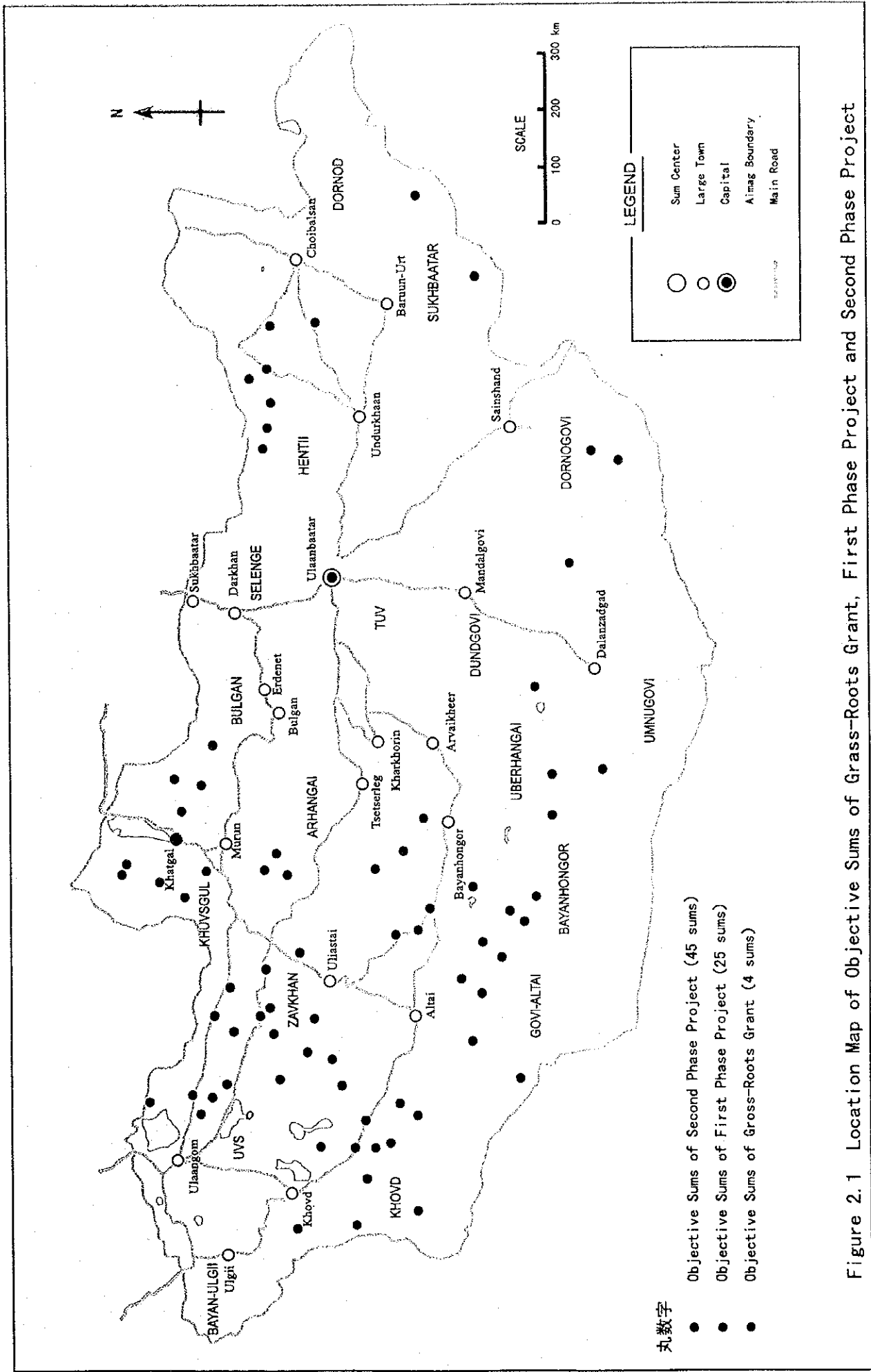


## **FIGURES**



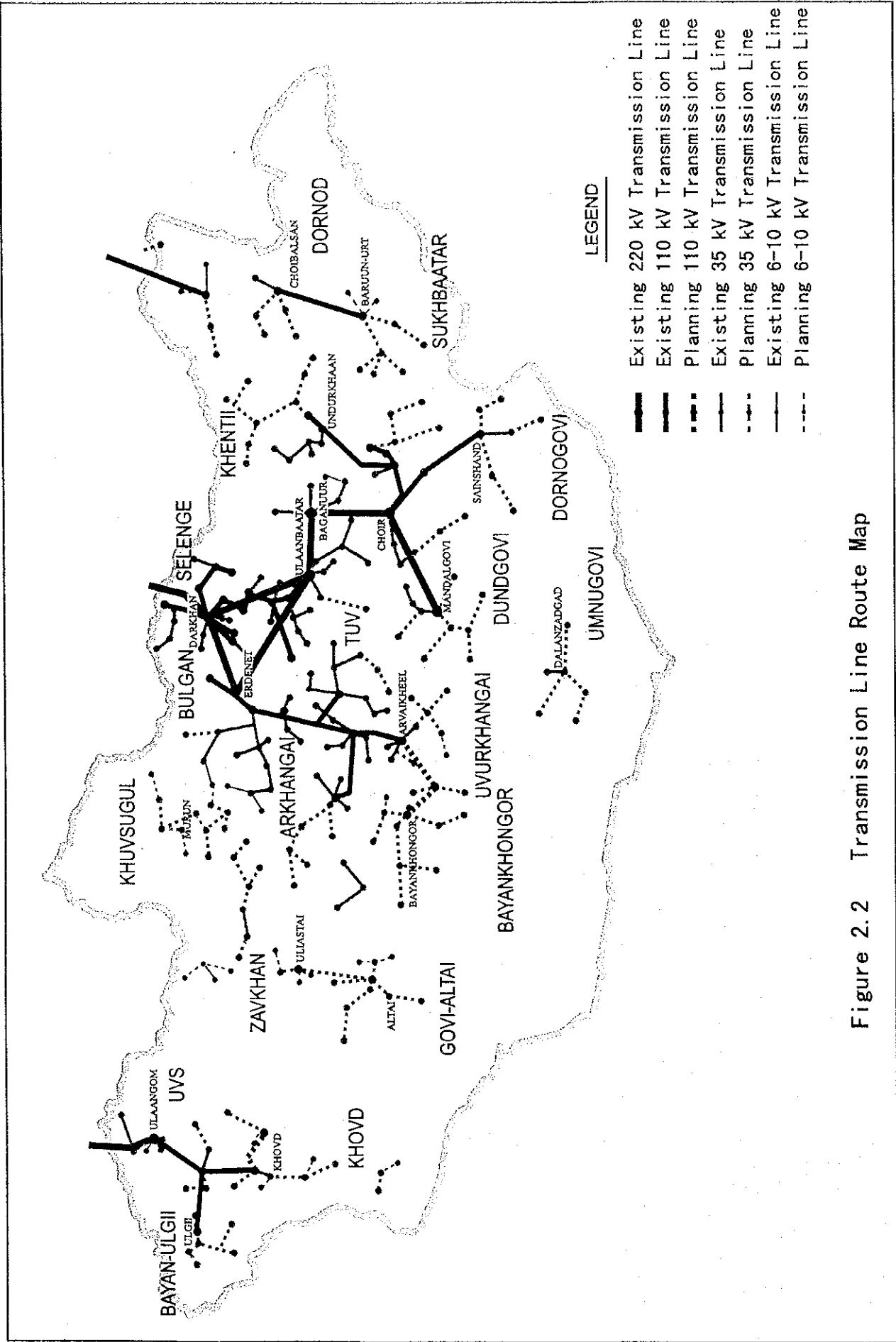


Figure 2.2 Transmission Line Route Map

Figure 2.3 Calculation Example of Power Demand Forecast (Khangai)

