

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
(5) Brick Work						
Brick Walls		301	m ²	300	90,300	
Transportation		1			4,816	
SUB-TOTAL					95,116	
(6) Carpentry and Joinery						
Timber		15	m ³	7,000	105,000	
Reception Counter		1			10,000	
Storage Shelves		1			5,000	
Handrails		1			7,100	
Work Cost		1			126,000	
Nails and Hardware		1			8,000	
SUB-TOTAL					261,100	
(7) Roofing Work						
Slate Tile	Foundation Work included	357	m ²	300	107,100	
Corrugated Asbestos Sheets	Eaves	1			1,785	
Waterproofing Metal Plates		40	m	200	8,000	
SUB-TOTAL					116,885	
(8) Tiling Work						
Floor Tiles	Entrance Portch	13.5	m ²	500	6,750	
Mozaic Tiles	Toilet Floor	20	m ²	400	8,000	
Wall Tiles	Toilet Walls	66	m ²	450	29,700	
Non-Slip Tiles	Stairs	33	m	350	11,550	
SUB-TOTAL					56,000	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
(9) Metal Items						
Lightweight Steel Frames	Ceiling	302	m ²	200	60,400	
Balusters		1			5,000	
SUB-TOTAL					65,400	
(10) Plaster Work						
Mortar Coating of Floor		359	m ²	140	50,260	
Mortar Coating of Baseboards		125	m	40	5,000	
Mortar Coating of Interior Walls	with Plaster Finish	600	m ²	180	108,000	
Mortar Coating of Exterior walls	with Water-proofing Coat	251	m ²	190	47,690	
Mortar Coating of Handrails	Entrance and Stairs	12.4	m ²	190	2,356	
Fitting of balusters	Ceramic Blue	72		150	10,800	
Terrazzo Partitions		1			46,130	
SUB-TOTAL					270,236	
(11) Steel Doors and Windows						
Entrance Door	with Steel Frame	1			25,000	
Corridor Door	"	1			15,000	
Storage Door	"	1			15,000	
Exhibition Room Door	with Aluminium Frame	1			15,000	
Installation Cost		1			5,160	
Glass		1			5,210	
SUB-TOTAL					80,370	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
(12) Wood Doors and Windows						
Windows	with Frame and Net	13		7,000	91,000	
Window	with Frame for Stair Room	1			7,000	
Small Window	with Frame and Net	1			2,500	
Entrance Door	for Exhibition Room with Frame	1			8,000	
Entrance Door	for Training Room with Frame	1			7,000	
Entrance Doors	for All Rooms	11		3,000	33,000	
Movable Partitions	1F, 2F	3		35,000	105,000	
Toilet Doors		4		2,500	10,000	
Installation Cost		1			32,600	
Hardware		1			38,700	
Glass		1			2,892	
SUB-TOTAL					337,692	
(13) Painting Work						
Oil Paint	Steel Parts	1			23,400	
Varnish	Wood Parts	1			25,500	
SUB-TOTAL					48,900	
(14) Interior Work						
Plastic Tile Installation	Floors	274	m ²	400	109,600	
Baseboard Decoration		83	m ²	80	6,640	
Fibreboard Installation	Ceilings	274	m ²	300	82,200	
SUB-TOTAL					198,440	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
(15) Miscellaneous Work						
Towel Hangers		1			500	
Office Desks and Chairs		1			185,185	
Washbasins		1			5,000	
Blackboards	with Screen	1			8,000	
Ventilation Fan	for Storage	1			3,000	
Handrails (Wood)	for Inside Stairs	6	m	1,000	6,000	
Solar Heater		1			55,000	
Veranda Door		1			2,000	
Curtains		4		2,500	10,000	
Beds		2		9,300	18,600	
Locker Unit		1			6,000	
Tables		2		3,500	7,000	
Chairs	Leather	2		2,500	5,000	
SUB-TOTAL					311,205	
<u>TOTAL</u>					2,987,980	
(16) Transportation						
Transportation		1			82,613	
SUB-TOTAL					82,613	
<u>GRAND TOTAL</u>					3,070,593	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
B. Electric Installation						
(1) Electrical Distribution						
Wiring for Lighting		47		340	15,980	
Wiring for Switches		31		105	3,255	
Wiring for Power Outlets		44		215	9,460	
Apparatus		1			70,000	
Panelboard Installation		1			20,000	
Work Cost		1			35,000	
TV Wiring		1			12,000	
Telephone Wiring		1			10,000	
Extension of Main Power Line		1			30,000	
Expendables		1			1,904	
Miscellaneous Materials		1			3,808	
Transportation		1			11,442	
SUB-TOTAL					222,849	

C. Plumbing Installation

Outside Water Pipes	Steel (1")	85	m	315	26,775	
Outside Water Pipes	Steel (3/4")	40	m	215	8,600	
Outside Water Pipes	Steel (1/2")	5	m	165	825	
Inside Water Pipes	Steel (3/4")	25	m	215	5,375	
Inside Water Pipes	Steel (1/2")	10	m	165	1,650	
Joints for Water Pipes		1			11,169	
Gate Valves	with Boxes	5		2,000	10,000	
Expendables and Miscellaneous Materials		1			1,287	
Water Supply Work Cost		1			15,808	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Sewer Pipes	VP 4"	60	m	813	48,780	
Sewer Pipes	VP 3"	50	m	505	25,250	
Sewer Pipes	VP 2"	10	m	235	2,350	
Joints for Sewer Pipes		1			1,527	
Catch Basin	Concrete	9		1,000	9,000	
Catch Basin	Concrete, φ800 - 5 stages	1			5,370	
Purification Tub	with Material and Work Costs	1			25,000	
Expendables and Miscellaneous Materials		1			6,196	
Sewer Work Cost		1			14,360	
Toilet Bowl (Western Style)	Coloured	1	set		2,120	
Toilet Bowl (Thai Style)	Coloured	4	set	500	2,000	
Urinals	Coloured	2	set	715	1,430	
Shower		1	set		4,450	
Washbasins	Coloured	3	set	1,195	3,585	
Toilet Roll Holders		5	set	260	1,300	
Mirrors		4	set	900	3,600	
Soap Holders		1	set		470	
Toilet Racks		3	set	760	2,280	
Liquid Soap Holders		3	set	690	2,070	
Water Taps		4	set	575	2,300	
Sprinklers		4	set	270	1,080	
Expendables and Miscellaneous Materials		1			1,163	
Installation		1			6,610	
Transportation		1			812	
SUB-TOTAL					254,592	
<u>TOTAL</u>					254,592	
<u>GRAND TOTAL</u>					3,548,034	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Breakdown of Hot-Water Supply Room Construction Cost						
Lay-out		1			210	
Excavating		4.6	m ³	36	165	
Crushed Stone Foundation		2.9	m ³	250	725	
Forms		17.3	m ²	300	5,190	
Concrete Placing		5.2	m ³	2,000	10,400	
Wire Net	φ6 150x150	25	m ²	80	2,000	
Timber		1.63	m ³	7,000	11,410	
Carpentry		1			5,000	
Nails and Hardware		1			300	
Corrugated Slates		52	m ²	90	4,680	
Asbestos Sheets		12		195	2,340	
Sink		1			2,500	
Gas Table		1			2,000	
Electric Installation		1			5,000	
Water Supply and Sewage (Inside)		1			3,000	
Transportation		1			1,486	
<u>TOTAL</u>					56,406	

