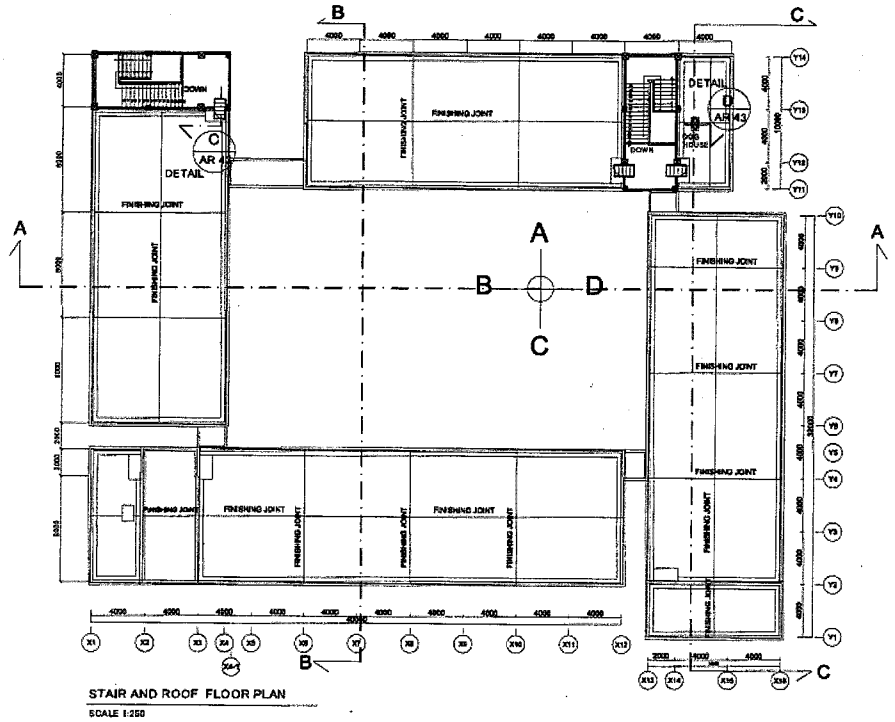
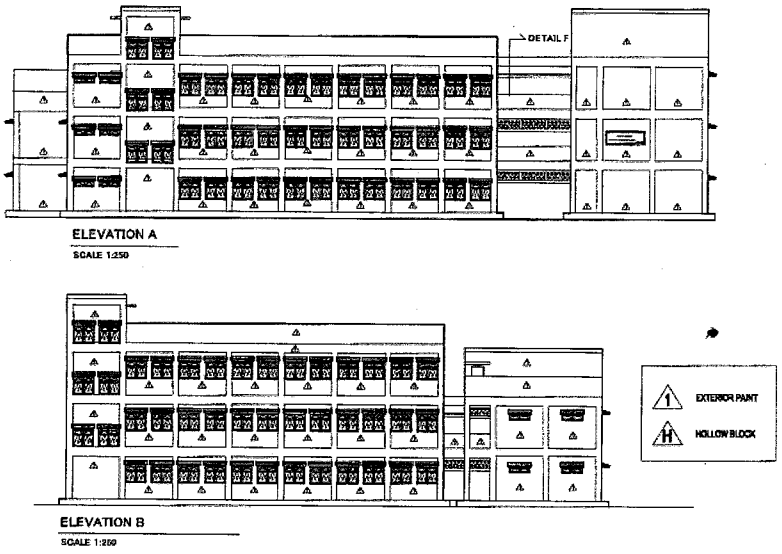
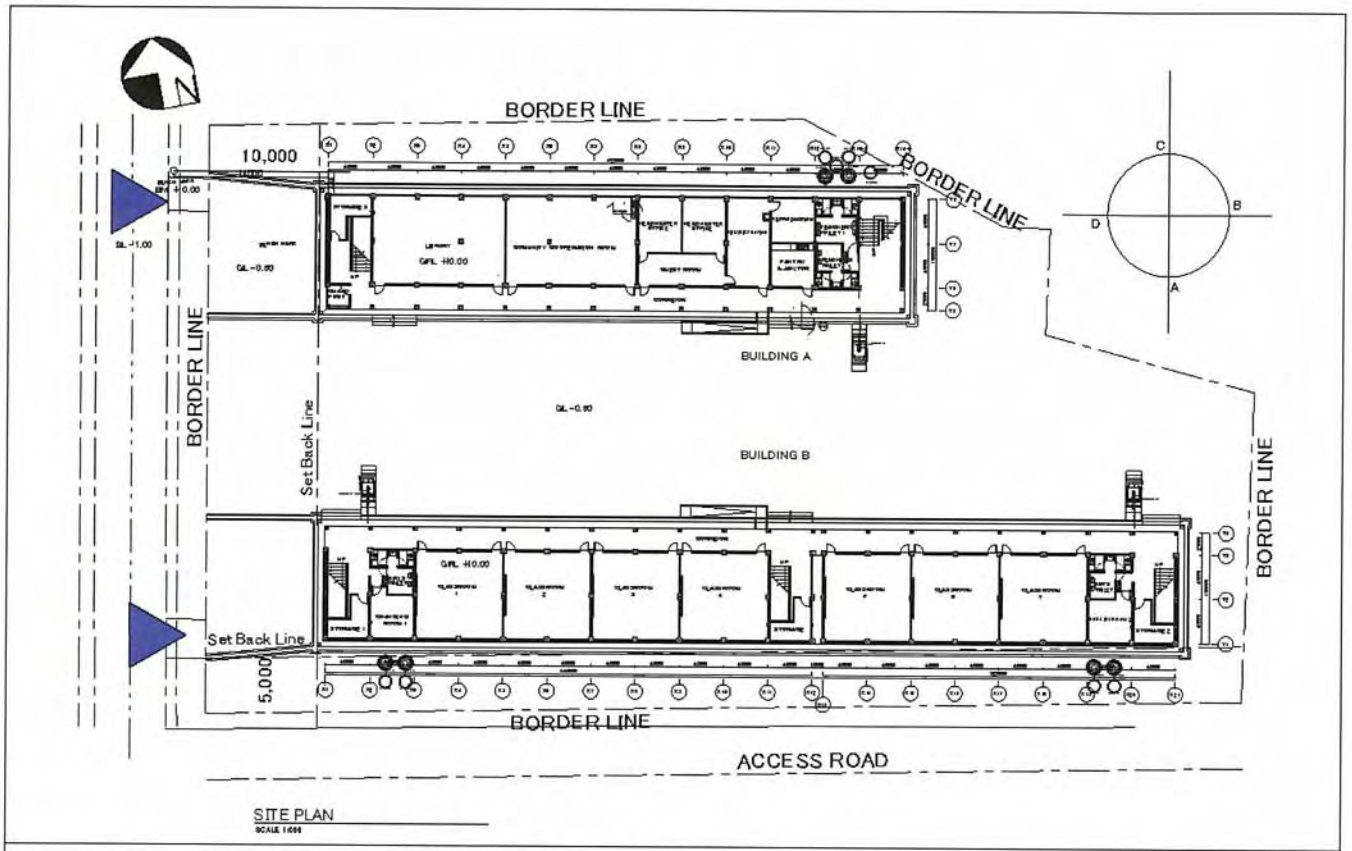