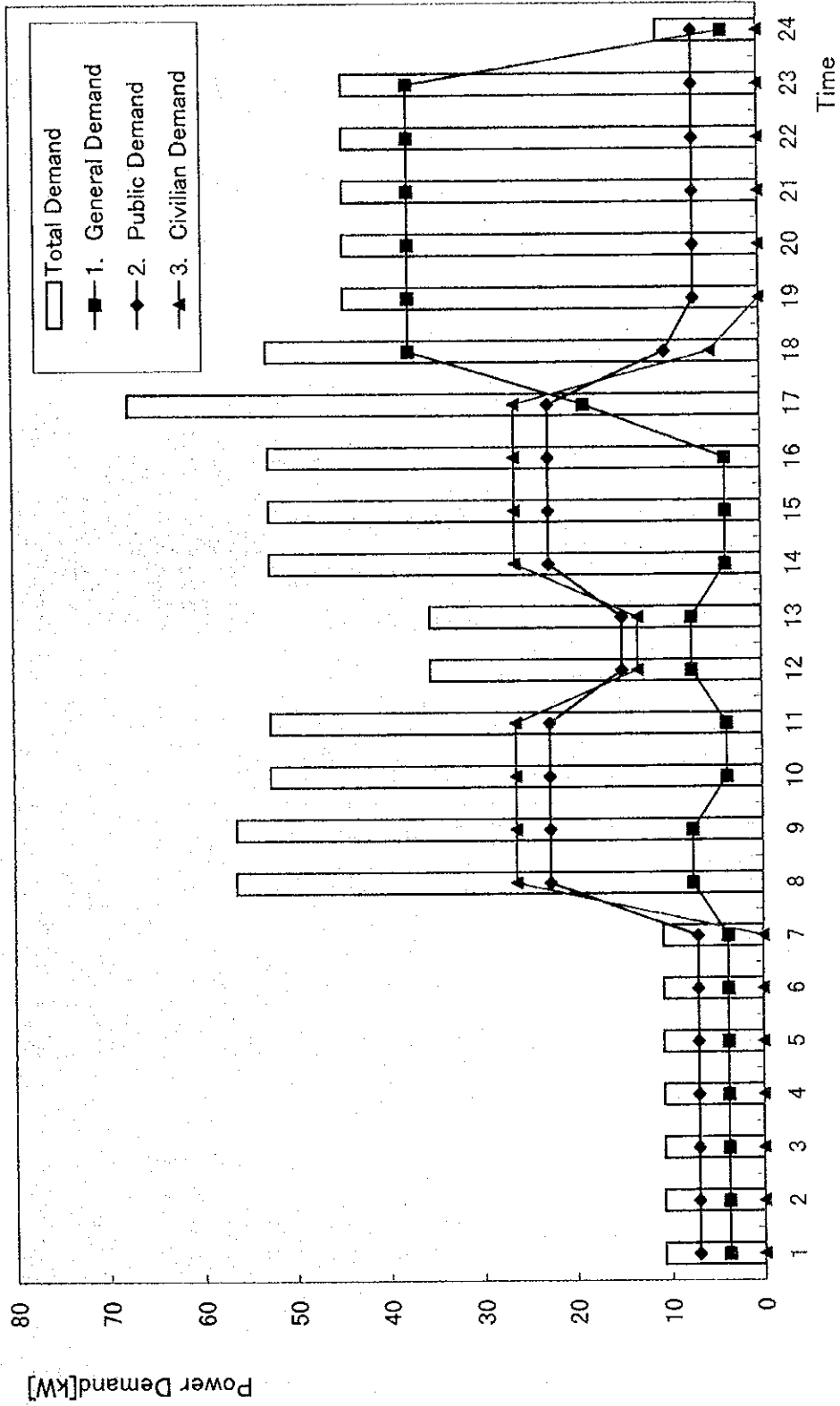
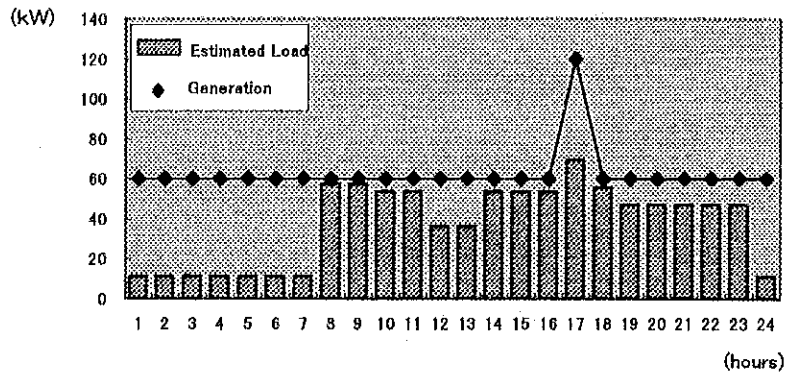
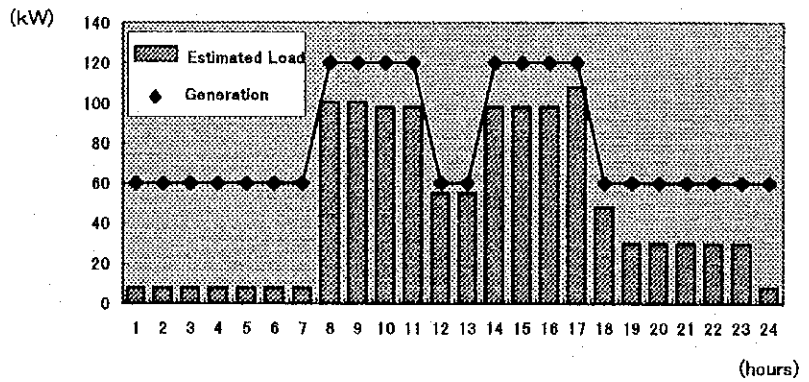


Figure 2.4-1 Daily Load Pattern and Number of Operating Generators

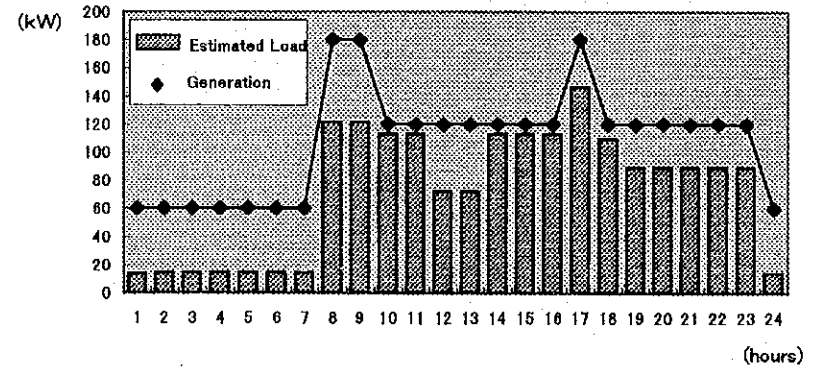
Aimag	ARKHANGAI
Sum	Khanagai
Generator	100 kW x 0 60 kW x 2