3. Breakdown of Glasshouse Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Lay-out		1			270	
Excavating		10.5	m ³	36	378	
Crushed Stone Foundation		6.9	m ³	250	1,725	
Forms		48	m ²	300	14,400	
Wire Net		54	m ³	80	4,320	
Steel Bars	Including processing	0.15	t	26,000	3,900	
Concrete Placing		13	m ³	2,000	26,000	
Mortar Floor Coating		54	m ³	70	3,780	
Mortar Low Wall Coating		23.4	m ²	100	2,340	
Brick Laying		23.4	m ²	300	7,020	
Work Tables	Concrete	2		10,000	20,000	
Work Table	Iron	1		9,000	9,000	
Steel Frames		1.1	t	13,000	14,300	
Processing and Assembly		1			12,000	
Miscellaneous Materials		1			1,500	
Installation		1			1,400	
Painting		1			7,000	
Aluminium Work		1			130,000	
Glass Work		1			98,952	
Sprinklers	with Plumbing cost	1			14,900	
Transportatin		1			6,800	
<u>TOTAL</u>					379,985	

4. Breakdown of Stump Storage Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Lay-out		1			262	
Excavating		38.4	m ³	36	1,382	
Crushed Stone Foundation		4.3	m ³	250	1,075	
Forms		61.2	m ²	300	18,360	
Concrete Placing		7.2	m ³	2,000	14,400	
Brick Laying		34.2	m ²	300	10,260	
Timber		3.1	m ³	5,000	15,500	
Work Cost		1			17,600	
Nails and Hardware		1			500	
Thatched Roof		106.2	m ²	80	8,496	
Thatched Walls		72.5	m ²	30	2,175	
Wood Doors		4		1,300	5,200	
Transportation		1			2,856	
<u>TOTAL</u>					98,066	

5. Breakdown of Stump Preparation House Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Lay-out		1			200	
Excavating		3.9	m ³	36	140	
Crushed Stone Foundation		5.7	m ³	250	1,425	
Forms		34.8	m ²	300	10,440	
Concrete Placing		8.5	m ³	2,000	17,000	
Steel Bars		0.1	t	26,000	2,600	
Wire Net	φ6 150x150	54	m ²	80	4,320	
Corrugated Slate Roofing		76	m ²	90	6,840	
Timber		4.4	m ³	7,000	38,290	
Plywood	for Gusset Plates	10	m ²	200	2,000	
Work Cost		1			14,000	
Nails and Hardware		1			400	
Work Tables		2		5,000	10,000	
Lighting Installation		1			5,000	
Transportation		1			2,706	
<u>TOTAL</u>					115,361	

6. Breakdown of Seed Storage

Included in 2.

7. Breakdown of Car Port Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Lay-out		1			360	
Excavating		10.5	m ³	36	378	
Crushed Stone Foundation		7.8	m ²	250	1,950	
Forms		35.2	m ²	300	10,560	
Concrete Placing		9.7	m ³	2,000	19,400	
Wire Net	for Earth Floor	72	m ²	80	5,760	
Steel Bars		0.13	t	26,000	3,380	
Timber		3.14	m ³	7,000	21,980	
Plywood	for Gusset Plates	8	m ²	200	1,600	
Corrugated Slate Roofing		101.4	m ²	90	9,126	
Work Cost		1			13,000	
Lighting Installation		1			5,000	
Transportation		1			2,373	
<u>TOTAL</u>					94,867	

8. Breakdown of Information Board Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Information Boards	Aluminium	2		34,000	68,000	at Access Point on NR.1 and Center Entrance
Work Cost		1			753	
Transportation		1			540	
<u>TOTAL</u>					69,293	

9. Breakdown of Tree Name Plate Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Metal Plates	3cm x 5cm	500		55	27,500	
Ceramic Plates	15cm x 35cm	300		155	46,500	
<u>TOTAL</u>					74,000	

10. Breakdown of Public Conveniences Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Lay-out		1			50	
Excavating		16	m ³	36	576	
Crushed Stone Foundation		2.5	m ³	250	625	
Forms		36	m ²	300	10,800	
Concrete Placing		4.6	m ³	2,000	9,200	
Steel Bars		0.15	t	26,000	3,900	
Brick Laying		21	m ²	140	2,940	
Mortar Wall Coating	also for Well Section	63.6	m ²	100	6,360	
Mortal Floor Coating		12.5	m ²	70	875	
Timber		0.5	m ³	7,000	3,500	
Slate Roofing		18.5	m ²	90	1,665	
Carpentry		1			5,000	
Nails and Hardware		1			130	
Wood Doors		2		1,500	3,000	
Toilet Bowls	Thai Style	2		200	400	
Urinals		2		520	1,040	
Handbasins		2		300	600	
Guttering		1			1,000	
Water Tank	1.2mx1.2mx1.2m	1		4,000	4,000	
Water Taps		5		625	3,125	
Water Pipes		40	m	92	3,680	
Joints and Valves for Water Pipes		1			5,000	
Plumbing Cost		1			4,946	
Purifier	Concrete Pipes (φ800)	8		2,300	18,400	
Septic Tank Lid		2		750	1,500	
Sewer Pipes	φ100	30	m	813	24,390	
Manhole Lid	φ800	2		500	1,000	
Joints, etc. for Sewage System		1			325	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Work Cost	Excavating and Plumbing for Purifier	1			14,424	
Crushed Stones		2.0	m ³	230	460	
Concrete		0.3	m ³	2,000	600	
Wire Net	φ6 150 x 150	1	m ²		80	
Transportation		1			3,202	
<u>TOTAL</u>					136,793	

11. Breakdown of Cross Open Culvert Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Excavating		15.24	m ³	80	1,219	
Refilling		10.07	m ³	60	604	
Crushed Stone Foundation		0.55	m ³	250	138	
Forms		19.50	m ²	300	5,850	
Concrete Placing		0.44	m ³	2,000	880	
Steel Bars	φ15	0.13	t	26,000	3,380	
Grating	750 x 1,000	5.00	m	1,900	9,500	
Work Cost		1.00			17,600	
Transportation		1.00			2,706	
<u>TOTAL</u>					41,877	