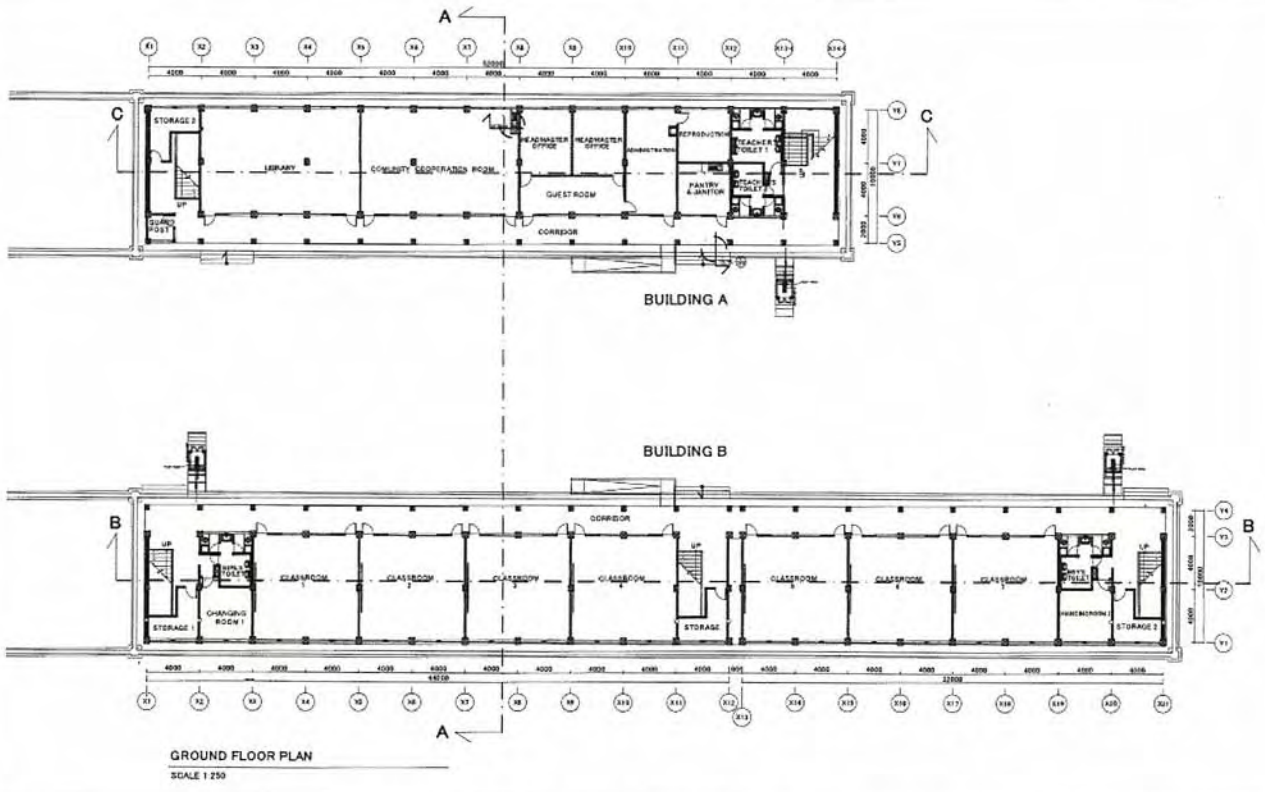
PA21 SMPN7 Padang Roof Floor Plan



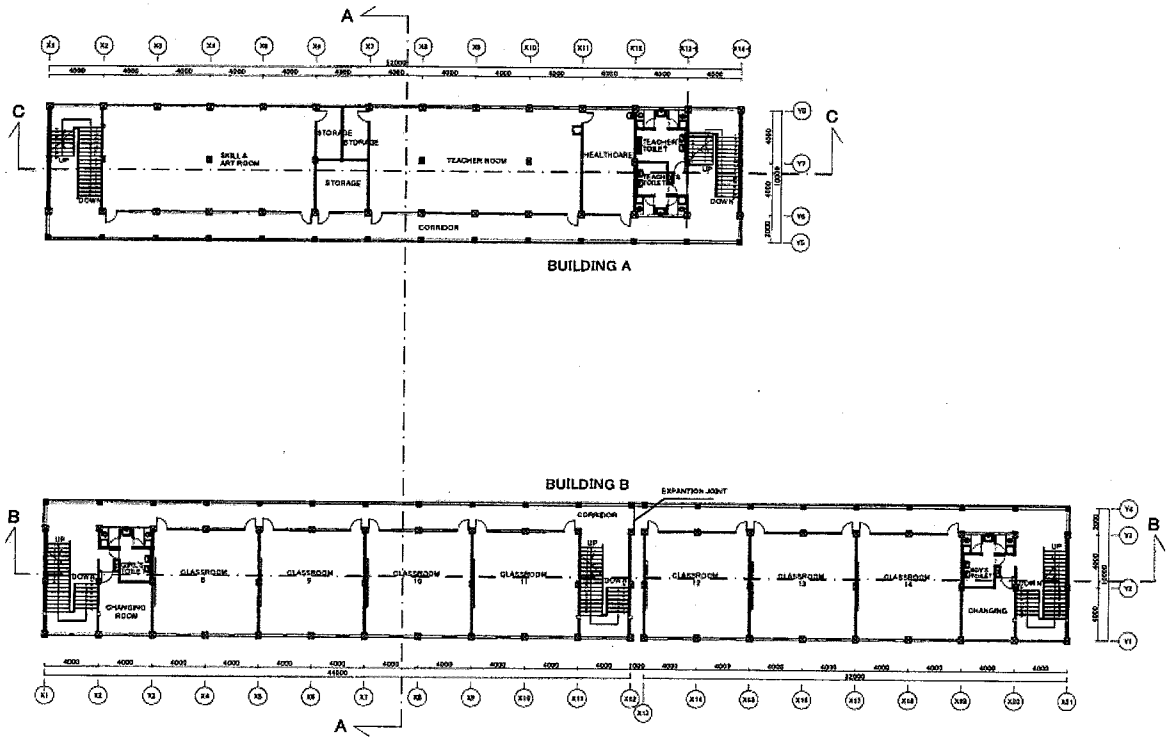
PA21 SMPN7 Padang Elevation



PA22 SMPN25 Padang Site Plan



PA22 SMPN25 Padang Ground Floor Plan



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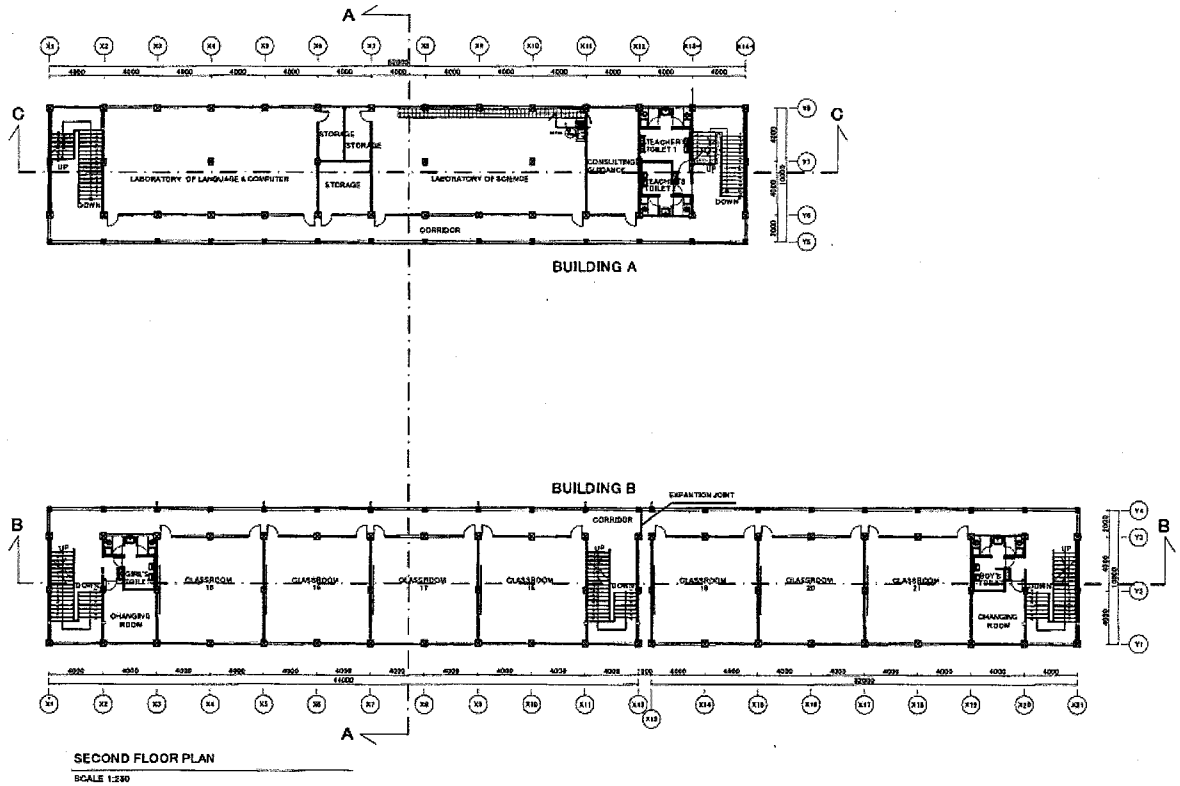

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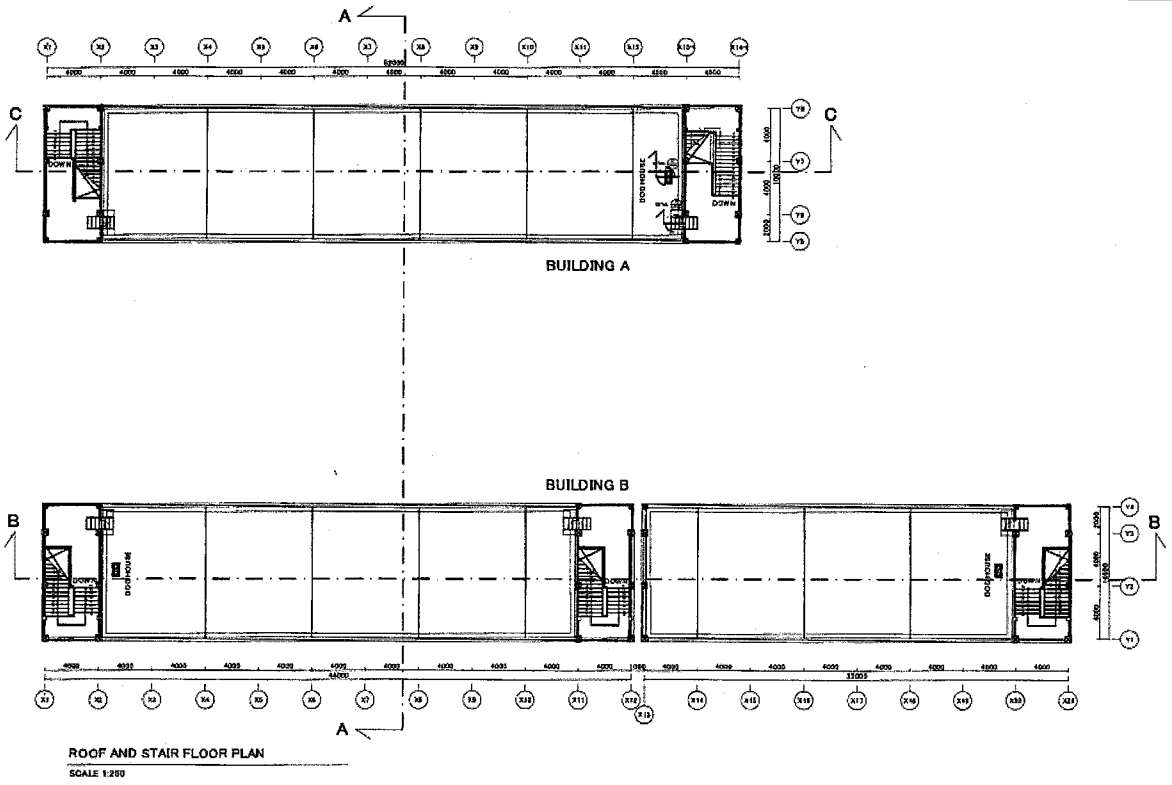
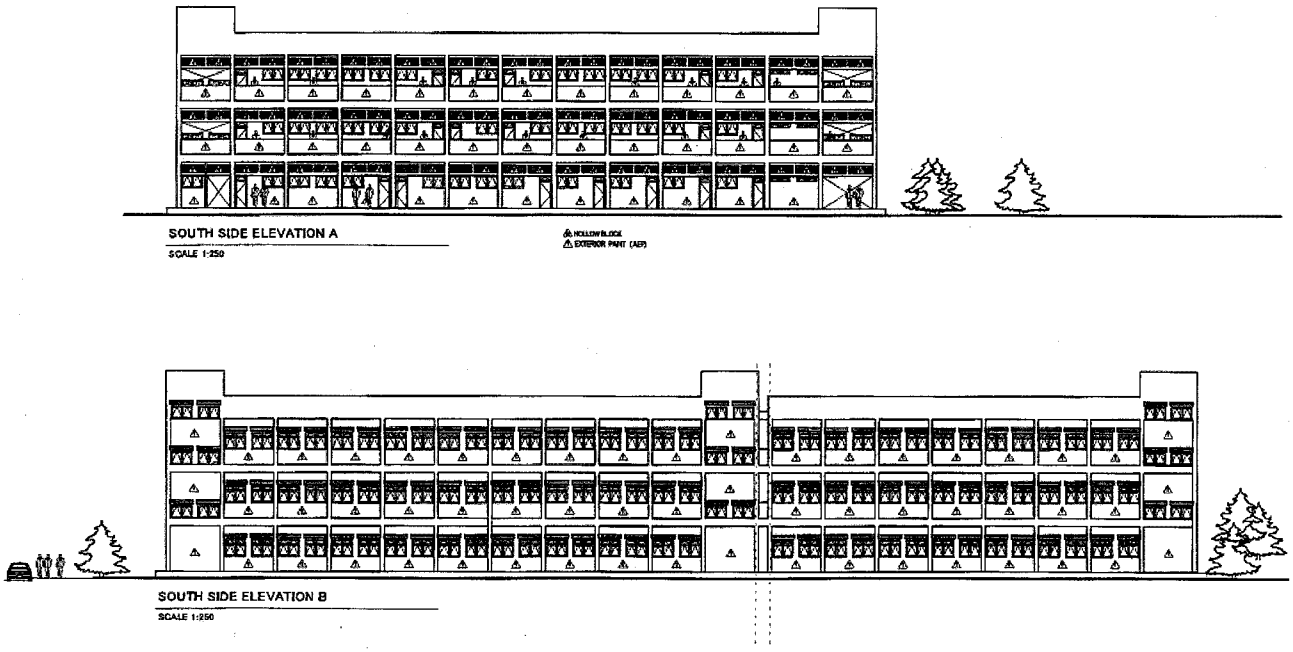
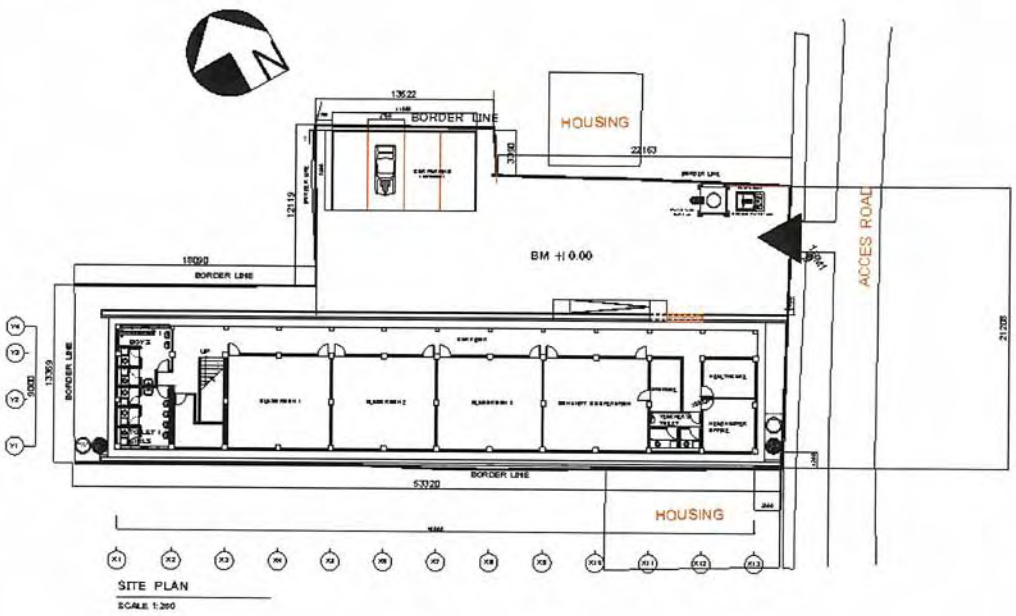