Aimag	ARKHANGAI
Sum	Tsakhir
Generator	100 kW x 0 60 kW x 2



Aimag	ARKHANGAI
Sum	Chuluut
Generator	100 kW x 0 60 kW x 3



Aimag	DUNDGOVI
Sum	Uizit
Generator	100 kW x 2 60 kW x 0

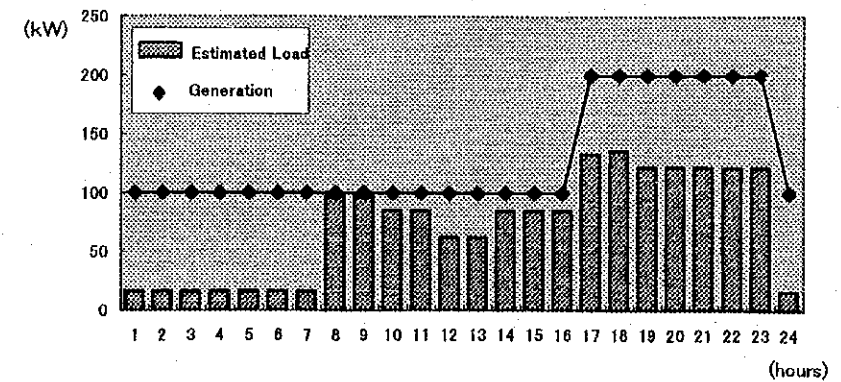
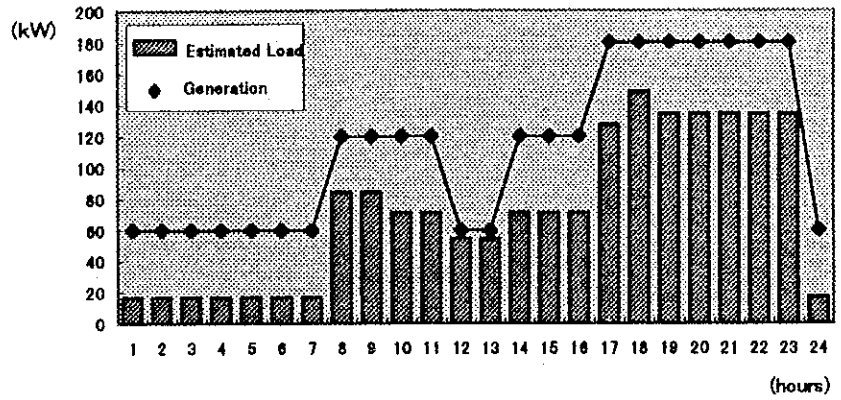
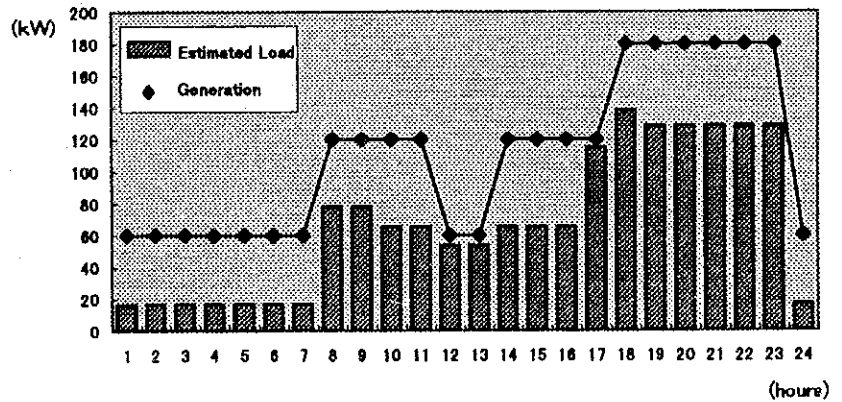


Figure 2.4-2 Daily Load Pattern and Number of Operating Generators

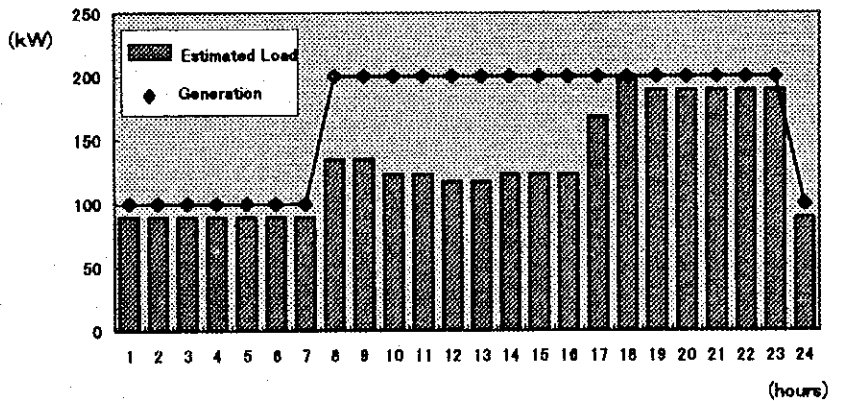
Aimag	DUNDGOVI
Sum	Undurshil
Generator	100 kW x 0 60 kW x 3



Aimag	DUNDGOVI
Sum	Bayanjargalan
Generator	100 kW x 0 60 kW x 3



Aimag	KHENTII
Sum	Gaishar
Generator	100 kW x 2 60 kW x 0



Aimag	KHENTII
Sum	Bayan Ovoo
Generator	100 kW x 0 60 kW x 3

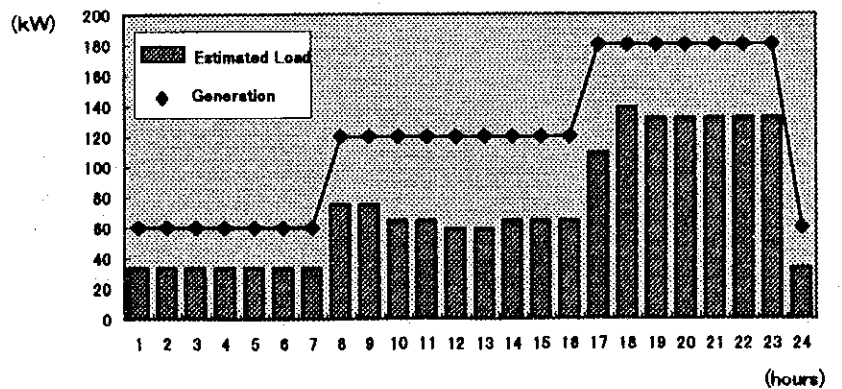
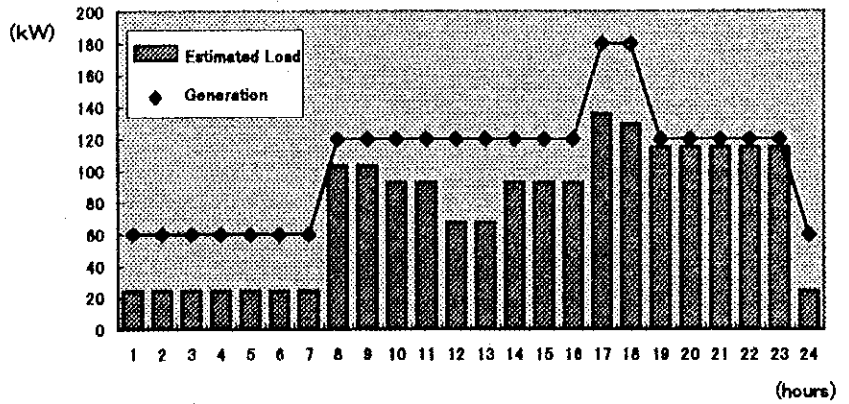
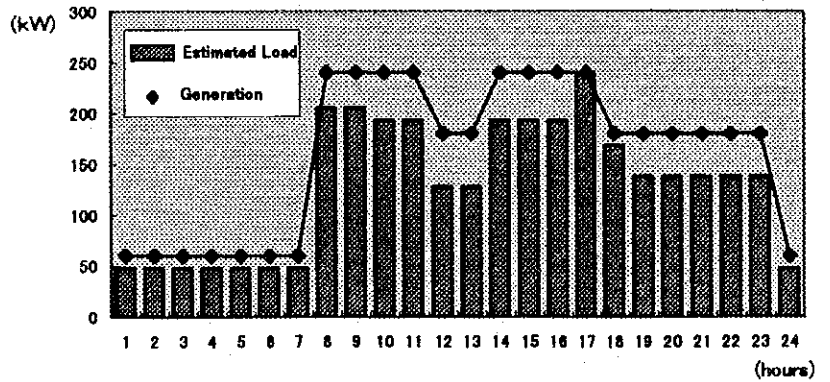