12. Breakdown of Water Supply Facility Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
(1) Construction of Water Tank						
Lay-out		1			80	
Excavating		43.2	m ³	36	1,555	
Crushed Stone Foundation		6	m ³	250	1,500	
Forms		162	m ²	300	48,600	
Concrete Placing		29.5	m ³	2,000	59,000	
Steel Bars		4.3	t	26,000	111,800	
Scaffolding		1			500	
Exterior Mortar Coating		81	m ²	60	4,860	
Interior Waterproof Mortar Coating		64	m ²	80	5,120	
Automatic Water Supply Unit		1			7,000	
Water Purifier	with Manhole Lid				19,000	
Transportation		1			7,511	
SUB-TOTAL					266,526	
(2) Plumbing of Water Supply Pipes						
Water Pump	φ32, Head: 76, Output 1.1K	1			92,700	
Water Pump Cable		1			7,750	
Water Pump Pipes	φ32	1			48,200	
Boring		1			345,800	
Excavation	with Refilling	300	m ³	80	24,000	
Water Pipes	Steel (4")	100	m	1,435	143,500	
Water Pipes	Steel (3")	125	m	990	123,750	
Water Pipes	VP (2")	910	m	235	213,850	
Valves		1			21,000	
Expendables and Miscellaneous Materials		1			12,044	

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Work Cost		1			42,800	
Transportation		1			36,443	
SUB-TOTAL					1,111,837	
<u>TOTAL</u>					1,378,363	

13. Breakdown of Public Power Supply Extension Work Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Connection to Main Line		1			33,000	
Transformers		2	set	55,400	110,800	
Concrete Poles	H=12m	57		3,850	219,450	
Cross Arms		57		870	49,590	
Insulators		114		660	75,240	
Breakers		2	set	3,500	7,000	
Fixing Wires		57	set	3,700	210,000	
Stubs		57		2,600	148,200	
Electric Wire	185mm	4,440	M	100	444,000	
Electric Wire	35mm	10	M	95	950	
Electric Wire	10mm	10	M	30	300	
Wood Support		57		95	5,415	
Foundation		1			15,000	
Wiring Cost		1			132,000	
Miscellaneous Materials		1			13,268	
Transportation		1			40,203	
<u>TOTAL</u>					1,505,316	

14. Breakdown of Climatic Box Construction Cost

<u>Item</u>	<u>Summary</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>	<u>Remarks</u>
Climatic Box	600 x 600	1			26,000	Box only
<u>TOTAL</u>					26,000	

CHAPTER 8

Appendix

8. Appendix

8.1 Points to Note in Selecting Sub-Contractors

8.1.1 Special Features of Planned Work

- (1) Although the access road work only consists of the construction of a cross open culvert, the work schedule must be carefully controlled in view of the use of the same road to transport construction materials to the main site.
- (2) Waterproofing must be secured in the case of the brick work for the water tanks and pump station.
- (3) Strict supervision of the surveying will be necessary for the laying of the water pipes.
- (4) Extreme care must be taken in regard to the plumbing and joint installation for the water tanks.
- (5) As the construction site is some 70km from Lampang (the source for material and labour supplies), temporary accommodation will be required for the workers. An appropriate site must be secured in advance with the cooperation of the RFD.

8.1.2 Examination of Selection Procedure for Sub-Contractors

The planned work is diverse, ranging from road repair to the construction of water and power supply facilities, research building, car port and glasshouse, etc. The construction order will be placed by the JICA Thai Office and it will be important to select a reliable and experienced sub-contractor of a medium size or larger.

The diversity of the work will necessitate close consultations between the builder (sub-contractor) and the Consultant. Therefore, the successful sub-contractor should be able to provide on-site supervisors

with a knowledge of spoken Japanese.

While the Thai Association of Builders has some 300 member companies, the number of companies which are able to handle the planned work under the Project is only about 20. In general, local builders have the following problems.

- . As builders increasingly specialize in terms of the processes and types of construction work, it is necessary to employ a very able coordinator to integrate the construction work.
- . As builders can easily change their attitude towards the work even after the commencement of the work, it is difficult to maintain the work schedule and work quality. The general attitude of local builders towards work is quite different from that of affiliates of Japanese companies.
- . As initial orders tend to be made on the basis of low nominal costs, after-care or after-services are often lacking. In some cases, the building maintenance capability of the builder is used as a selection criterion.

Japanese affiliates have both good design capabilities and extensive service systems and well satisfy such criteria as reliability, flexibility and serviceability.

In view of the above, several possible sub-contractors were studied.

8.2 Minutes (Duplicate)

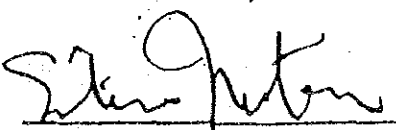
THE MINUTES ON
THE PILOT INFRASTRUCTURE PROJECT UNDER THE RESEARCH AND TRAINING
IN RE-AFFORESTATION PROJECT (PHASE II)

The pilot infrastructure implementation design survey team headed by Mr. EITARO MITOMA, Deputy Director of Forestry Development Division, JICA, visited Thailand from Aug. 10 to Aug. 24, 1989 for the purpose of working out the outline of the said project.

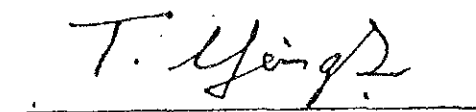
During its stay in Thailand, the Team exchanged views and had a series of discussions with Thai Authorities concerned in respect of the desirable measures to be taken by both Governments for raising the demonstration effect of the Research and Training in Re-afforestation Project (Phase II).

Referred to in the document attached hereto

Bangkok, 23rd August 1989



Eitaro Mitoma
Leader
Implementation Design Survey Team
for the Research and Training
in Re-afforestation Project (Phase II)
in Thailand



Dr. Thanit Yingwanasiri
Director of Silviculture Division
Royal Forest Department

ATTACH

The purpose of the meeting is to discuss and finalize the following matters :

1. Establishment of the project :
2. Necessary facilities
3. Design/Construction schedule
4. Tentative plan

Participants :

1. RFD Side

Mr. Boonchoob	Boontawee
Mr. Vichien	Sumantakul
Dr. Apichart	Kaosa-ard
Mr. Thurdpong	Supaperm

2. JICA Mission

Mr. Eitaro	Mitoma
Mr. Tadami	Imai
Mr. Keiji	Horiuchi

3. JICA expert

Mr. Ryosuke	Kato
Mr. Shōzo	Nakamura
Dr. Masaharu	Sakai
Mr. Toshifumi	Serizawa

1. Establishment of the project

The Forest Research, Demonstration and Extension Center will be established under the RFD/JICA cooperative programme (Phase II), and the center will be jointly operated under the three main organizations : Division of Forest Management, Division of Silviculture and the Lampang Regional Forest Office . The cost of establishment of the center will be allocated by JICA (at approximately 7,000,000 Baht) and the running cost will be allocated by RFD.