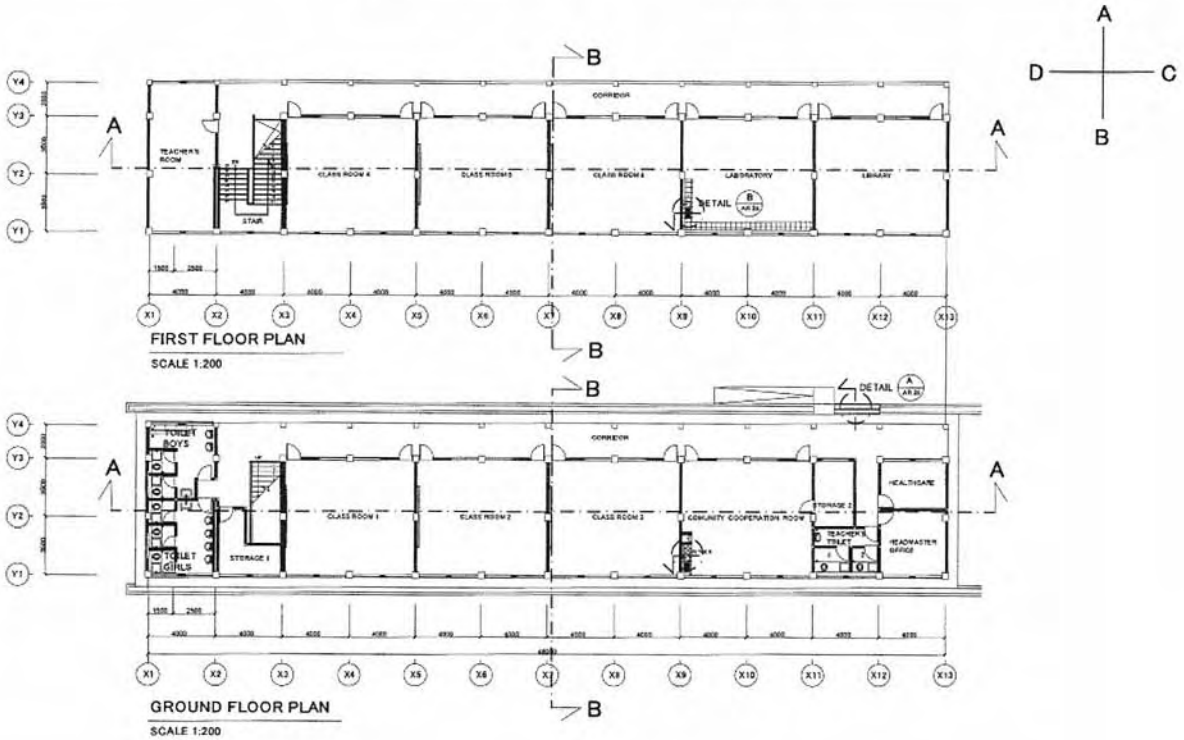
PA22 SMPN25 Padang Roof Floor Plan



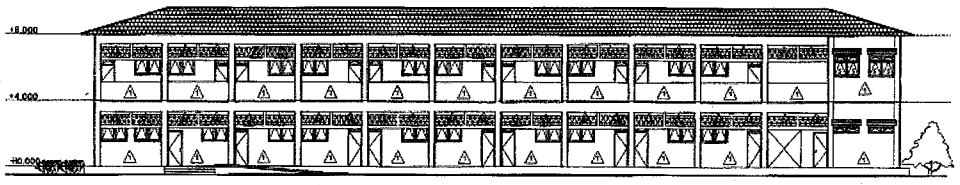
PA22 SMPN25 Padang Elevation



PP21 SDN02 V Koto Timur　Site Plan

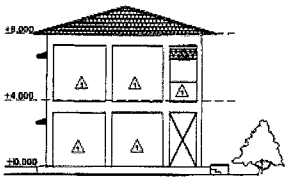


PP21 SDN02 V Koto Timur　Ground Floor Plan/1st Floor Plan



A SIDE ELEVATION

SCALE 1:200

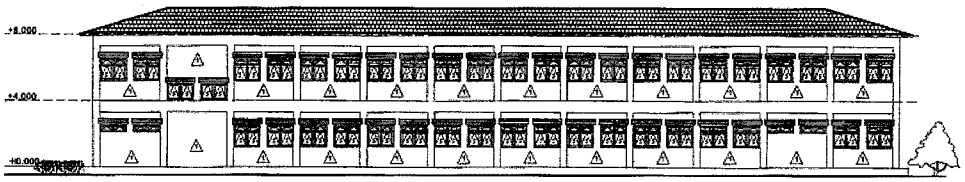


C SIDE ELEVATION

SCALE 1:200

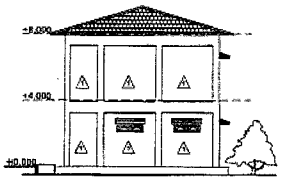
EXTERIOR PAINT (AEP)