Figure 2.4-3 Daily Load Pattern and Number of Operating Generators

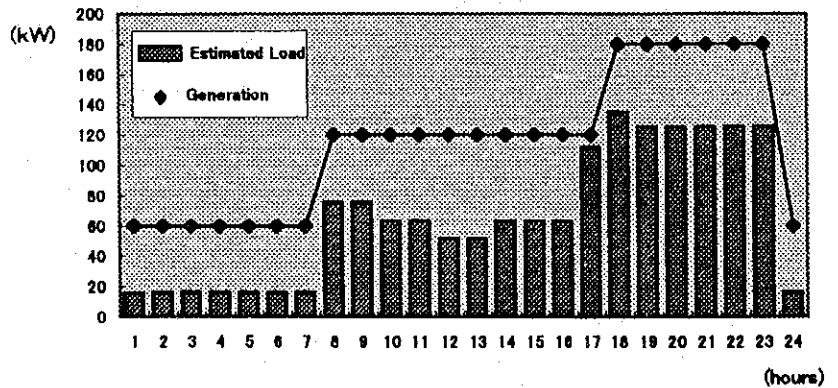
Aimag	UVURKHANGAI
Sum	Baruunbayan-Ulaan
Generator	100 kW x 0 60 kW x 3



Aimag	UVURKHANGAI
Sum	Nariinteel
Generator	100 kW x 0 60 kW x 4



Aimag	UVURKHANGAI
Sum	Guchin-Uus
Generator	100 kW x 0 60 kW x 3



Aimag	UVURKHANGAI
Sum	Bayan-Undur
Generator	100 kW x 0 60 kW x 3

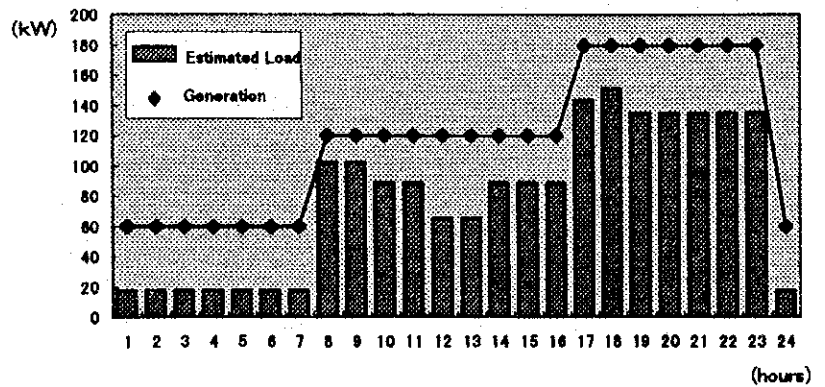
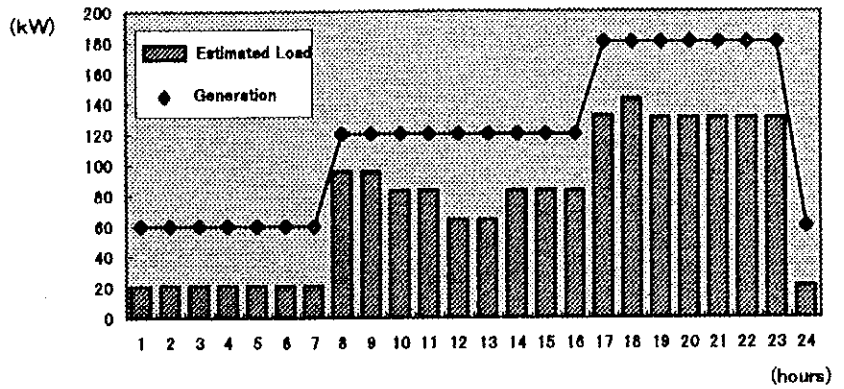
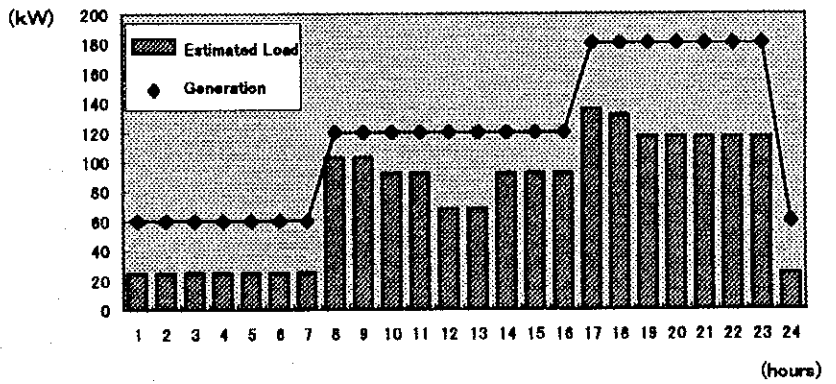


Figure 2.4-4 Daily Load Pattern and Number of Operating Generators

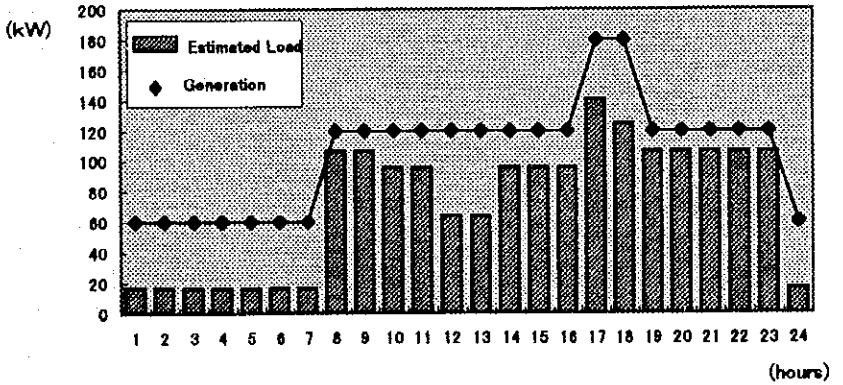
Aimag	UVURKHANGAI
Sum	Hairhandulaan
Generator	100 kW x 0 60 kW x 3



Aimag	BAYANHONGOR
Sum	Bayangovi
Generator	100 kW x 0 60 kW x 3



Aimag	BAYANHONGOR
Sum	Bogd
Generator	100 kW x 0 60 kW x 3



Aimag	BAYANHONGOR
Sum	Jinst
Generator	100 kW x 0 60 kW x 2

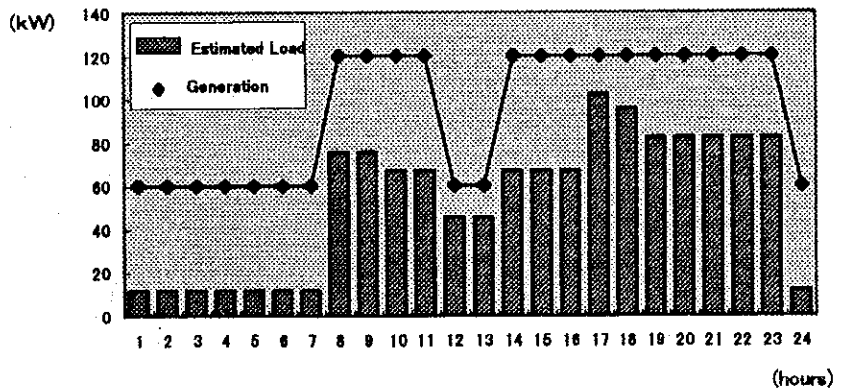
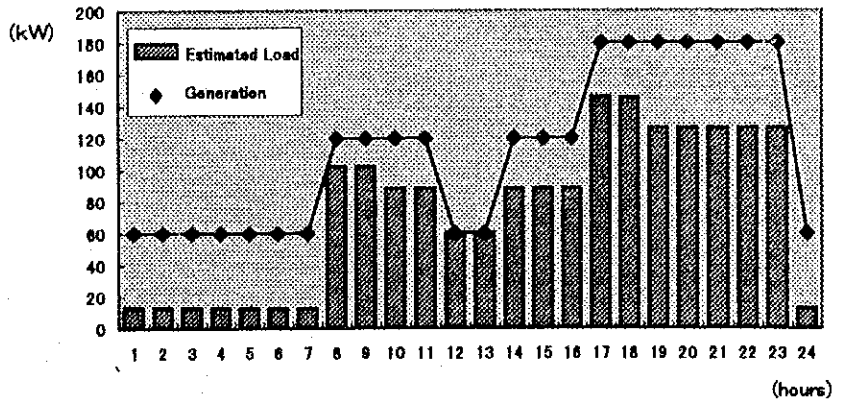