2. Necessary Facilities

The infrastructure to be constructed in the compound area consists of :

(1) The main building which includes demonstration room, office, research laboratories, accomodation, lecture room, and etc.

(2) Seed storage house

(3) Glasshouse

(4) Teak stump storage house

(5) Teak stump preparation shed

(6) Water supply system

(7) Electricity supply system from the entrance of the plantation (approximately 1.5 km.)

The RFD will be responsible for connecting the high voltage main line system from the nearest village (Ban Huad) to the entrance of the Mae Huad Teak Plantation (approximately 5 km.). Right now, the center is using generators. A letter to the Secretary of Provincial Electric Authority is issued from the Director-General of RFD asking installing the high voltage powerline to the center and its vicinity.

(8) Improvement of the main road from the entrance to the center (approximately 1.5 km.)

(9) Improvement of an arboretum and natural forests within the compound.

(10) Climatic Station

3. Design Construction Schedule

(1) A detail design of establishment of the infrastructure will be conducted by Mr. Tadami Imai and Mr. Keiji Horiuchi during the period of August 24 to September 23, 1989.

(2) The submission of the final report will be in November, 1989.

(3) The construction period is expected for four months, from February 1990 to May 1990.

4. Tentative Plan

Identification, function and plan of the project (shown in appendix) should be completed as soon as possible.

APPENDIX

Identification/Function and Plan of the Project

a) Identification

b) Function/Plan

	Research	Demonstration	Extention (Training)
Forest Management Department (DF Sub-div.)			
Silviculture Dept. (TIC, Silvicultural Research Sub-div.)			
Lampang Regional Forest Office			

8.3 Replies to Questions Made in Meeting on August 21st

8.3.1 Study Plan by Demonstration Forest Sub-Division

Research Plan

- (1) Growth and yield assessment on man-made and natural forests - survey on the impact of forest fire prevention measures on regeneration and growth in dry dipterocarp forests.
- (2) Growth and yield assessment on man-made and natural forests - survey on the impact of tending on regeneration and growth in mixed deciduous forests after selective cutting.
- (3) Growth and yield assessment on man-made and natural forests - experimental thinning of teak plantation.

* The research results, developed methodologies and experimental plot will be demonstrated and disseminated to other forestry officials and students of the Faculty of Forestry of Kasetsart University.

- (4) Forestry inventory using the remote sensing technique and modern instruments (prism and relascope) associated with various sampling design methods will be disseminated to others through training courses, journals and reports, etc.

(5) Forest Management Modelling

A comprehensive forest management model with an integrated Geographic Information System (GIS) will be developed by reviewing, evaluating, testing and modifying the existing forest management models.

(6) Forest Mensuration and Forest Management Operation

Timber marketing and forestry advisory services will be provided and management techniques will be demonstrated.

- local transportation (elephants and others)
- modern techniques (skyline logging)

8.3.2 Teak Improvement Center

(1) Research Program

- (a) plant propagation, i.e. cutting, grafting and budding
- (b) seed collection and storage methods
- (c) seed germination and nursery techniques
- (d) plantation development techniques for forest tree species

(2) Demonstration

Recently acquired knowledge and developed techniques and/or the following existing experiments of the TIC will be demonstrated to assist the activities of the FRDEC.

- (a) breeding program, i.e. plus tree selection, clone bank, clone seed orchards, seed production areas, clone tests
- (b) provenance tests
- (c) teak nursery techniques, i.e. seedling and stump preparation, stump storage
- (d) teak plantation establishment techniques

(3) Diffusion

The TIC will assist the FRDEC in organizing training courses and study tours, etc., particularly in the following fields.

- (a) forest tree improvement and seed procurement
- (b) nursery operation
- (c) plantation development program

8.4 Main Species in Arboretum

	<u>Local Namae</u>	<u>Academic Name</u>
1	Hak Khee Muu	Melanorrhoea usitata
2	Liang Eai	Kydia calyeina
3	Sak	Tectona grandis
4	Rok foa	Terminalia alata
5	Daeng	Xylia kerrei
6	Sakae-saeng	Cananga latifolia
7	Ploug	Dipterocarpus tuberculatus
8	Som-kob	Hymenodictyon excelsum
9	Teng	Shorea obtusa
10	Rung	Shorea siamensis
11	Ka-sa-long	Millingtonia hortensis
12	Koa	Sehleichera oleose
13	Ma-kok-pha	Spondias pinnata
14	Ma-kha-mong	Afgekia xyloerpa
15	Ma-had	Artocarpus lakoocha
16	Pu-chao	Terminalia tripteroides
17	Ta-baek lued	Terminalia mueronata
18	Krang	Ficus altissima
19	Phe-ka	Oroxylum indicum
20	Pheesuca	Alangium chinense
21	Krorum khao	Neonauclea calyeima
22	Kraphee khao khwaai	Dalbergia cultrata
23	Ket khao khwaai	Dalbergia fusca
24	Tabtow	Diospyros ehretioides
25	Mee men	Litsea glutinosa
26	Kea-lack-pha	Cassia siamea
27	Salaeng-fai	Strychnos nux-vomica
28	Cook	Lannea coromandelica
29	Taeo	Cratoxylon formoxem
30	Khee-aai	Walsura robusta
31	Kang hua moo	Miliusa relutina
32	Po-dao	Sterculia fulgens
33	Kraphee khrua	Dalbergia foliacea
34	Tabaek plueak baang	Lagerstroemia doperreana

	<u>Local Name</u>	<u>Academic Name</u>
35	Krapheechan	Millettia brandisiana
36	Matuum	Aegle marmelos
37	Ma-dook	Siphonodon celastrineus
38	Kae hang khang	Fernandoa adenophylla
39	Ko daeng	Guercus ringiana
40	Plaoyai	Croton oblongifolius
41	Ketdam	Dalbergia assamiea
42	Khae foi	Stereospermum cylindricum
43	Pa-yab	Colona flagroearpa
44	Mued khon	Helicia excelsa
45	Teen nok	Vitex pinnata
46	Ma mao dong	Antidesma bunius
47	San hing	Dillenia parviflora
48	Ngiu paa	Bombax aneeps
49	Ha	Syzygium zemmermanh
50	Tiew	Cratoxylum fonnosum
51	Ho saphaai khwaoi	Sphenodesme pentandra
52	Lieng-man	Borria ammonilla
53	Soh-maeo	Premna flaveseens
54	Liang faai	Kydia calycina
55	Ngiu pha	Bombax valetionii
56	Yomhin	Chukrasia velutina
57	Ma kuem	Canarium kerrie
58	Ket daeng	Dalbergia oliveri
59	Pradu	Pterocarpus macrocarpus
60	Samo thai	Terminalia chebula
61	Pha sian	Vitex canecans
62	Inthanin bok	Lagerstroemia macrocarpa
63	Saw	Gmelina arborea
64	Teng-nam	Bridelia retusa
65	Yo-paa	Morinda coreia
66	Hieng	Dipterocarpus obtusifolius
67	Ta-kham	Garuga pinnata
68	Kra-bok	Irvingia malayana
69	Siew-paa	Bauhinia variegata
70	Ma-khet	Gelsemium elegans

	<u>Local Name</u>	<u>Academic Name</u>
71	Thum-kwang	Mitragyna brunonis
72	Kea-leck american	Cassia floribunda
73	Sai-yoi	Ficus benamina
74	Ma-kham-pom	Phyllanthus emblica
75	Kra-daon	Careya sphacriea
76	Ma-kea	Diospyros mollis
77	Ma-kwon	Flacourtia indica
78	Pho	Ficus religiosa

8.5 Draft Work Contract

This contract form (original in Thai) drafted by the Lampang Regional Forest Office of the RFD is given below as a work contract example.