HOLLOW BLOCK 20X40CM



B SIDE ELEVATION

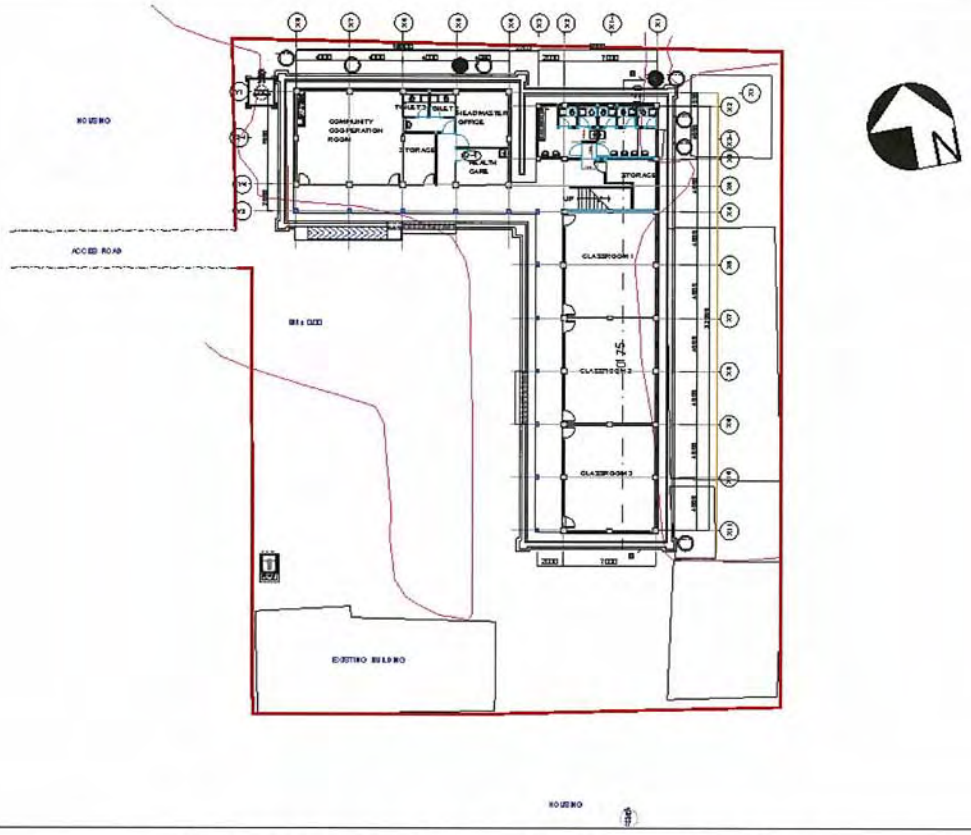
SCALE 1:200



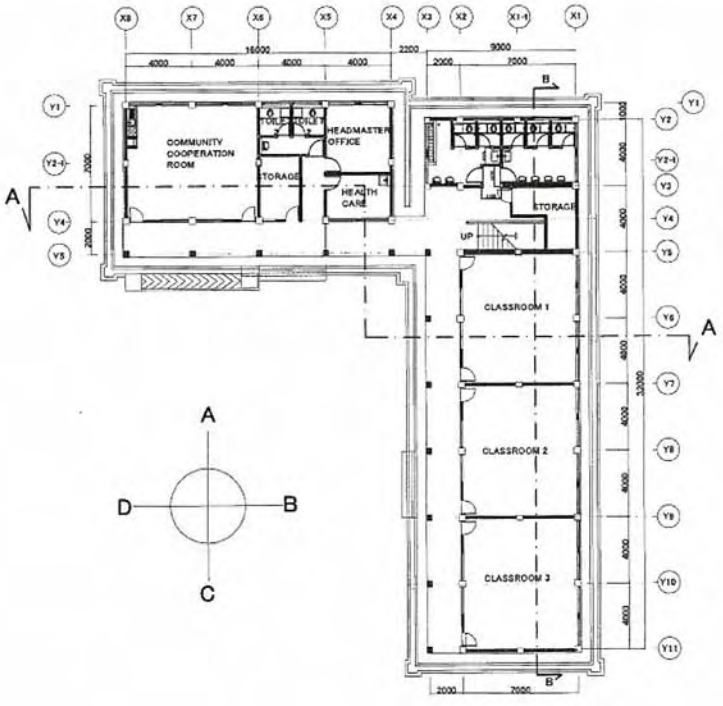
D SIDE ELEVATION

SCALE 1:200

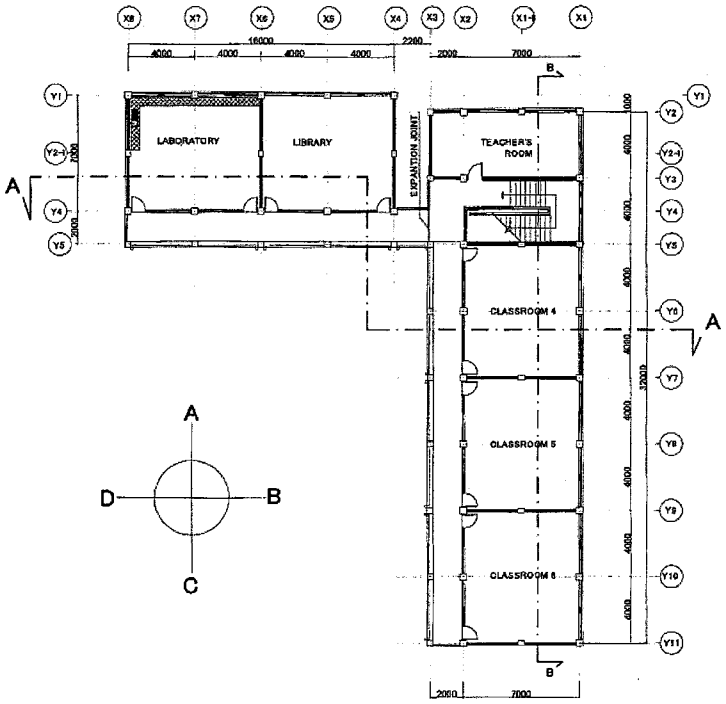
PP21 SDN02 V Koto Timur Elevation



PP22 SDN08 2 x 11 Enam Lingkung Site Plan

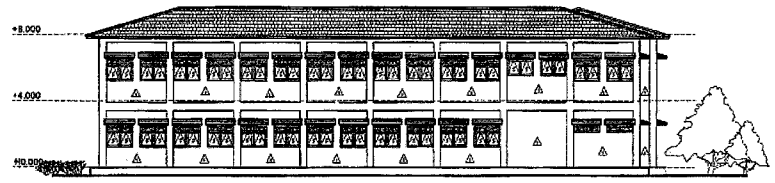


PP22 SDN08 2 x 11 Enam Lingkung Ground Floor Plan



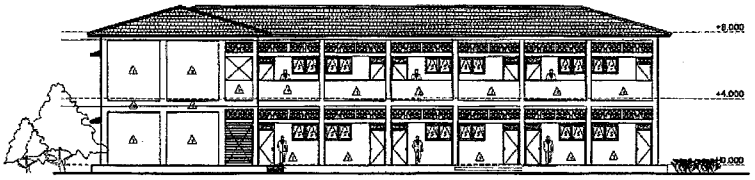
FIRST FLOOR PLAN

PP22 SDN08 2 x 11 Enam Lingkung 1st Floor Plan



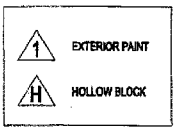
B SIDE ELEVATION

SCALE 1:200



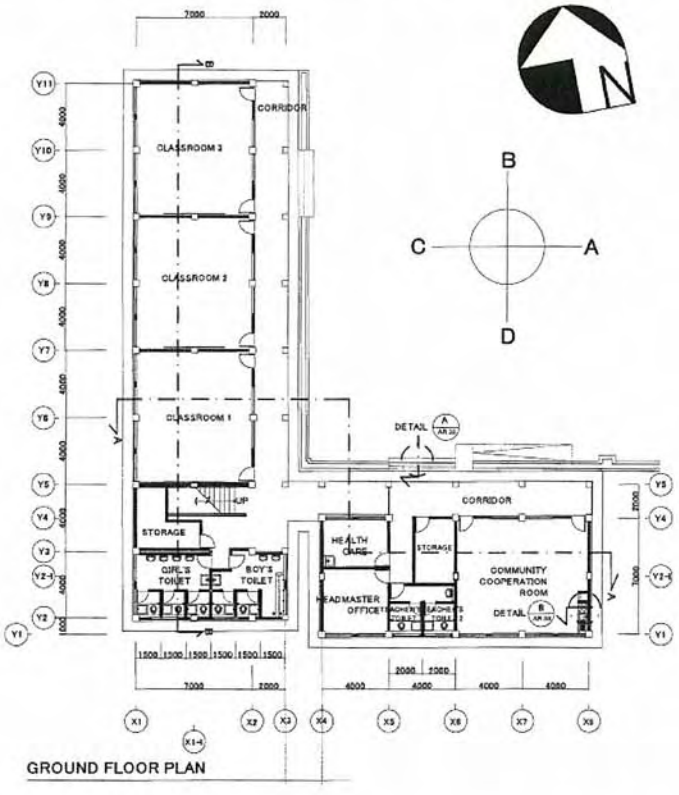
D SIDE ELEVATION

SCALE 1:200

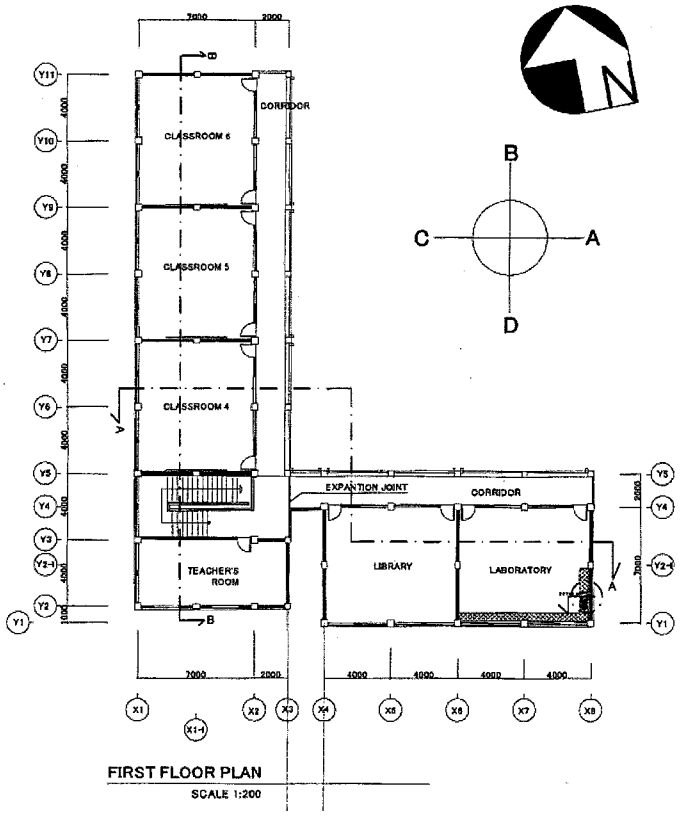


PP22 SDN08 2 x 11 Enam Lingkung Elevation

PP23 SDN03 V Koto Kampung Dalam Site Plan



PP23 SDN03 V Koto Kampung Dalam Ground Floor Plan



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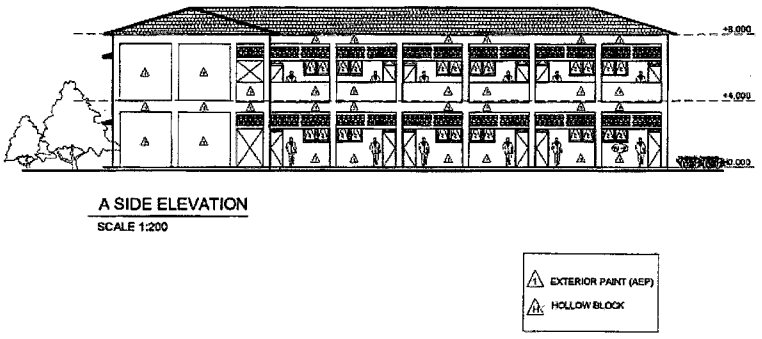
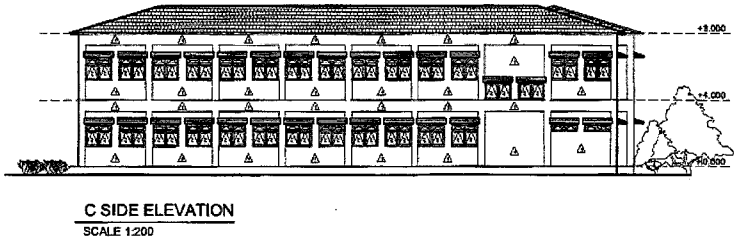
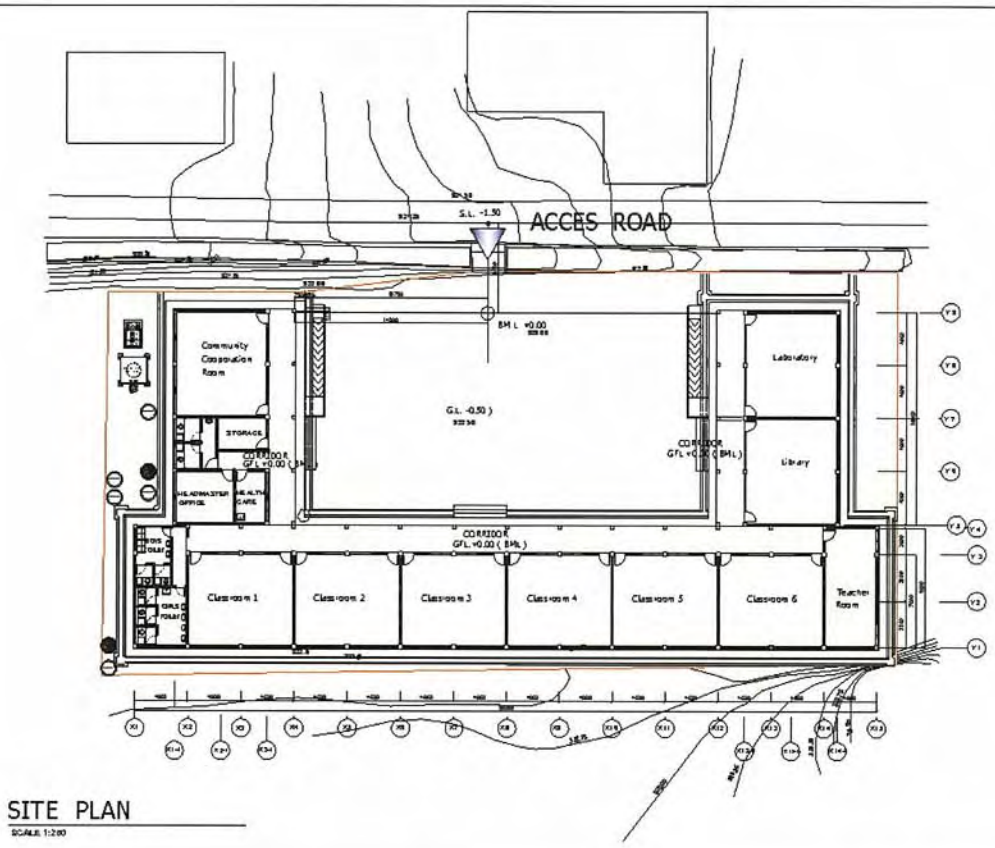
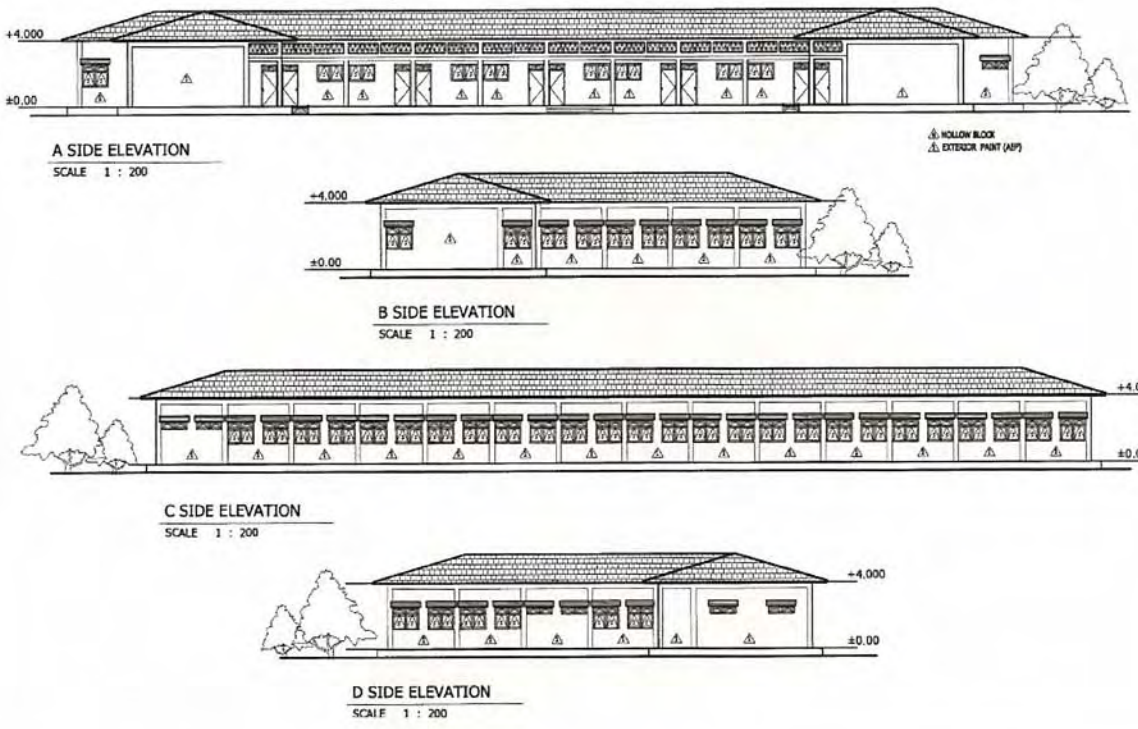