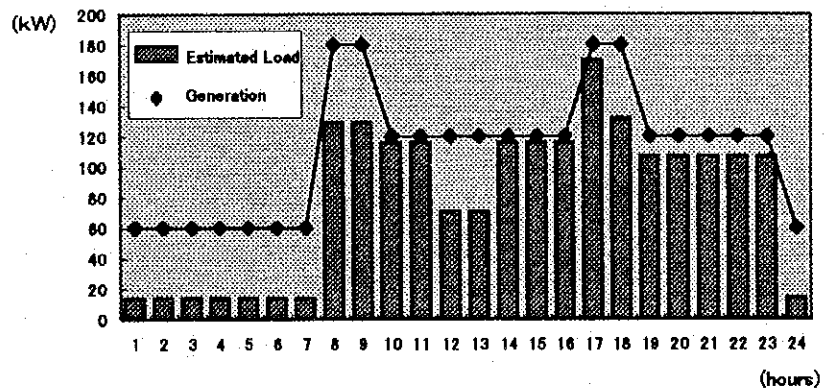


Figure 2.4-5 Daily Load Pattern and Number of Operating Generators

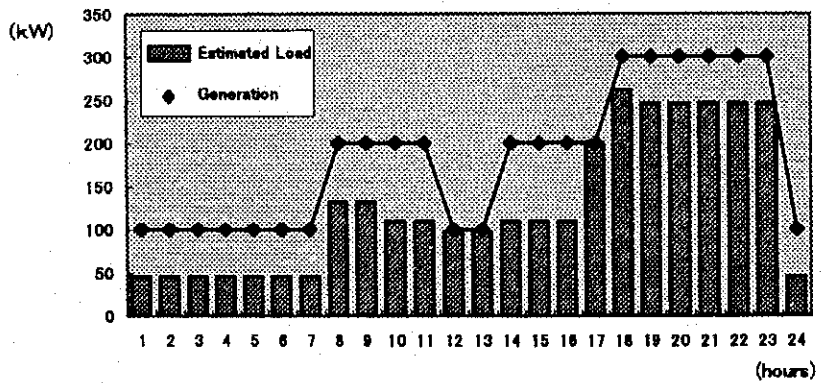
Aimag	BAYANHONGOR
Sum	Bumbugur
Generator	100 kW x 0 60 kW x 3



Aimag	DORNOGOVI
Sum	Mandakh
Generator	100 kW x 0 60 kW x 3



Aimag	DORNOGOVI
Sum	Saihandulaan
Generator	100 kW x 3 60 kW x 0



Aimag	SUKHBAATAR
Sum	Dariganga
Generator	100 kW x 0 60 kW x 3

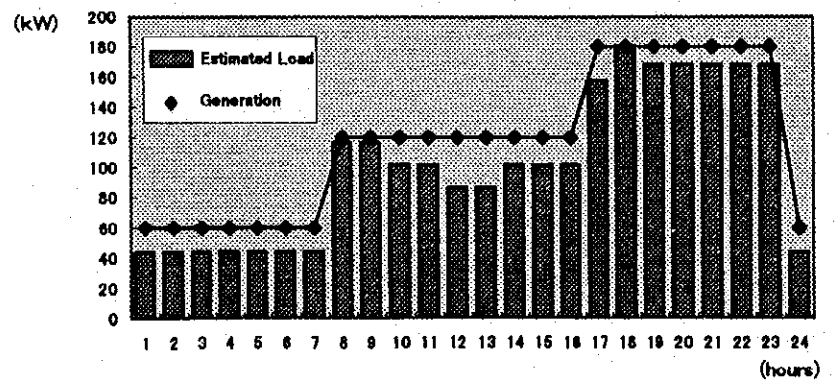
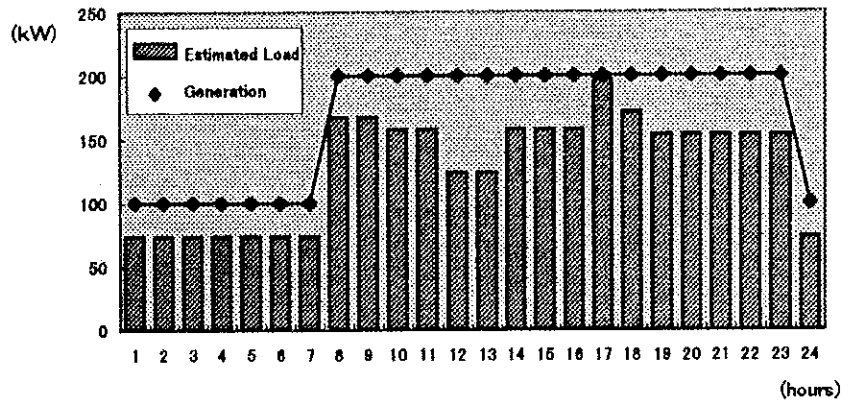
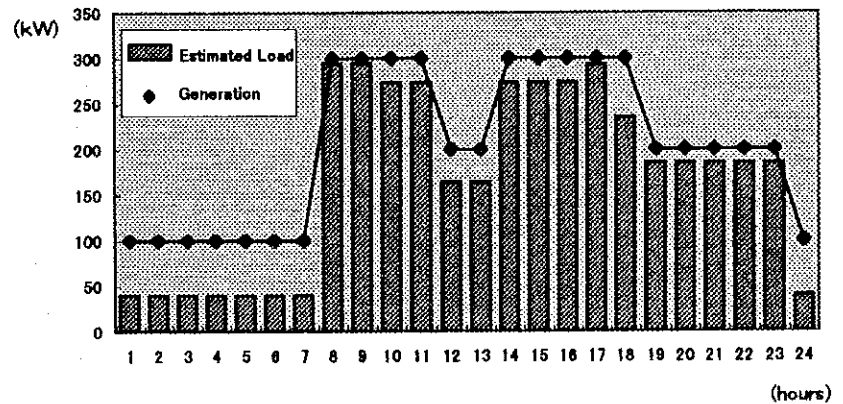


Figure 2.4-6 Daily Load Pattern and Number of Operating Generators

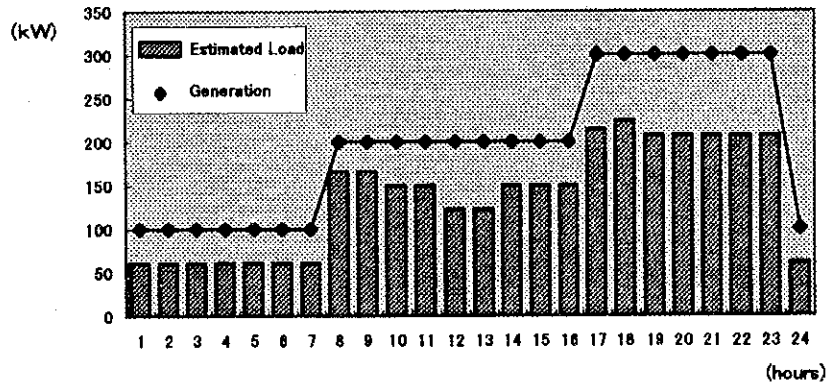
Aimag	SUKHBAATAR
Sum	Ongon
Generator	100 kW x 2 60 kW x 0