No. _____

CONTRACT

This contract is made at _____
sub-district, _____ district and _____
province _____ on ___ day _____ month _____ year, between _____
_____ hereinafter
referred to "employer" and _____
_____ of the address: _____, _____ Road, _____
_____ sub-district, _____ district, _____ province
hereinafter referred to "employee" with following conditions:

Article 1. Employer agrees with employee to _____

according to the design and the details attached hereto, the total cost
is baht _____ (_____).

Article 2. Employee admits the operation following the article 1 by
promising to provide good materials and equipment including qualified
workmen till the work finished.

Article 3. Date of signature. Employee deposits baht _____ as security to employer. The security is valid until the date the work finished within limited period agreed upon in the contract. If the duration of work is extended due to any causes, employee must deposit the security to employer for the period of contract.

The security deposited by employee according to the first paragraph, will be returned when employee is out of the bind according to the first paragraph of article 6.

Article 4. Employer and employee agree with payment of wages as follows.

The first time, baht _____ (_____)
when employee _____

_____ It
will be finished until ____ day ____ month ____ year.

The second time, baht _____ (_____)
when employee _____

_____ It
will be finished until ____ day ____ month ____ year, and employee has already done according to the article 22.

When employee delivers job correctly and completely following each time of the contract, employer or employer's officer will examine the job as evidence.

Article 5. In the case of events of beyond control, employer's offense, or the event at employee must not be liable according to law, which will cause work delay, employee must inform the mentioned event together with document to employer within 15 days, as from the end of the event, so that the working period will be extended.

If employee does not perform according to the first paragraph, it is regarded as employee leave the rights to ask for extention of work period without any conditions. Unless the offense caused by the employer due to evidence expressly or employer has known for the beginning.

The extension of working period according to the first paragraph depends on employer's consideration.

Article 6. The employee promises to begin the work at the appointed place on ___ day ___ month ___ year and the work will be finished completely until ___ day ___ month ___ year. If the employee does not begin work within the agreed date or the employer believes that the employee can not complete work in the limited period agreed upon or the employee breaks the contract, the employer has the rights to cancel the contract and can hire other contractor to do this work, too.

In the event the employer does not cancel the contract following the first paragraph, it does not mean that the employee is out of responsibility.

Article 7. When the work has been finished and the employee (new or old) delivered the work to employer in case of employee did not follow the contract and employer canceled the contract following article 5, if the damages occur within _____ year(s) _____ months as from the delivered date and the damages are the offense of employee, i.e. incomplete work within limited period, free charged material, free-charged wages or free-charged other expenses; if employee refuses to repair the damage within _____ days as from the date of notification, or the repair is not finished within limited period, employer has the rights to hire other contractor instead of the employee.

In case of the damages happen after the above limited period, employee must still have responsibility for the damages according to Civil and Commercial Code.

In the event of employer hiring other contractor instead of the employee following article 5 and the first paragraph of article 6, employee admits payment of wages, materials, and other expenses (if having) according to the amount that employer pays, and employee is still responsible for the damages following No.3 as if the work that new employee does is his.

Article 8. Due to the agreement of both parties according to this contract, employee admits that factory, buildings, and materials taken to the construction area for work following article 1 are the property of

Article 12. The employee must control this work all time when the work is not complete, or he can assign others to control instead. In this case, the employee must inform the name of the assigned person or persons to the employee by letter. The controller and representatives of the employee, has to take responsibilities instead; any command that informs the representatives is regarded as it informs the employee directly.

Article 13. In the case the employee appoints the representatives as the controller following article 11 when the employer asks for the new representatives, the employee accepts and changes immediately without any claim for charges or the cause of extension of working period. And the employee must inform name of the new representatives by letter everytime.

Article 14. The employee must take responsibility for accidents, dangers, or damages that result from the employee's working, and must take responsibility for the damages to the employer in the construction area, which occurs from workmen, technicians, and other people under employee's control.

Article 15. The employee must pay wages to workers according to law and time that both parties agree together.

If the employee does not perform following the first paragraph, the employee allow the employer to pay wages to workers with money that the employer will pay the employee, and it is regarded as that amount of payment has been paid to the employee already.

If the employee does not pay the workers' wages following the second paragraph, besides allowing the employer pay the workers' with his wage, it is considered that the employee breaks the contract and the employer can cancel all the contract.

Article 16. If the employer appoints the committee or supervisor to examine the work permanently at the construction site at the time that the employee works, the committee or supervisor has the rights to check all the time. The employee must cooperate.

Even when there are the committee or supervisor examining the work, it does not mean that the employee will be out of the responsibilities.

Article 17. Before the work, if there are the misplace of the design or details attached hereto, the employee promises to do following the judgement of the committee or supervisor, and if this judgement is match correctly with any items in the design, the employee must admit it absolutely. If any item is not stated in the details, but it is necessary for completing the work correctly, the employee promises to manage it without any additional charge. Anyway the misplace item or unappeared item must not be the important matter.

Article 18. In the case that the employer appoints the committee or supervisor, the employee admits the committee or supervisor to have the authority to check and control according to the contract, the design and details. And the committee or supervisor has the power to change, correct, add, or cancel this work to follow the contract, the design and details. And if the employee refuses, the committee or supervisor can stop this work temporarily and this delay can not count for the extension of the working period.

Article 19. The employee has the right to correct, add or reduce the work in design or details according to the contract without cancelling the contract. The increase or decrease must be calculated and make a new agreement on the new price, and if the increase or decrease of price or the extension of working period are existed, it must be done at that time.

Article 20. If the employee delivers the work later than the agreed date, but the employer do not cancel the contract, the employee admits the employer to do as follows:

(1) Fine the employee per day at the cost of baht _____ (_____) as from the date that is agreed upon in the contract for the work to finish to the date that work is completed.

(2) Call for the damage fee from the delay of employee's work (if there is any)

(3) Call for the expense in controlling the work since the employer has to hire the contractor as from the date that is passed the limited date in the contract to the date that the employee delivers the work at the cost of baht _____ per day (_____).