PP23 SDN03 V Koto Kampung Dalam Elevation



PP24 SDN07 Sungai Geringging Site Plan/Ground Floor Plan



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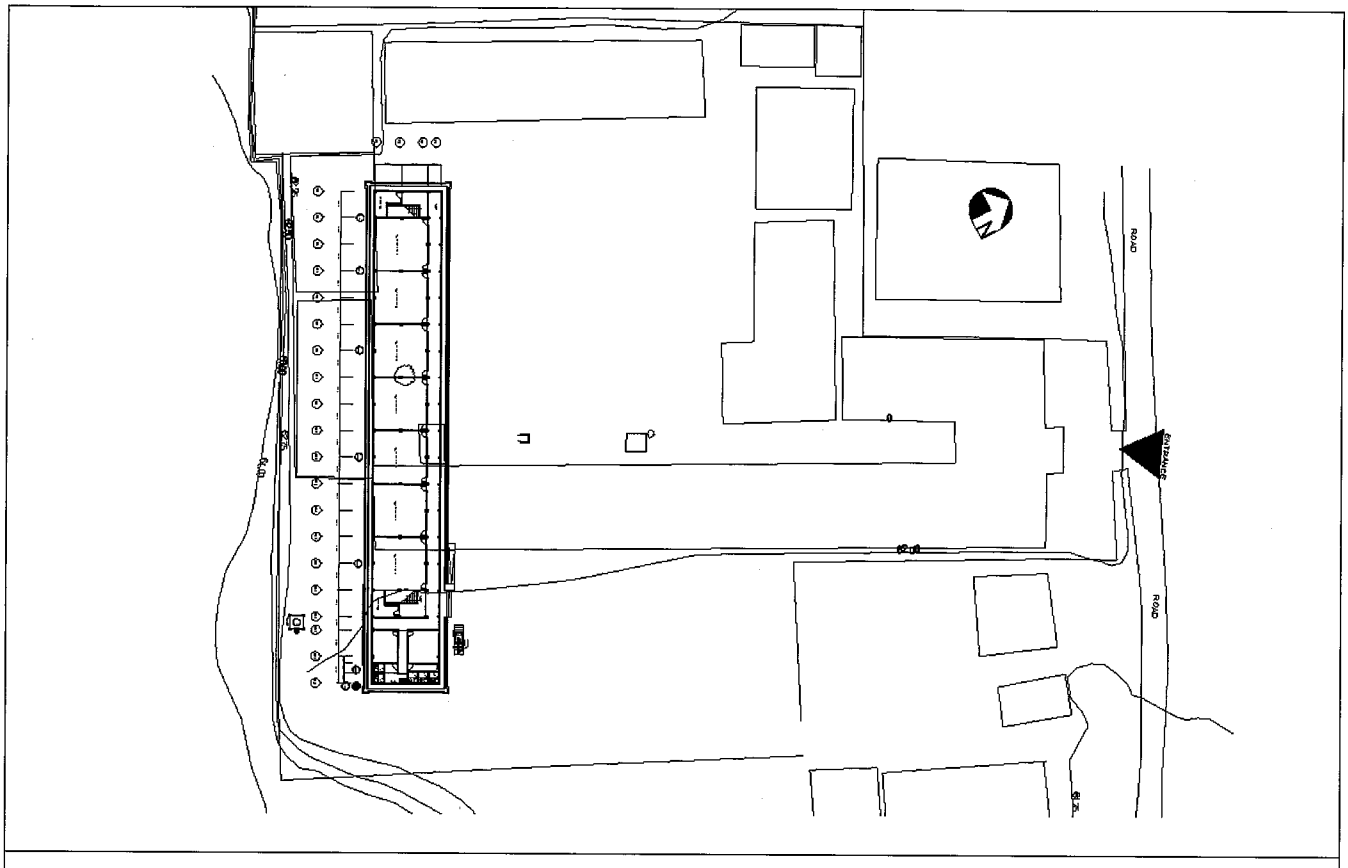
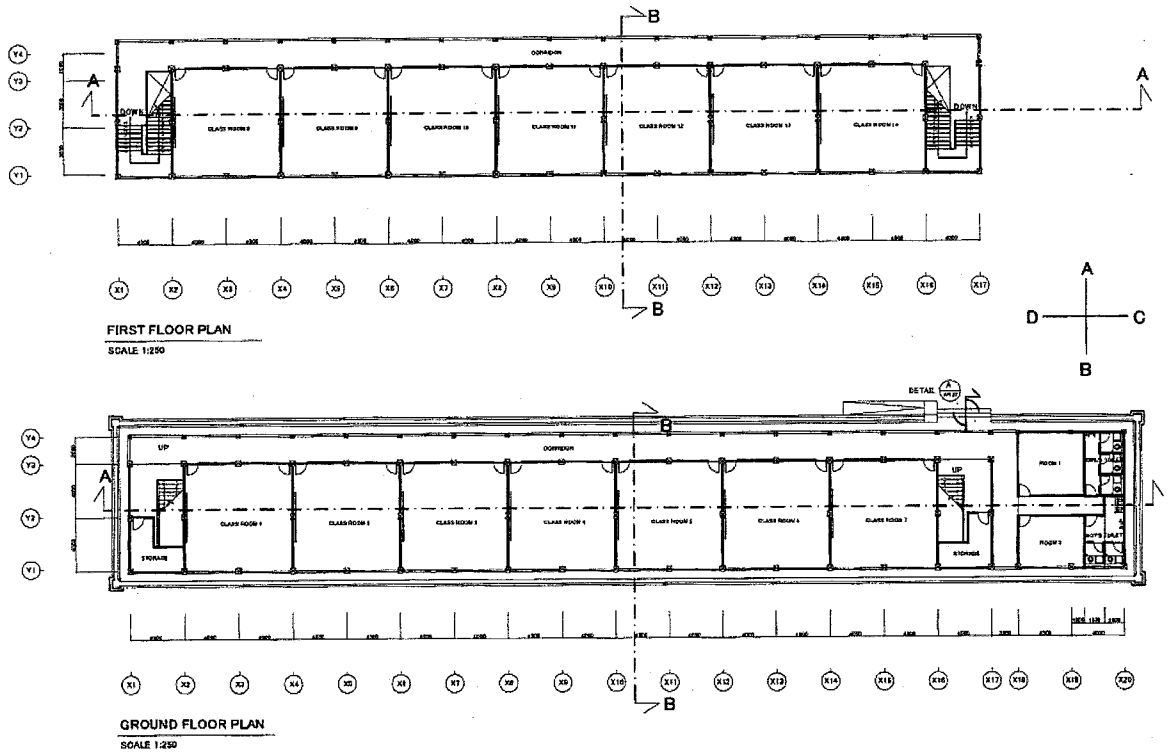
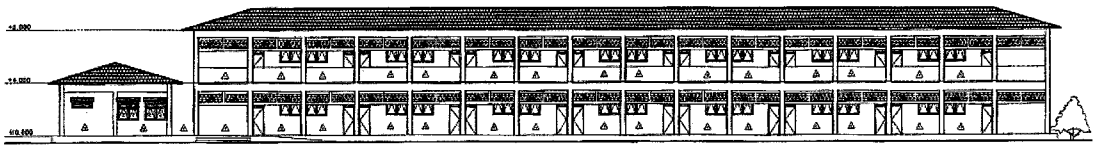