Aimag	SUKHBAATAR
Sum	Bayandelger
Generator	100 kW x 3 60 kW x 0



Aimag	SUKHBAATAR
Sum	Tumentsogt
Generator	100 kW x 3 60 kW x 0



Aimag	UMUNGOVI
Sum	Noyon
Generator	100 kW x 0 60 kW x 3

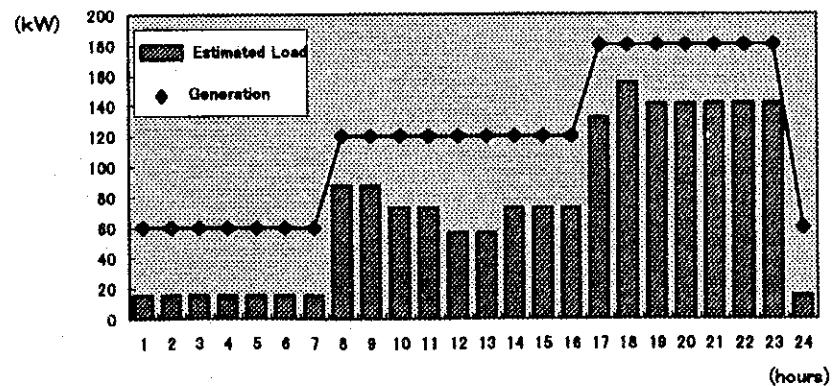
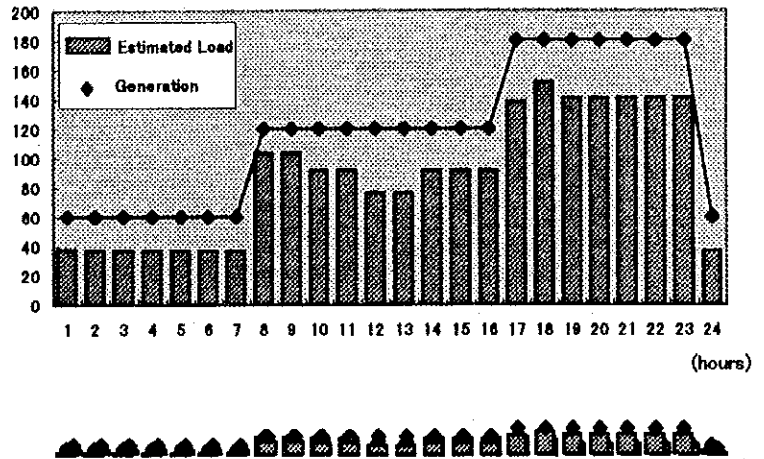
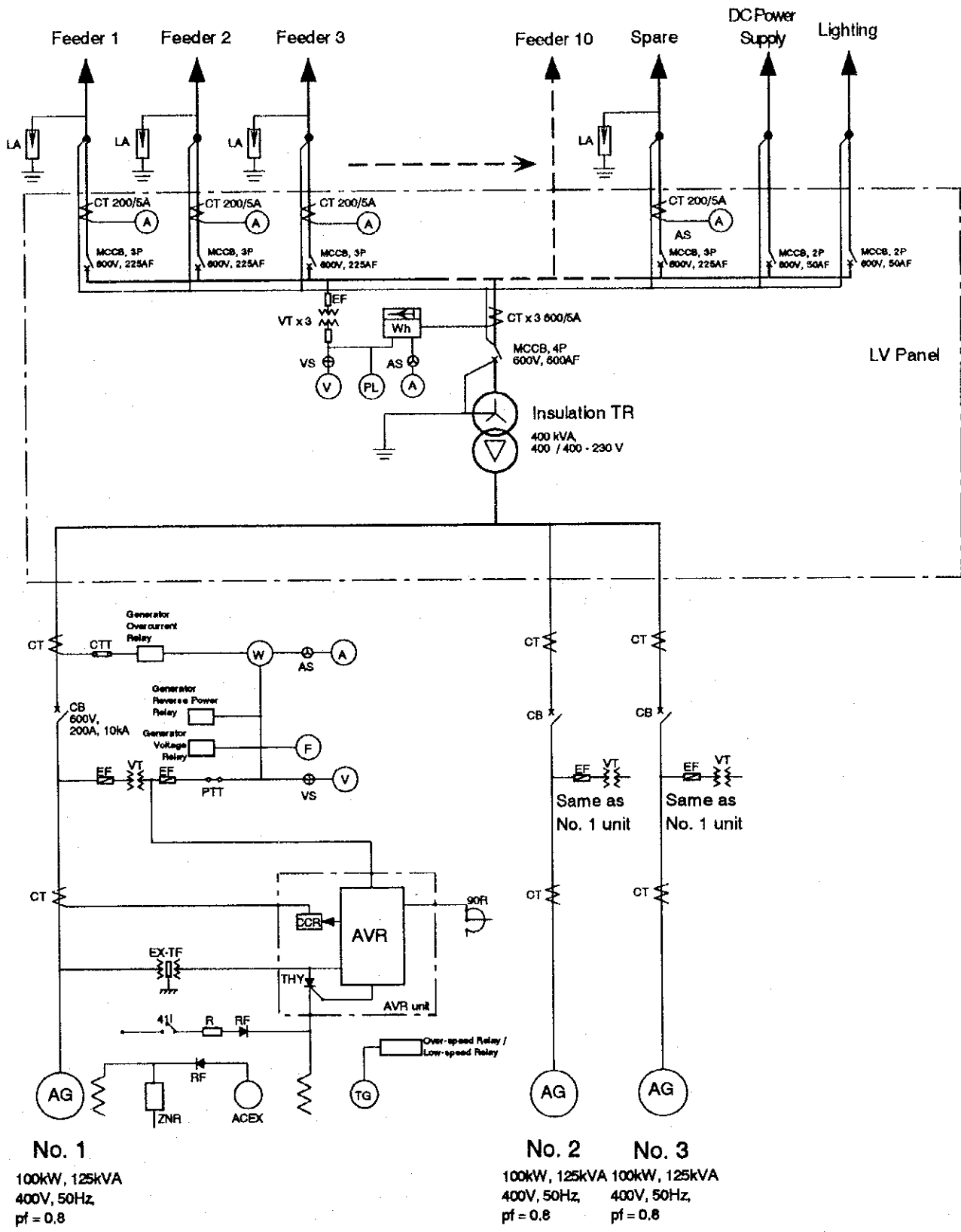