During the insurance period if the employer considers that the employee can not follow the contract, the employer has the right to cancel the contract and use his right in article 2, besides the fine, until the cancellation date.

Article 21. If the employer cancels the contract, the employee admits the employer the following:

- (1) Confiscate the security mentioned in article 3.
- (2) Admit the employer to call for the increase of wage because of hiring others to work until the works are completed.
- (3) Call for the expense in controlling the work because of hiring the controllers until the works are completed.
- (4) Call for any damage fee existed from the employee.

Article 22. When the employer cancels the contract, all works that the employee has done and the materials that brought into the construction area, especially for the works, the employee transfers the right of ownership to the employer and the employee can not claim for any charges of any payments. And the employee admits the employer to have the right to stop paying the unpaid wage for the ready work which is to insure the debt payment.

In the case of hiring others to do the incompleated work, and the remaining wage is not enough for this hiring, the employee admits the employer to deduct this amount from the unpaid wage as in the first paragraph and response for the missing amount.

If the wage according to the contract, which is deducted for the insurance fee and damage fee, is left, it will be returned to the employee all.

Article 23. If the employee or the workers of employee build any factory or any accommodations around the construction area or make the hotel, the employee promises to keep the area clean during the work period. And when the works are completed, they must remove any build-ings away, make the ground smooth and bring the splinter and lift over materials out of the construction area, including cleaning the construction area in a usable situation.

Article 24. In the event of any dispute arising about the contents of this contract or the performance of its terms, both parties agree to make the best attempt with sincerity and goodwill to negotiate and amicably settle such dispute(s).

This contract is written in two copies with the same contents. After understanding the details throughly, both parties sign in front of the witnesses and one copy will be keep by each party.

(Signature) _____ Employer
(_____)

(Signature) _____ Employee
(_____)

(Signature) _____ Witness
(_____)

(Signature) _____ Witness
(_____)

The following is another example of contract form which is used by Japan International Cooperation Agency (JICA).

CONTRACT

For Construction of _____

This contract is executed on the ____ day of _____ at the JICA Bangkok Office between _____

Japan International Cooperation Agency, Thailand Office as authorized representative of the JICA Thailand Office, hereinafter called "the JICA", and Mr. _____ of _____

TEL. _____ Represented by _____ Nationality _____
_____ Title _____ hereinafter called "the Contractor".

Both parties mutually agree under the terms of this Contract as follows;

ARTICLE 1 PURPOSE OF THE CONTRACT AND CONTRACT COST

The JICA agrees to employ the Contractor and the Contractor agrees to perform the Works for the construction of Pilot Infrastructure on Research and Training in Re-afforestation Project (phase 2) Located at Demonstration Forest in Lampang District for the total amount of Baht. _____
(_____)
hereinafter called "contract Cost".

The following documents shall form integral part of this Contract;-

- Terms and conditions of this contract
- Specifications
- Bill of Quantities
- Drawings

Article 2 PERFORMANCE BOND

As a security for the faithful performance of the Works under this Contract, the Contractor has on the execution of this Contract deposited a performance bond with the JICA _____ Baht (_____) in a Bank Guarantee issued by the _____ bearing the number _____ and date _____ which represents five (5) percent of the Contract Price. The name of the issuing bank and the form of the bank guarantee are to be approved by the JICA.

The JICA will return the performance Bond in cash or the Bank Guarantee to the Contractor as the case may be at the end of the twelve (12) months after final acceptance of the Works by the JICA as stipulated in Article 15 of this Contract, provided that the completed Works shall not show any defect or damage caused through the fault of the Contractor, or through the fault of any new Contractor in the case of termination of Contract by the JICA under Article 4.

Should the Contractor be in default, the JICA shall have the right to demand payment from all or any part of the performance Bond. In addition, the Contractor shall remain liable for the full loss sustained by the JICA.

Article 3 PAYMENT

The JICA agrees to effect payments for the Works to the Contractor in the following manner;-

a. Advance Payment to be effected upon the bringing of equipment and materials required for the Works and properly stored at the job site by the Contractor and of value estimated by the supervisor. Baht _____ (_____) which corresponds to Thirty (30) percent of the Contract Price shall be paid upon signing of this Contract.

b. Interim Payment to be effected according to the progress of the Works satisfactorily executed by the Contractor and accepted by the supervisor. Baht _____ (_____) which corresponds to Thirty (30) percent of the Contract Price shall be requested for payment at the middle of the construction term. In case that value of the executed construction works estimated by the supervisor is less than fifty (50) percent of the Contract Price, Interim payment shall be deducted by the full amount of advance payment, balance of which correspond to value of the executed construction works.

c. Final Payment, to be effected upon the satisfactory completion of the Works by the Contractor and accepted by the supervisor.

The remainder of Baht _____ (_____) which corresponds to Forty (40) percent of the Contract Price, or the remaining amount of Contract Price shall be paid after the Final Certificate by the JICA for payment to the Contractor.

Payment under (b) and (c) shall be effected within ten (10) days after the respective acceptance of the Works by the supervisor.

Taxes payable by the Contractor, if any, shall be deducted at source by the JICA on each payment.

It is expressly understood that payments by the JICA do not mean acceptance responsibilities under this Contract.

Article 4 COMPLETION TIME

The Contractor agrees to commence the Works at the site within ten (10) days from the date of signing of this Contract (commencement date) and the Contractor agrees to satisfactorily complete the Works within _____ days (completion time) after the date hereof which will become due on _____ (completion date)

If the Contractor fails to commence the Works by the above commencement date, or should in the course of the construction any event occur which may reasonably cause the JICA to believe that the Contractor will not be able to complete the Works on the completion date, or should the Contractor fail to meet any of the Contract requirements, the JICA shall have the right to terminate this Contract by giving written notice to the Contractor.

However, in case that the Contractor fails to complete the Works by the completion date, or to meet any of the Contract requirements, if the supervisor thinks that the Contractor has the ability for completion of the Works within reasonably extended period, the Contractor may be permitted by the JICA to continue the Works beyond the completion date.

Article 5 PENALTY

In case that the Contractor is in default as mentioned in Article 4, the Contractor agrees to be responsible to the JICA as follows:-

5.1 In case of the termination by the default of commencement for the Works, the Contractor shall pay a penalty of Twenty Thousand Bath (20,000.00 Bath) per day counting from the commencement date until the new Contract is completely executed with a new Contractor for this Works.

The period of which is included the time spent for finding the new Contractor and executing the new Contract etc.

5.2 In case the JICA thinks that the Contractor will not be able to complete the Works within the completion time and thereby terminates this Contract, the Contractor shall pay a penalty of Twenty Thousand Baht (20,000.00 Baht) per day counting the number of days in the same manner as prescribed in 5.1 above. However, the JICA may reduce such number of days according to the ratio between the completed Works and the total Works as may be decided by the supervisor.