PP25 SMPN1 Enam Lingkung Site Plan

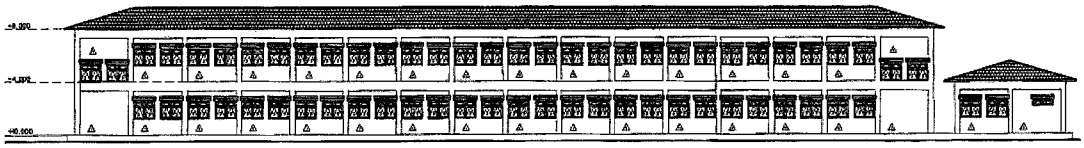


PP25 SMPN1 Enam Lingkung Ground Floor Plan/1st Floor Plan

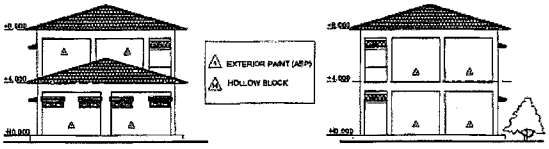


A SIDE ELEVATION
SCALE 1:250

EXTERIOR PAINT (AEP)
HOLLOW BLOCK



B SIDE ELEVATION
SCALE 1:250

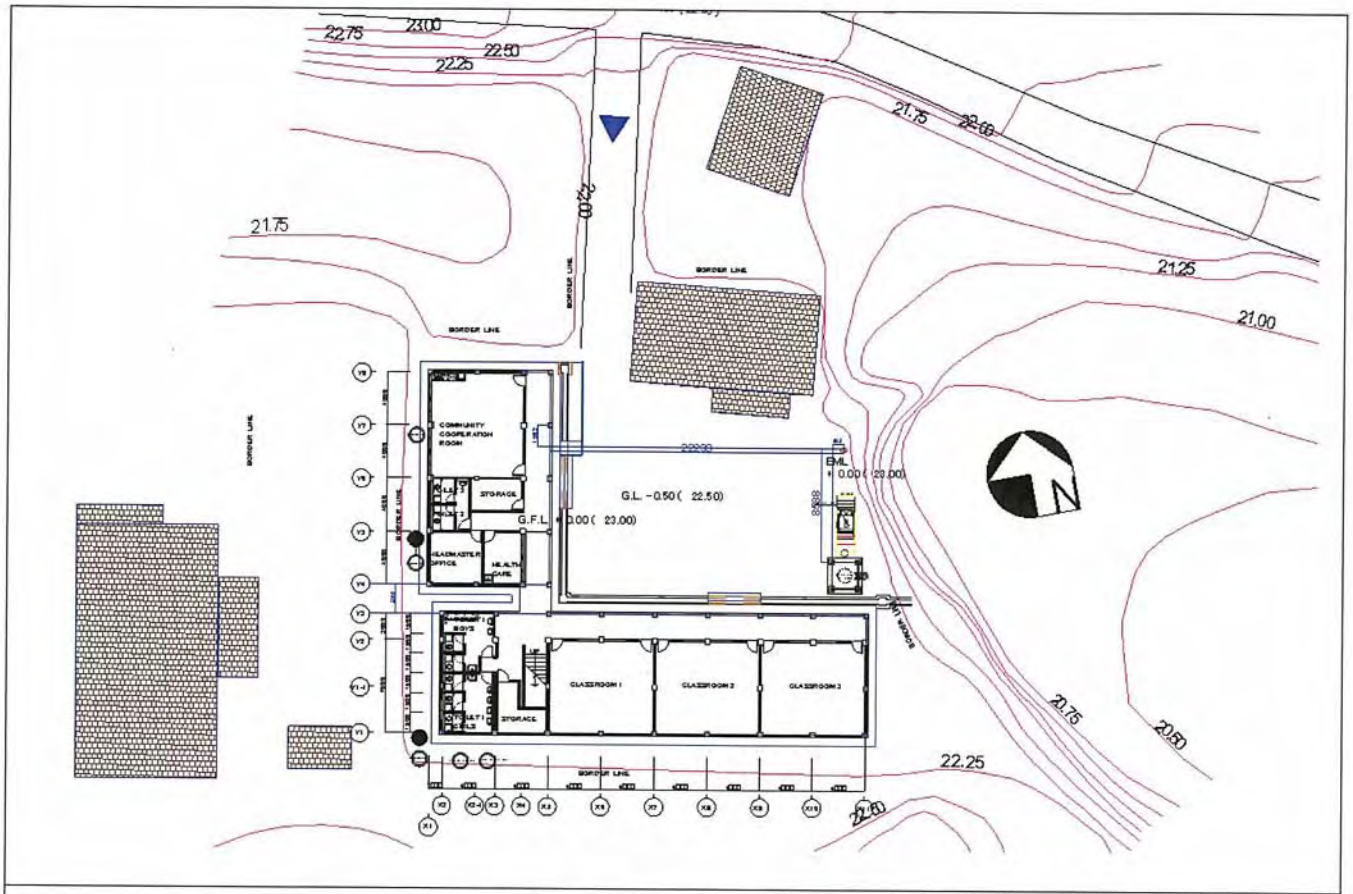


EXTERIOR PAINT (AEP)
HOLLOW BLOCK

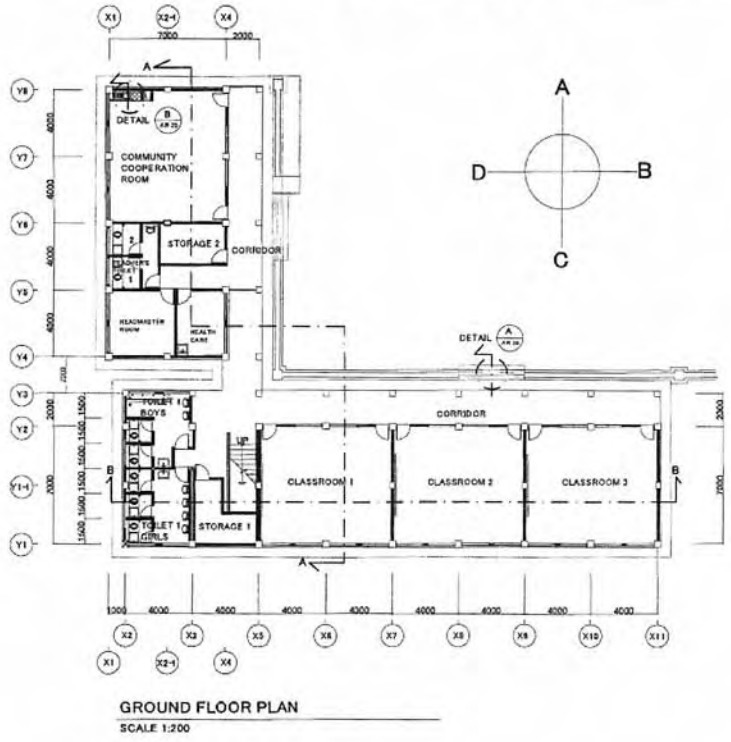
C SIDE ELEVATION
SCALE 1:250

D SIDE ELEVATION
SCALE 1:250

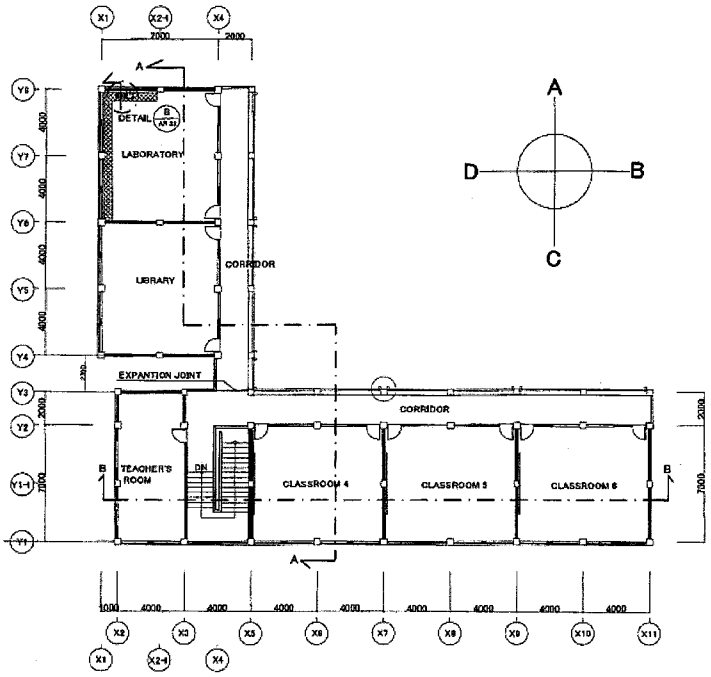
PP25 SMPN1 Enam Lingkung Elevation



PP26 SDN05 Batang Gasan Site Plan

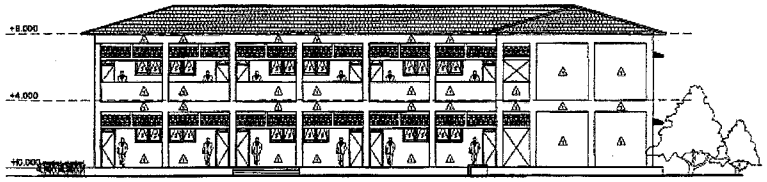


PP26 SDN05 Batang Gasan Ground Floor Plan

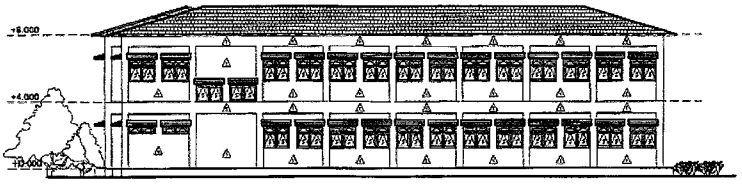


FIRST FLOOR PLAN
SCALE 1:200

PP26 SDN05 Batang Gasan 1st Floor Plan

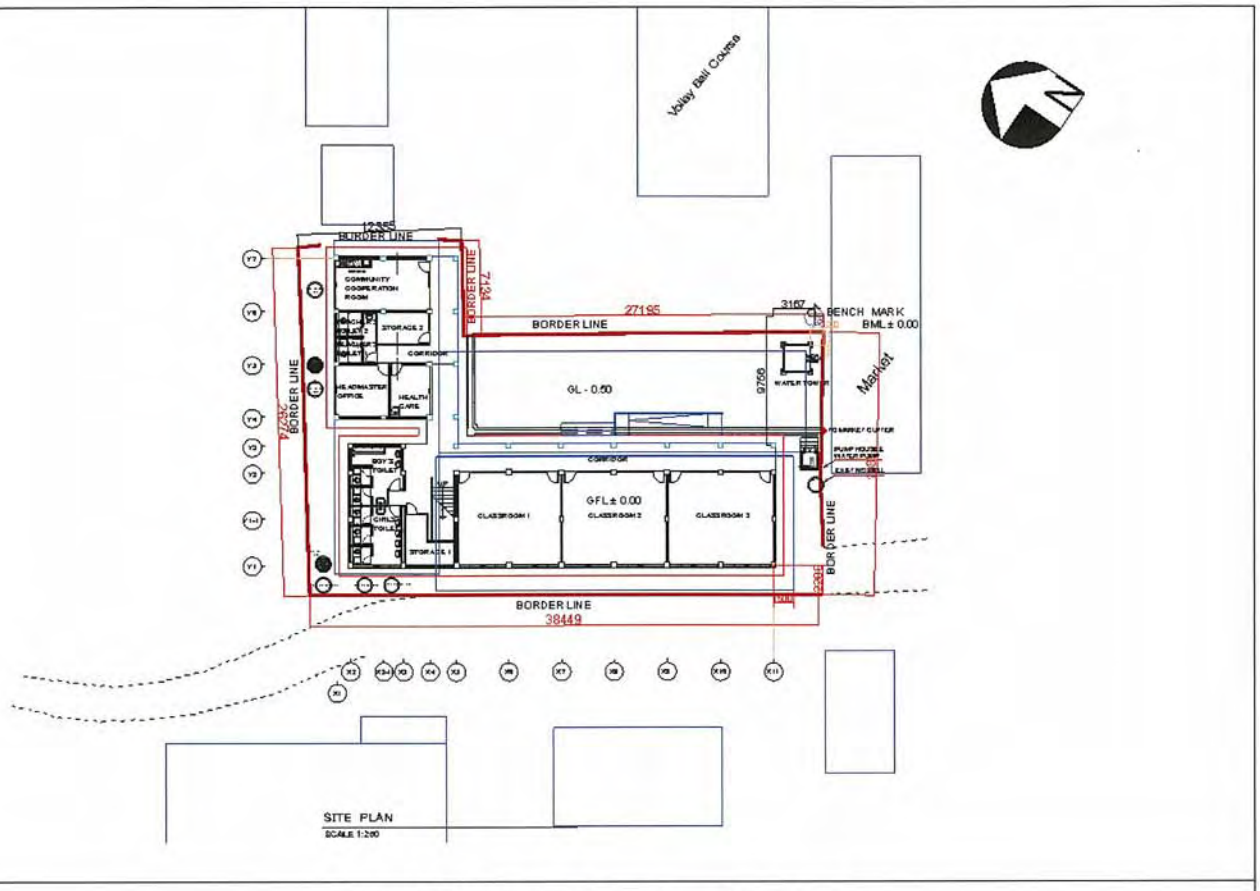


A ELEVATION
SCALE 1:200

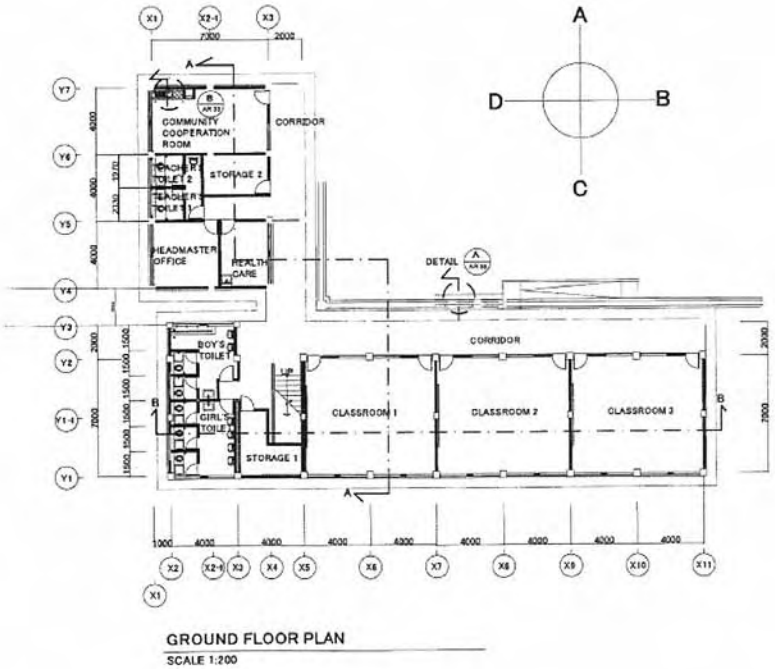


C ELEVATION
SCALE 1:200

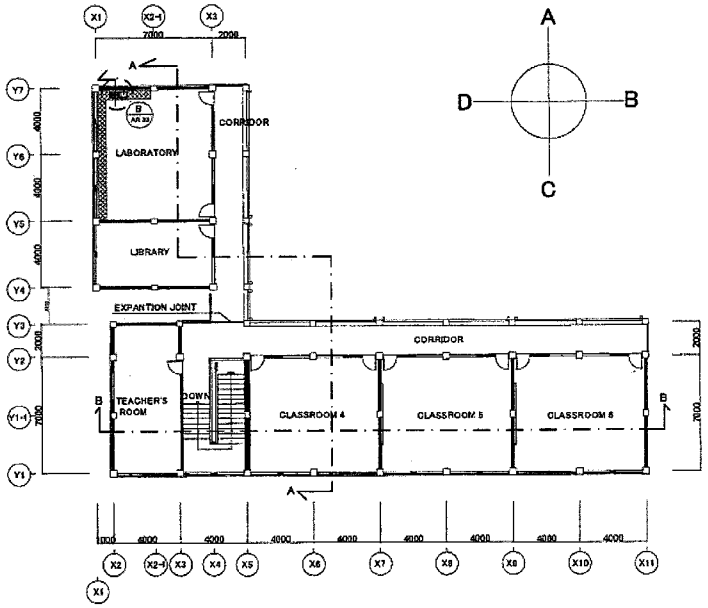
PP26 SDN05 Batang Gasan Elevation



PP27 SDN01 Enam Lingkung Site Plan

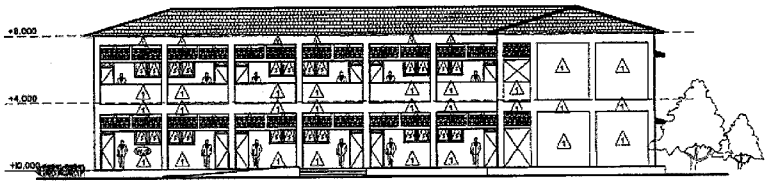


PP27 SDN01 Enam Lingkung Ground Floor Plan

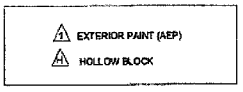


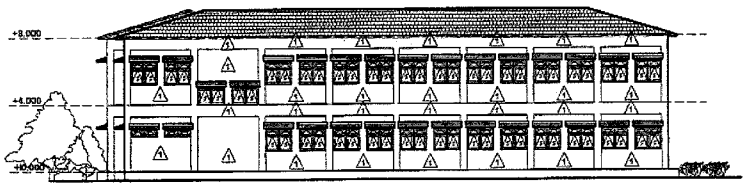
FIRST FLOOR PLAN
SCALE 1:200

PP27 SDN01 Enam Lingkung 1st Floor Plan



A SIDE ELEVATION
SCALE 1:200





C SIDE ELEVATION
SCALE 1:200

PP27 SDN01 Enam Lingkung Elevation

2-2-6 Implementation Plan

2-2-6-1 Implementation Policy

Following the Exchange of Notes (E/N) for the grant aid, the Government of Indonesia will make agreement with the procurement agent for management of the Project. The supervision consultant and the contractors shall bind contracts with the procurement agent for implementation of their respective areas of work. The work contents of each related agent are stated below.

1) Responsible organization

BNPB shall be the responsible organization for the Project. The responsible organization will act as coordinator between Indonesian implementing organization and the Government of Japan.

2) Implementing organization

The implementing organization will be as follows:

- ◊ Government of West Sumatra Province
- ◊ Municipality of Padang City
- ◊ Government of Padang-Pariaman District

3) Procurement agent

The procurement agent for the Government of Indonesia will implement project management work such as the section and conclusion of contracts with the consultant and contractors, and will manage funds including payments to the consultant and contractors.

4) Consultant

The consultant will supervise the construction works with quality control, progress control and safety consideration, etc.

5) Contractors

The contractors selected by the procurement agent will implement the works based on contracts. All the necessary equipment and materials for the works can be procured in Indonesia. An international tender targeting both local and overseas contractors shall be conducted, while the local contractors should be more competitive.

6) Steering Committee

A Steering Committee will be set up to guide the project implementation. The committee consist of the will hold meetings upon request of BNPB and JICA.

◊ National Disaster Management Agency (BNPB)
◊ Technical Support Team for Rehabilitation and Reconstruction of West Sumatra Province
◊ Planning Board (BAPPEDA) of West Sumatra Provincial Government
◊ Provincial Education Office of West Sumatra Provincial Government
◊ Municipal Education Office of Padang City Municipality
◊ District Education Office of Padang-Pariaman District

◊ Japan International Cooperation Agency (JICA)
◊ Embassy of Japan (EoJ)
◊ Procurement Agent

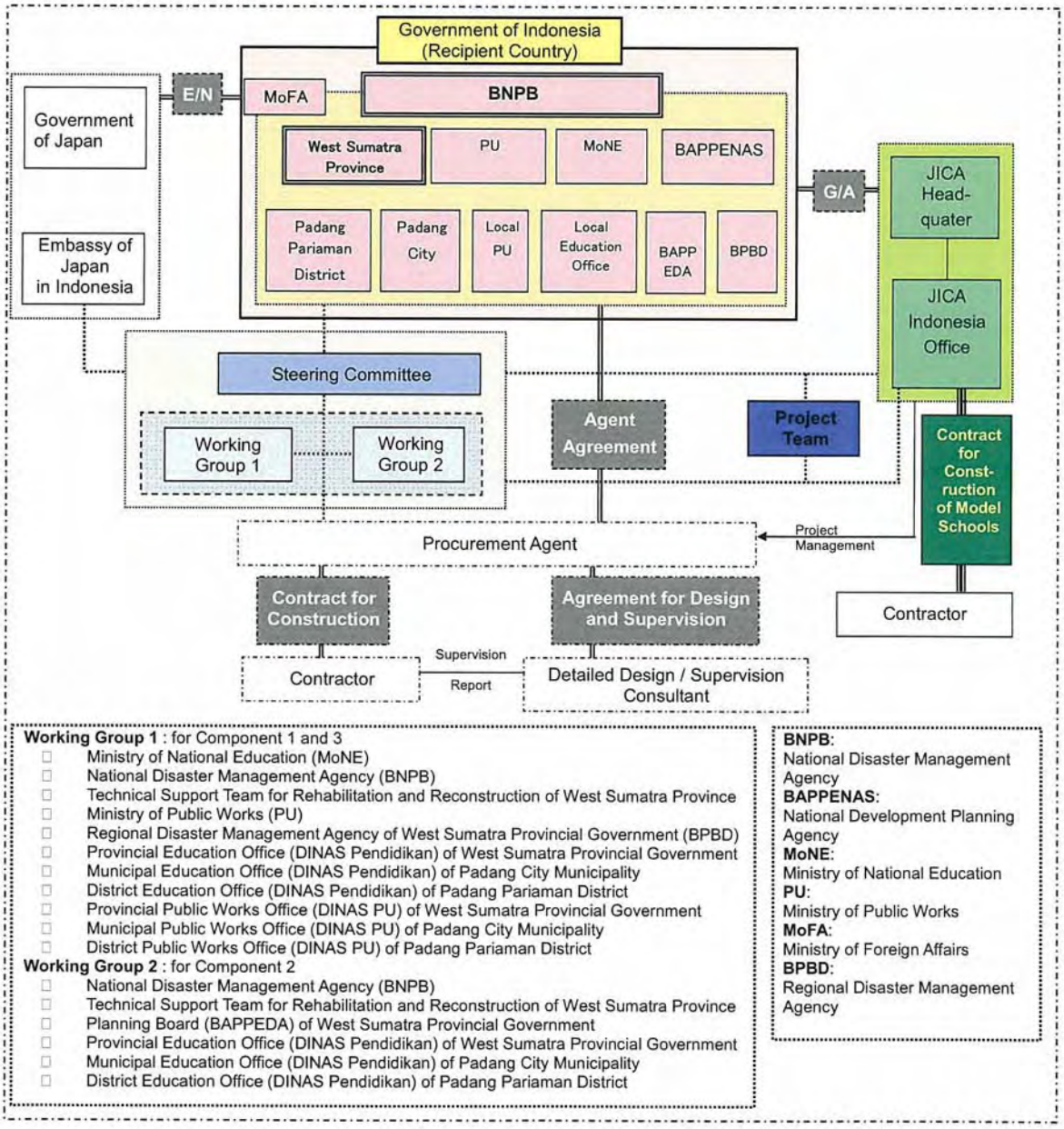


Figure 2-1 Organization Chart for Project Implementation

2-2-6-2 Implementation Conditions

There should be no problem regarding the supply and management of equipment and materials.

2-2-6-3 Quality Control Plan

(1) Basic Concept

The consultant supervising the construction work will check the contents and progress of the work as well as the procurement of materials and will also verify the amount of work completed each month to be reported to the procurement agent to ensure the quality of the work and that the work itself is duly completed by the deadlines stipulated in the contracts. The consultant will also supervise and provide guidance for the contractors to ensure the safety of the site work.

(2) Quality Control Items

1) Checking of the Working Drawings and Specifications of the Materials to be Used

The submission of working drawings prior to the commencement of the construction work will be a compulsory requirement for the contractors so that the contents of these drawings can be checked in advance. Equally, contractors will be required to submit the specifications and proof of purchase of the materials to be delivered to the construction sites so that their quality can be assured.