Figure 2.4-7 Daily Load Pattern and Number of Operating Generators

Aimag	UMUNGOVI	(kW)
Sum	Gurvantes	
Generator	100 kW x 0	
	60 kW x 3	





**Figure 2.5-1 Single Line Diagram of Diesel Power Station (100kW x 3)**

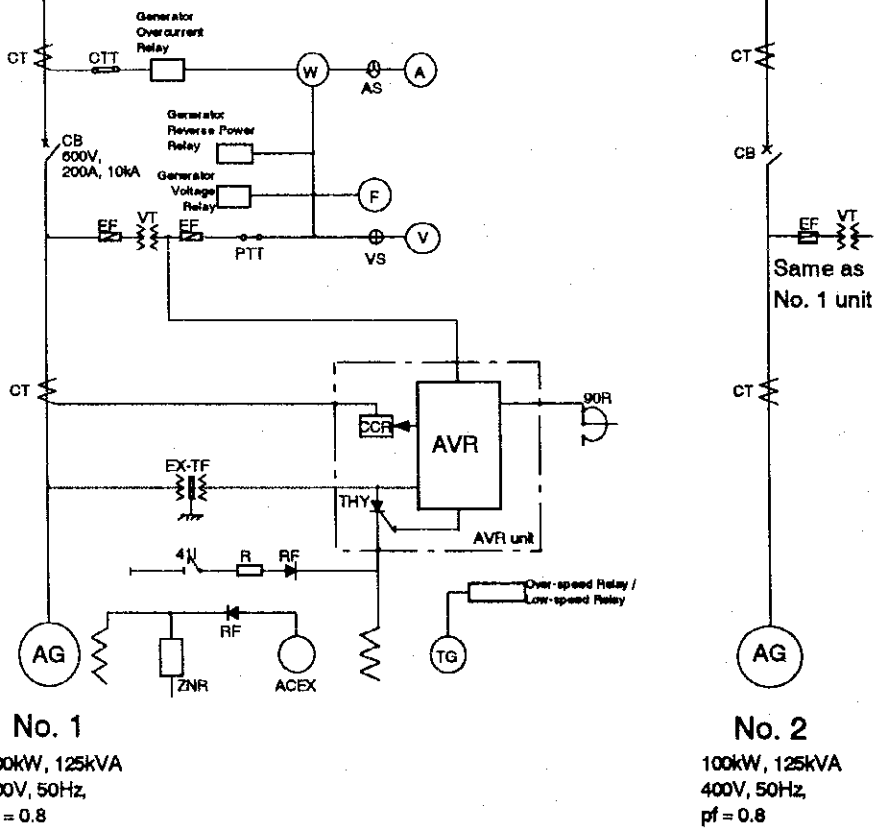
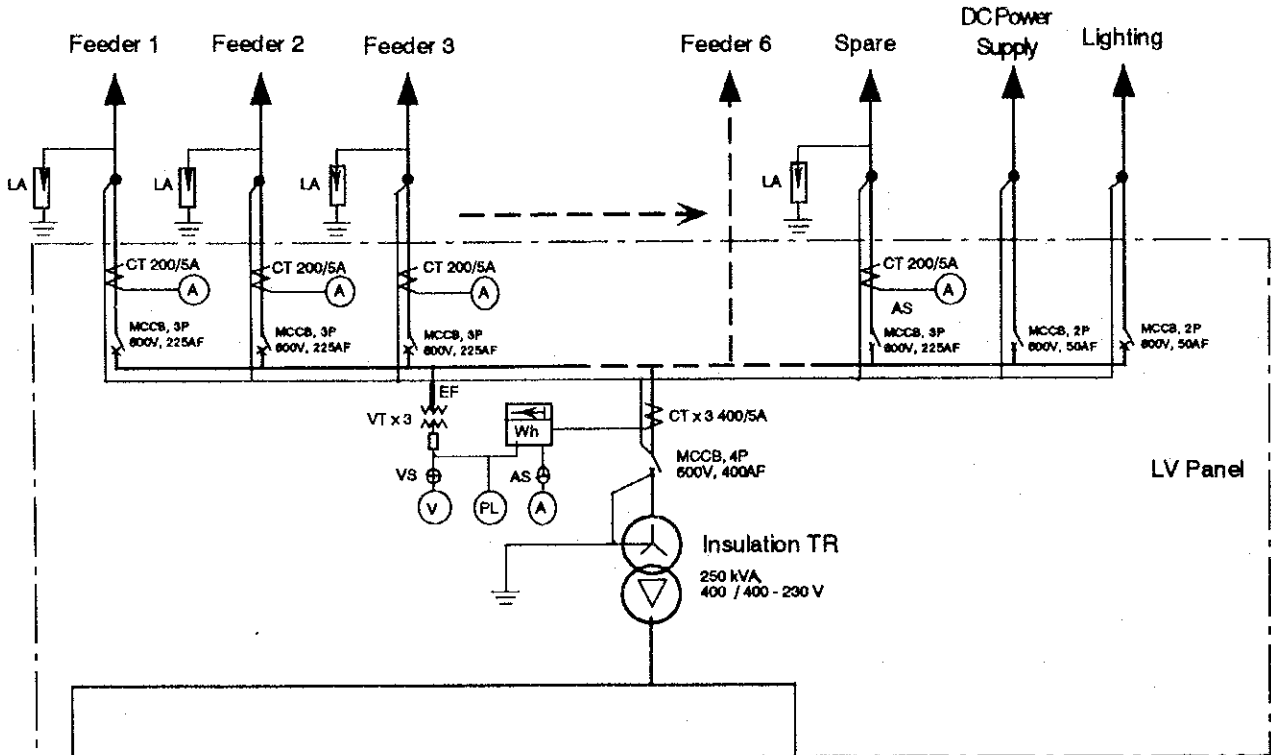


Figure 2.5-2 Single Line Diagram of Diesel Power Station (100kW x 2)