5.3 In case the Contractor fails to complete the Works by the completion date or to meet any Contract requirement, the Contractor shall pay a penalty of Twenty Thousand Baht (20,000.00 Baht) per day counting from the date following the completion date until the Works satisfactorily completed and accepted by the supervisor.

Article 6 COMPENSATION

If the JICA sustains any losses as direct or indirect damages caused by the Contractor's failure, the Contractor shall compensate the JICA for such losses. The parties agree that time is essential for the completion of the Works.

Article 7 THE JICA'S RIGHT FOR DEFAULT

The JICA has the sole and absolute right to decide whether to terminate the Contract, to impose only the penalty on the Contractor or to claim the compensation for the damage as stated in Article 5 or Article 6. The money due to the JICA exercising its right under this article shall be retained and deducted from any money due to the Contractor but yet unpaid, including from the performance bond. If the total amount of the loss is larger than the money above-mentioned, the Contractor agrees that the JICA has the right to retain the construction equipment; materials and supplies etc. and demand payment of the balance from such equipment etc. or proceeds of sale thereof.

Article 8 CONTRACTOR'S RESPONSIBILITY ON TERMINATION OF THIS CONTRACT

After the Contract has been terminated in accordance with the foregoing Article 4, the JICA shall have the right to employ another Contractor (hereinafter called the "New Contractor") to carry on the remaining parts of the Works, and the payment for the Contractor that fall to complete the work shall be made out of the necessary Contract Price for the remaining Works. Should the remaining amount after payment of the advance and interim payment from the Contract Price, be

insufficient to effect payment to the new Contractor, the difference between such remaining amount and actual cost estimated by the JICA for the satisfactory completion Works carried out by the JICA, and the Contractor shall pay such difference to the JICA within ten (10) days from the date of request by the JICA, failing which interest at the rate of eighteen (18) percent per annum shall be charged thereon.

Article 9 SUPERVISOR

The supervisor, authorized to act on behalf of the JICA will be appointed by the JICA and the supervisor is entitled to do all things that the JICA may do so. The supervisor shall control and supervise the Works all the times whether it is in the preparation or implementation of the Works and the Contractor shall promptly furnish all necessary facilities for proper inspections of the Works in accordance with the supervisor's request. At any moment the supervisor can request the Contractor to stop the Works, if necessary and the Contractor shall have no claim on the JICA for extension of the completion time due to such suspension of the Works under this Article.

The Inspection will not be deemed as the acceptance of the Works, and the Contractor shall not be relieved from his responsibility to meet the Contract requirements by the fact that the Supervisor exercise their duties. Should it be found that the Works have not been satisfactorily performed in the faithful manner, the Contractor shall correct any part of the Works indicated by the supervisor within the period specified by the supervisor.

Article 10 PROHIBITION FOR THE EQUIPMENT REMOVAL

Should the Contractor fail to complete the Works during the completion time or the supervisor thinks that the contractor will not be able to satisfactorily complete the Works, any equipment and materials brought to the site for use on the Works shall not be removed without the prior approval of the supervisor in writing.

Article 11 RECTIFICATION OF THE DEFECTIVE CONSTRUCTION

For a further period of One (1) year after satisfactory completion and final acceptance of the Works by the JICA, whether completed by the Contractor or by the new Contractor in case of termination of Contract under Article 4, any damage to the Works which is caused by the Contractor's fault, either because of defective workmanship or the use of inferior materials or any other cause, shall be made good as necessary by the Contractor to the satisfaction of the JICA at no extra cost.

In case of the termination of the Contract, the JICA may decide which part of the Works should come under the Contractor's responsibility, and requests the Contractor to make good of the damaged Works. Should the Contractor fail to do so within period specified after receipt of written request to do so from the JICA, the JICA shall have the right to employ another Contractor to carry out such work and the Contractor agrees to bear all expenses incurred.

Article 12 DISCREPANCIES AMONG THE CONTRACT DOCUMENTS

Of, prior to or during the course of the Works, any discrepancies found in the drawing and/or the Specifications etc. attached to this Contract, the Contractor shall follow the ruling given by the supervisor at no additional cost to the JICA.

Article 13 CONSTRUCTION METHOD AND TEMPORARY WORKS

The construction method including implementation schedule and plan of the temporary works such as installation of temporary facilities, offices, ware house, construction roads, electric wiring, etc. shall be submitted by the Contractor and approved by the supervisor at least ten (10) days in advance of the commencement of the Works.

Should the cost the above temporary works be estimated in the unit cost of each work items of Bill of Quantities in this Contract, and the Contractor is not entitled to claim any amount of charges for the temporary works.

Article 14 MODIFICATION OF PLAN

If the Supervisor finds it necessary to make modification of construction design, quantities and/or materials and so forth during the course of construction, the JICA has the right to order the modification of the Works to the Contractor, and such order shall be made in writing from the supervisor to the Contractor.

The JICA agrees to adjust upwards or downwards the necessary expense for such modification to the Contractor, which will be estimated by unit price in the bill of quantities of this Contract in case of modification of quantities of construction works. In the case of additional works which are not quoted by unit price in the bill of quantities of this Contract, the supervisor will make estimation thereof and the JICA will pay to the Contractor for such additional works accordingly. But if the Contractor does not agree to such estimation, the Contractor is then entitled to negotiate with the JICA. Also the extension of the completion time due to the modification shall be given by the JICA who

shall have the sole right to decide the number of days of such extension.

Article 15 ACCEPTANCE OF THE WORKS

When the entire Works have been completed, the Contractor shall submit the invoice in written form indicating the Work actually completed to the supervisor. If there are compliance with drawings or Technical Specifications, the JICA shall accept the Works as the final acceptance of satisfactory completion Works within ten (10) days after the receipt of the written form and it shall be deemed that the final acceptance has been made on such date of the receipt of the written form.

On the other hand, should non-compliance with drawings or General Specifications or defects be found in the Works executed by the Contractor, the supervisor will have the right not to accept the Works and to order the rectification of the Works. If the required period for the rectification of the Works is beyond the completion date, the Contractor shall not be relieved from its responsibility to pay the penalty as stipulated under clause 5.3, and after the completion of rectification of the Works, then the final acceptance will be made in the same manner as described in the first paragraph of this Article.

During the course of construction, whether in the completion time or of extended time specified in the last paragraph of Article 4, the JICA has the right to accept a part of the Works already completed in the written form which shall be considered as a part of final acceptance. However, both parties shall negotiate with each other for the maintenance and usage of the accepted part of the Works the contractor is not entitled to request the extension of the completion time due to any interruption caused by the use of such accepted Works by the JICA, the supervisor or the officers of Thai Government authorities, or any delay in repairing such accepted Works.