2) On-the-Spot Visits to Manufacturing/Production Sites or Checking of the Inspection Results

In regard to the building equipment and materials to be procured, visits will be made, if necessary, to the manufacturing or production factories to conduct on-the-spot checks of the material quality and product inspection certificates.

3) Control and Confirmation of the Completed Amount of Work

Technical supervision and on-the-spot inspection will be conducted at the construction sites at the construction stage. The completed amounts of the work will be checked against the relevant working drawings.

4) Inspection Records

Work supervision instructions will be given to the locally recruited work supervisors. These supervisors will be required to keep inspection records for each structural member and each type of work conducted at every stage of the construction work for efficient work supervision without fail. The main quality control items are shown in the following table.

Table 2-19 Main Quality Control Items

Type of Work	Management Item	Testing (Inspection) Method	Testing Frequency
Foundation work	Bearing capacity of the soil	Portable cone penetration test or Plate load test	One place of each (spread foundation)
	Pile supporting layer	Comparison between excavated soil and boring data; measuring	For each pile
Earth work	Degree of compaction	Visual inspection	Entire foundation base, soil filling
	Incoming sand quality inspection	Visual inspection	Quarry: 1 site
Form work	Completed amount	Dimensional inspection and photographs	All members
	Material inspection	Plate thickness, quality and deformation	All members
	Assembly inspection	Visual check (gaps, reinforcing material and spacers)	All members
Reinforcing bar work	Tensile strength	Tensile strength test	Once for each size and every 20t
	General quality	Mill sheet inspection	Once for each size
	Bar arrangement inspection	Number of bars, diameter, spacing, joint length, setting length and covering thickness	Prior to concrete placing at all points
Concrete work	Aggregate particle size	Sieve-analysis test	Once
	Test mixing	Blending, water-cement ratio, compressive strength, slump and salt content	Once
	Compressive strength	Compressive strength test	Once for casting day, 6 pieces each
	Slump	Slump test	Once for casting day
	Temperature	Temperature gauge	Each batch
	Water quality	Visual inspection	Once for casting day
Brick work	Brick quality	Factory inspection	Once
Doors and windows	Quality of doors and windows	Visual inspection; measuring	When delivered
Furniture and fixtures	Quality of furniture and fixtures	Visual inspection; measuring	When delivered

(3) Progress Control

In order to ensure that the contractors adhere to the deadlines stipulated in their respective contracts, the consultant will compare the implementation schedule in each contract with the actual work progress every month. When a delay is predicted, the consultant will alert the contractor and request that the said contractor submit a plan to prevent the delay and implement the said plan to ensure that the construction work and delivery of the necessary equipment, etc. is duly completed by the agreed deadline. Comparison between the planned schedule and actual progress will be mainly conducted in the following manner.

- Confirmation of the amount of completed work
  (procurement state of building materials and state of work progress)
- Confirmation of the amount of delivered equipment and materials
  (construction machinery and fixtures)
- Confirmation of the progress of temporary work and preparation of construction machinery
- Confirmation of the number of engineers, skilled workers and laborers

(4) Earthquake-resistant Control

Civil engineering and building works by the Indonesian government are controlled according to Japanese and British standards, however, in the Project, priority shall be given to Japanese quality control standards as far as possible in consideration of earthquake-resistant design.

Important points to consider in earthquake-proof design are as follows.

1) Condition of the building structural design qualification system in Indonesia

There are two qualification systems in the Indonesian building industry – that issued by the architectural association (IAI: Ikatan Arsitek Indonesia) and that issued by the state (LPJK). The handling of qualifications differs according to each local government, which acts as the building approval agent. In many regional areas, design and execution approval is often granted to non-holders and the qualification system is not so thoroughly enforced.