Article 16 CONSTRUCTION ENGINEER

The Contractor shall appoint a construction engineer at his own expense for the supervisor of the Works performance, who shall be authorized to act on behalf of the Contractor, and the instructions given to him shall be deemed as given to the Contractor. Such construction engineer shall be a good speaker of English and accepted by the JICA, who shall stay at the job site all the time and shall not leave without obtaining the prior approval from the supervisor. If the Contractor replaces the construction engineer, the Contractor shall obtain the prior approval from the supervisor in writing.

Article 17 REPLACEMENT OF LABOUR, ENGINEER AND FOREMAN

The supervisor may request the Contractor to remove any of the Contractor's labours, foremen or engineers if it appears to the supervisor that such labour, foreman or engineer is incompetent for his job or is not suitable or is not capable of handling his workmen or staff, and the Contractor shall promptly replace any such labour, foreman or engineer. No extra cost or claim for extension of time will be allowed because of such replacement.

Article 18 SUB-CONTRACTOR

The Contractor shall not sub-contract or assign any portion of the Works under this Contract without obtaining the prior approval of the JICA who has the sole right to decide which portion of the Works may be sub-contracted or assigned to the Sub-Contractor. However, the Contractor shall be fully responsible for the Works done by the sub-contractor.

Article 19 NOTICE

All Notices required by this Contract shall be effective only at the time of receipt thereof, and only when received by the parties concerned at following address;-

The JICA Thailand Office
 1674/1 New Petchburi Road
 Bangkok

The Contractor _____

All Notices required by the terms of this Contract shall be made in writing in English Language, and delivered by registered mail or hand delivery.

Article 20 DISPUTE

In the event of any dispute arising from the interpretation and performance of the terms of this contract, both parties agree to make the best attempt with sincerity and in good faith to negotiate and amicably settle such dispute. When failed to do so, the parties agree to refer such dispute to arbitration under Thai Commercial Arbitration Rules and Regulation, Bangkok, by 2 arbitrators, each of which is to be appointed by each party. If either party fails to appoint its arbitration within seven (7) days or should be arbitrators fail, within fifteen (15) days after their appointment, to agree upon the decision of the dispute or on decision is reached on the appointment of an umpire, then the dispute shall be brought before the court in Thailand for decision under the laws and procedures of the Kingdom of Thailand.

This Contract is executed in duplicate of the same tenor, one of the original copy to be kept by JICA and the other original copy to be kept by the Contractor. Both the JICA and the Contractor have set their signatures and affixed the seals thereto in the presence of the witnesses.

8.6 Labour and Material Unit Price List

Item	Unit Price		Note
Chief Supervisor	200	B/DAY	8 Hour/Day
Common Worker	90	"	
Light Worker	80	"	
Mannipulater	600	"	
Driver	100	"	
Scaffolding Man	100	"	
Chipping Man	150	"	
Carpenter	150	"	
Assistant Carpenter	100	"	
Carpenter	150	"	
Reinforcing Bar Mechanic	120	"	
Brick layer	120	"	
Assistant Mason	100	"	
Mason	150	"	
Tile layer	200	"	
Roofing Worker	100	"	
Tinsmith	150	"	

Item	Unit Price		Note
Assistant Plasterer	100	"	
Plasterer	150	"	
Joiner (Wood)	120	"	
Joiner (Metal)	200	"	
Glass Worker	200	"	
Assistant Painter	100	"	
Painter	150	"	
Assistant Electrician	150	"	
Electrician	250	"	
Assistant Plumber	150	"	
Plumber	250	"	
Well Borer	600	"	
Cement (50kg - 1 Bag)	70	B/BAG	for Mortar
Cement (50kg - 1 Bag)	80	B/BAG	for Concrete
Sand	330	B/m ³	for Concrete
Sand	180	B/m ³	for Earth Work
Gravel 3/4	230	B/m ³	
Steel ϕ 6	14.7	B/kg	
ϕ 9	14.7	B/kg	

Item	Unit Price	Note
SD 30 D12	13.3 B/kg	
SD 30 D16	13.0 B/kg	
COC, Block 190 x 390 x 70	2.7 B/PCS	
COC, Block 190 x 390 x 90	4.7 B/PCS	
Corrugated Asbestos Sheet 1,200m x 500 x 5T	38 B/PCS	
Asbestos Sheet Plain 1,200m x 2,400 x 6T	195 B/PCS	
Monier (Roof)	110 B/SQM	
Hard Wood (Teng) 100m x 100 x 5M	580 B/PCS	
2" x 6" x 4M (51m x 152m x 4M)	65.5 B/PCS	
2" x 8" x 4M (51m x 203m x 4M)	88 B/PCS	
Soft Wood 100m x 100 x 5M	450 B/PCS	
Flooring Block	300 B/m ²	
Thairite Chamber Pot White	200 B/PCS	
Foreign Style White	1,750 B/PCS	
Stall Urinal	520 B/PCS	
Pipe PCB 1"	92 B/M	
2"	235 B/M	

Item	Unit Price		Note
Rental Fee			
Bulldozer D=30	3,500	B/DAY	
D=50	4,500	B/DAY	
Back Hoe 0,5	4,500	B/DAY	
Truck 10 Wheels	1,800	B/DAY	
Truck 6 Wheels	1,000	B/DAY	
From Lampang to the Poject Site 100km about			
100kg	50	B/kg	
500kg	10	B/kg	
1,000kg	5	B/kg	
4,000kg	1.25	B/kg	

8.7 Water Analysis Report for Project Site

Messrs. TEM ENGINEERING CO., LTD.
(JICA PROJECT)

Date September 18, 1989.

No. PD-09013-B

WATER ANALYSIS REPORT

Item	Sample Name	Well front Dormitory			
Sampling Date		5/9/89			
Appearance		Yellow to Brown			
Turbidity		23.5			
Color		*Lack of sample			
pH		6.85			
Electric Conductivity (micro S/cm)		650			
Total Solid (ppm. as NaCl)					
Total Hardness (ppm. as CaCO ₃)		332			
Calcium Hardness (ppm. as CaCO ₃)					
Total Iron (ppm. as Fe)		5.8			
M-Alkalinity (ppm. as CaCO ₃)		213.0			
P-Alkalinity (ppm. as CaCO ₃)		None			
Chloride Ion (ppm. as Cl)		83.6			
Sulfate Ion (ppm. as SO ₄ ²⁻)		*Lack of sample			
Silica (ppm. as SiO ₂)		*Lack of sample			
Phosphate Ion (ppm. as PO ₄ ³⁻)					
Chemical Oxygen Demand					
Manganese (ppm. as Mn)					
Suspension solid (ppm)		11.3			
Remark	700 cc sample volume is not enough to analysis to all items. If need more items, Please send at least 2,000 cc. Thank you.				

Manager _____

Representative _____

JICA