2) Classification of building design qualifications

The IAI design qualification generally applies to design of buildings and general residences up the three stories. In order to conduct structural and foundation design for concrete high-level buildings and bridges, etc., it is necessary to acquire qualifications from the Indonesian association of construction specialists (HAKI: Himpna Ahli Konstrksi Indonesia). Meanwhile, there are hardly any qualification systems for important crafts subject to quality control apart from welding. Craftsmen in reinforcing bar work, concrete work, earth work and form work, etc. only need some experience in order to get work on construction sites. In order to secure quality of buildings, important issues to be tackled will be the transfer of technology to these craftsmen and establishment of qualification systems.

3) Method of acquiring qualifications

State qualifications and association qualifications regarding design of buildings can generally be acquired by the following methods.

Table 2-20 Division of Building Design Qualifications

Class	Persons Qualified to Sit Exams
3rd Class Ahli Muda (Junior Expert)	University graduates with around 5 years of experience
2nd Class Ahli Madya (Middle Expert)	University graduates with around 10 years of experience
1st Class Ahli Utama (Senior Expert)	University graduates with around 15 years of experience

Applicants for the above qualifications are required to submit their work history, sit lectures for around two weeks and take an examination, and around 70% of applicants are successful.

Successful persons are able to acquire the next class qualification after around five years more experience and again sitting lectures for around two weeks and taking an examination. However, there are no appraisal and review agencies concerned with structural design. In other words, anybody is able to conduct structural design, and awareness of earthquake-proof design is low in society in general. Following the experience of the earthquake disaster, it is a fact that awareness of the importance of earthquake-proof structures is increasing.

4) Building approval agencies

The building approval departments on each local government are basically in charge of granting building permission. The central government has main roles that are the establishment of building standards, implementation of national examinations for engineers and issue of technical guidelines, etc.

5) Buildings subject to approval

As a rule all buildings are subject to approval by the space planning department in Padang City and the public works department in Padang-Pariaman District.

6) Earthquake-proof design in Indonesia and future issues

In consideration of the social background described above, important issues facing future earthquake-proof design in Indonesia are as follows:

Review of building standards; Thorough enforcement of earthquake-proof design; Thorough implementation of education for craftsmen (seminars and qualification systems); and Improvement of building approval system (inspection methods, manuals, standard building compilations, etc.)

2-2-7 Procurement Plan

All of the building materials to be used under the Project are common materials and their procurement in Indonesia (including imported materials which are readily available in Indonesia) is planned.

2-2-8 Implementation Schedule

The implementation schedule for the Project after the signing of the E/N will include 3.5 months for the tender-related work and 13 months for construction work.
The following tender-related works will be carried out for 3.5 months.

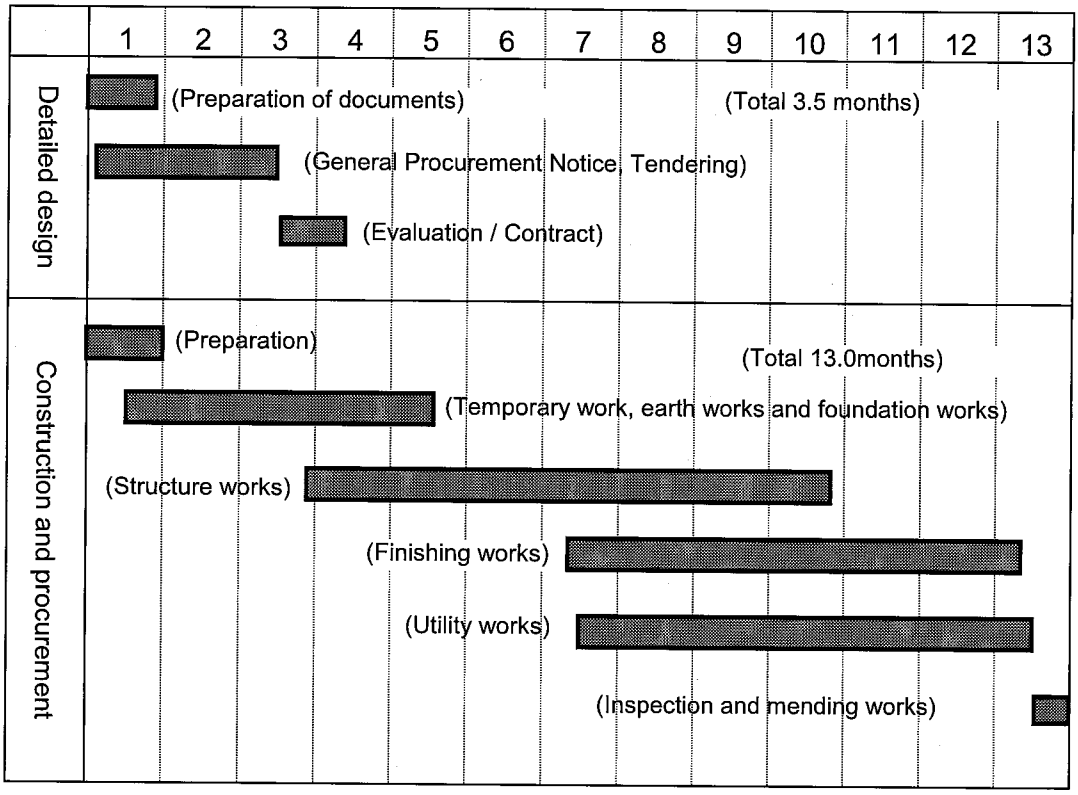
- Opening of the office 1.0 months
- Preparation and approval of the tender documents 1.0 months (simultaneously above)

- Public announcement — 0.5 months (simultaneously above)
- Distribution of the tender documents and Tender — 1.5 months
- Evaluation, Negotiations and Signing of contract — 1.0 months

Approximately 13 months will be required to complete the construction work in consideration of the construction management capability of the contractors, time required for the delivery of the materials to the construction sites, work capability of the workers, rainy season, time required for foundation work , time required for waterproofing of the roof and other relevant matters.

The following graph shows the implementation schedule for the Project following the E/N.

Table 2-21 Project Implementation Schedule



<Important points to consider in the schedule>

1) Removal of existing buildings

Lessons and medical treatment are currently being carried out in tents and temporary facilities amidst the remains of school buildings and special classrooms that were destroyed by the earthquake. In the Project, all these damaged buildings shall be removed and new facilities constructed on the former lots, and because these demolition (buildings and foundations) and waste transportation works (temporary storage on sites) will be included in the Project, periods for the removal of existing structures have been included in the overall

schedule according to the scale of each facility. Each school generally consists of between 10 and 20 existing buildings.

2) Securing of safety

The implementation schedule has been compiled upon giving full consideration to securing safety during the works. In particular, in consideration of corridors and movements for children and school staff during the works period, time has been set aside for temporary works for carrying in construction machinery and materials.

3) Execution capacity

It is thought that skilled workers will be available with no difficulty in Indonesia, however, since the works are located in regional areas and it is thought that a lot of local workers will be employed, this condition is taken into consideration.

2-3 Obligations of the Recipient Country

Following the signing of the E/N, the Indonesian side will perform the range of undertakings described next in cooperation with the responsible ministry for and implementing organization of the Project.

2-3-1 General Matters

(1) Opening of an account with a Japanese bank to enable payments to be made to the procurement agent, consultant responsible for supervision of the construction work and contractors under Japan's grant aid scheme. The Indonesian side will be responsible for the payment of banking fees/commissions for the opening of the account and money transfers.

(2) Securing of swift landing and tax exemption for materials to be imported for the Project even though it is believed that the Project does not involve any imports using Japan's grant aid scheme

(3) Affording Project-related personnel (Japanese nationals and third country nationals) such conveniences as may be necessary for their entry to Myanmar and their safe stay therein

(4) Customs duties, domestic taxes and other levies relating to the Project which may be imposed in Indonesia shall be exempted or borne by Indonesian side.

(5) Proper use and maintenance of the facilities rehabilitated with Japan's grant aid

(6) Payment of all other expenses which are not covered by Japan's grant aid

2-3-2 Special Notes

(1) The Indonesian side must provide the land for material storage and temporary installations free of charge to the contractors.

(2) The Indonesian side must provide disposal sites for the surplus soil and construction waste free of charge to the contractors

(3) It is believed that an environmental impact assessment (EIA) is unnecessary as all of the project sites are existing school sites based on the idea that the planned construction work under the Project is the restoration of the pre-disaster state.

(4) The Indonesian side shall obtain permission for construction from the land owner or relevant organization at each site.

2-3-3 Demarcation of Work

In addition to the above, the demarcation of the work to be undertaken by the Japanese side under the grant aid project and that of the implementing body on the Indonesian side is shown in the following table:

Table 2-22 Demarcation of Work

No.	Item	Demarcation		Remarks
		Japan	Indonesia	
1	Fence, gate, landscaping, sports court		●	
2	Paving of main access and parking lot	●		
3	Furniture		●	
4	Blackboard	●		
5	Demolition and transportation of debris	●		
6	Final disposal of debris		●	Environmental consideration
7	Teaching materials		●	

2-4 Project Operation Plan

2-4-1 Operation and Maintenance Plan

The Project aims to reconstruct existing schools. Operation and maintenance before the disaster were implemented with adequate teaching staff. Considering reassigning the teachers, the projects schools will be operated with no problem after completion of the construction work.

2-4-2 Operation and Maintenance Cost

The operation and maintenance cost should be prepared as before.

The estimated annual maintenance for all target schools will be as follows:

Table 2-23 Estimated Annual Maintenance Cost of Target Schools

Item	Cost (thousand Rp./year)	Remarks
Maintenance of septic tank	5,000	
Painting, repair of hardware of doors and windows	20,000	
Repair of desks and chairs	10,000	
Total	35,000	

The above cost will be provided and the school facilities will be maintained properly without problems.

2-5 Responsibility and Cost borne by Recipient Country

The responsibility and the cost to be borne by the recipient country will be as follows:

Table 2-24 Responsibility and Cost borne by Recipient Country

Description	Cost (thousand Rp.)	Remarks
Connection of Water Supply, Drainage and Electricity	53,000	
Fence, gates, sports court, landscaping	420,000	
Furniture	270,000	Supplement after using existing furniture
Payment for banking arrangement	13,000	
Total	756,000	

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

The implementation of the Project is expected to produce various effects of which the principal effects are described in Table 3-1.

Table 3-1 Principal Project Effects

Current Situation and Problems	Measures by the Project	Direct Effects and Extent of Improvement	Indirect Effects and Extent of Improvement
After the earthquake on 30 September 2009, many schools are left collapsed or damaged and the students of primary schools and junior high schools are having education in poor condition. Reconstruction of schools should be urgent task. There are no proper shelters in emergency and basis for community based disaster risk management.	Quake resistant and safe school facilities will be reconstructed contributing to reduction of disaster risk through community based disaster risk management	◊ 6 primary schools and 3 junior high schools in Padang City and Padang-Pariaman District will be reconstructed. Approximately 3,000 students will have education in proper and safe condition. The benefiting number of students will account for about 50,000 cumulatively in 50 years. ◊ About 40,000 people in the school area will have shelter and space for community based disaster risk management.	◊ Increase of enrollment rate and achievement will be expected through improved safe educational environment. ◊ The schools in Padang City will function as shelter in case of Tsunami. ◊ The quake resistant buildings will be a model for promotion of construction of quake-resistant and safe schools.

3-2 Recommendations

In order to realize and sustain the Project effects, it will be necessary for the Indonesian side to tackle the following issues.

- In order for lessons to be appropriately conducted at the target schools following the handover of facilities, it will be necessary to assign the teachers and staff without delay. Also, it will be necessary to immediately restore the operation and maintenance setups based on support from the national, provincial and local governments and parents.