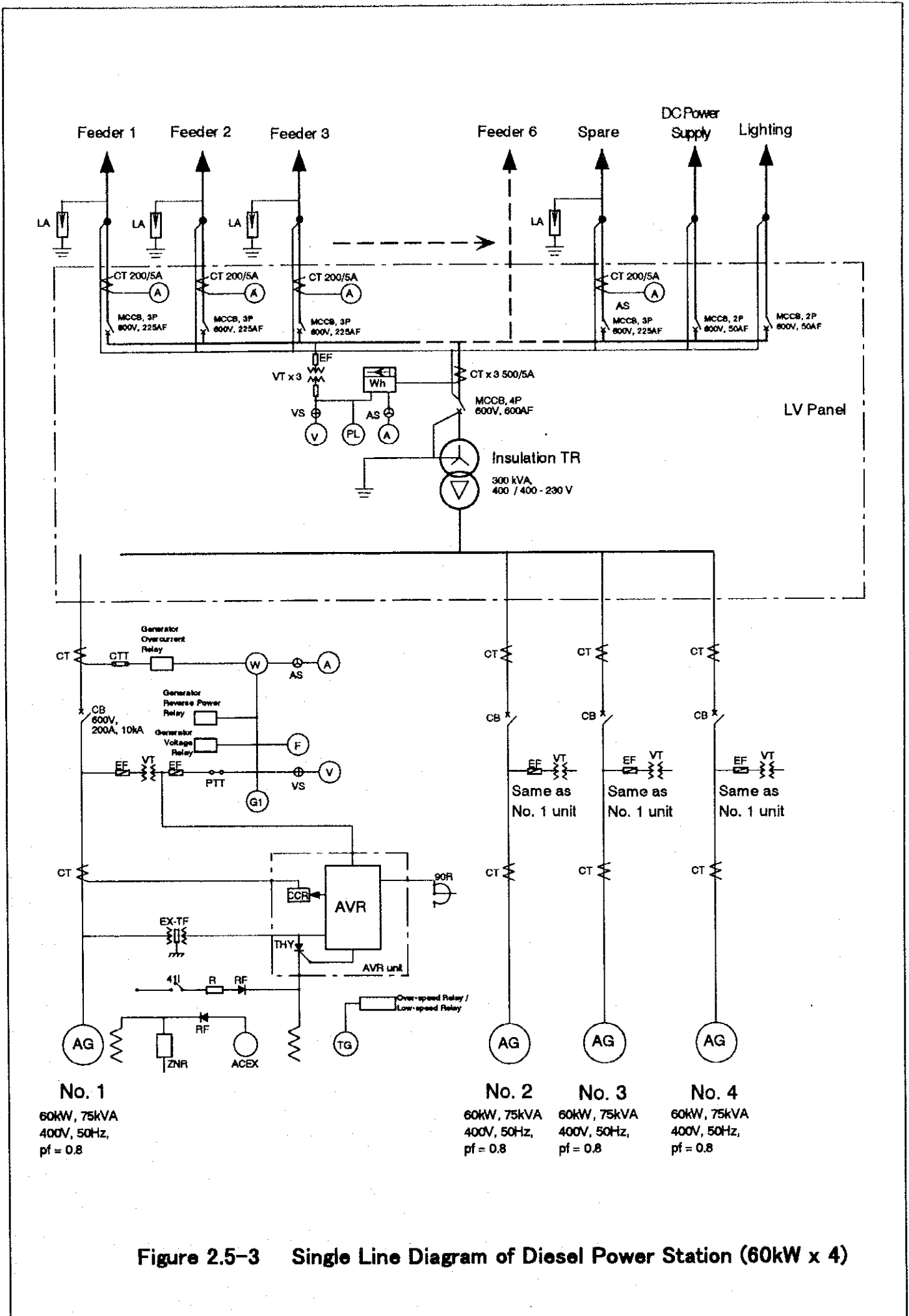
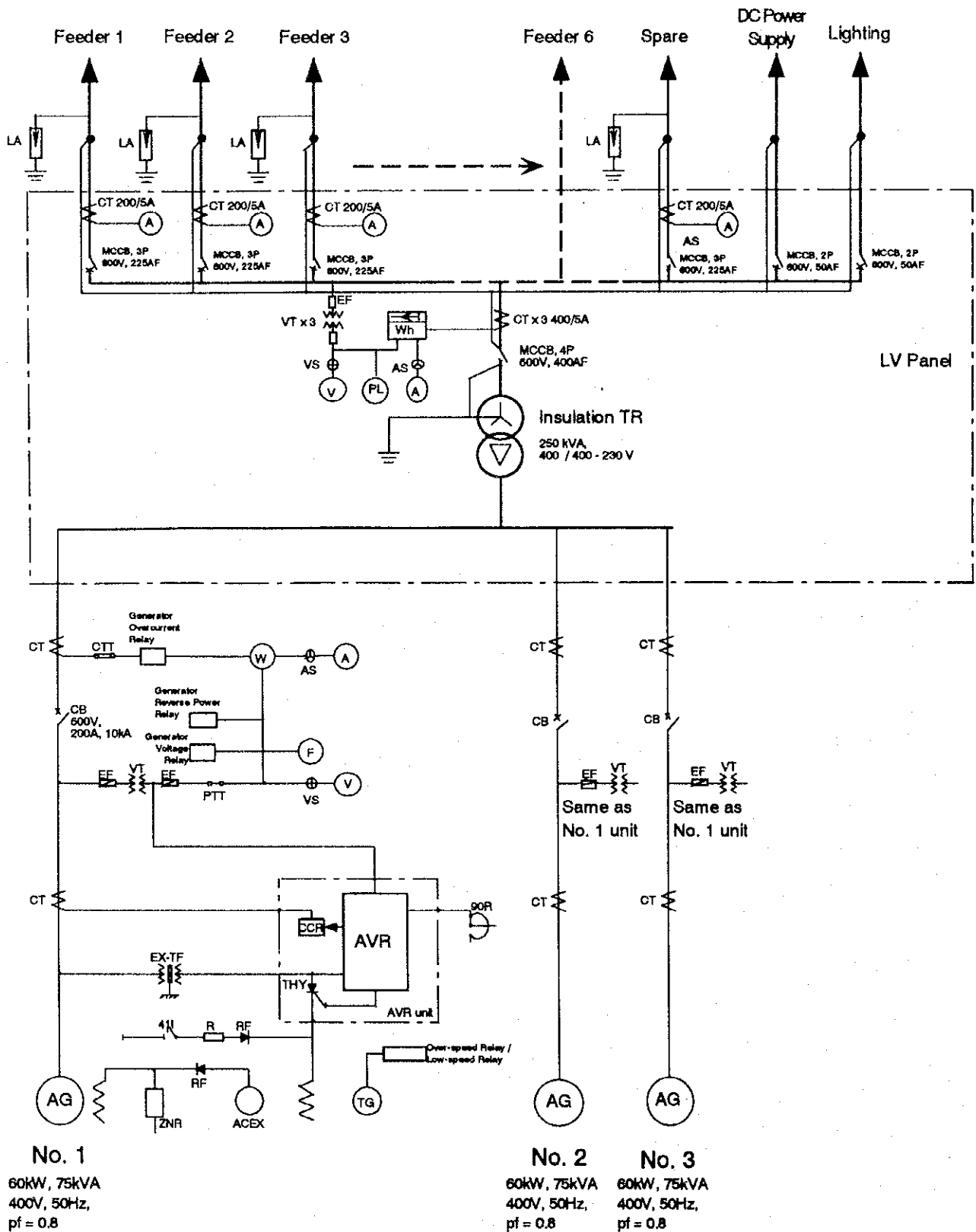
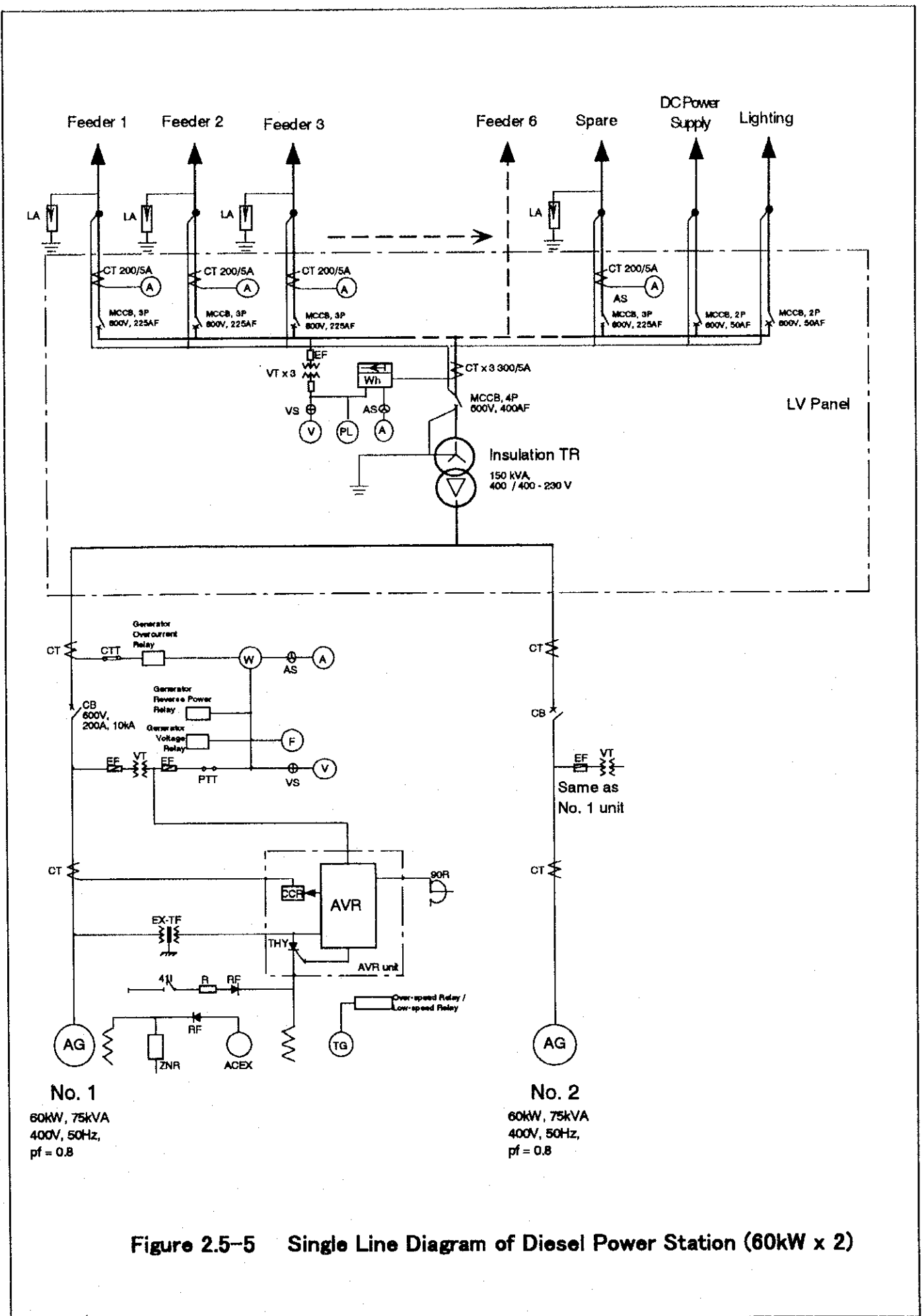


Figure 2.5-3 Single Line Diagram of Diesel Power Station (60kW x 4)



**Figure 2.5-4 Single Line Diagram of Diesel Power Station (60kW x 3)**

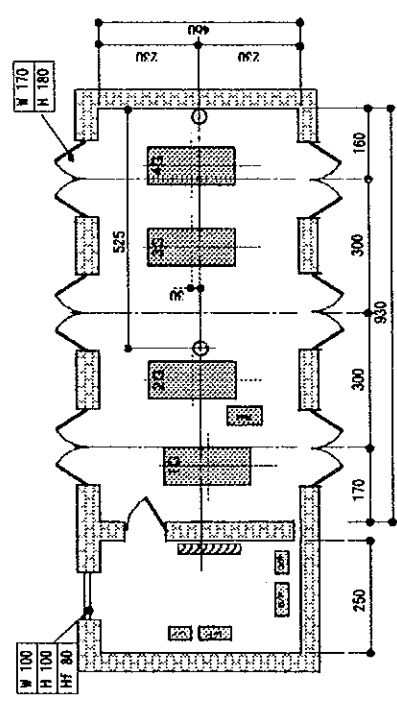


**Figure 2.5-5 Single Line Diagram of Diesel Power Station (60kW x 2)**



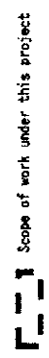
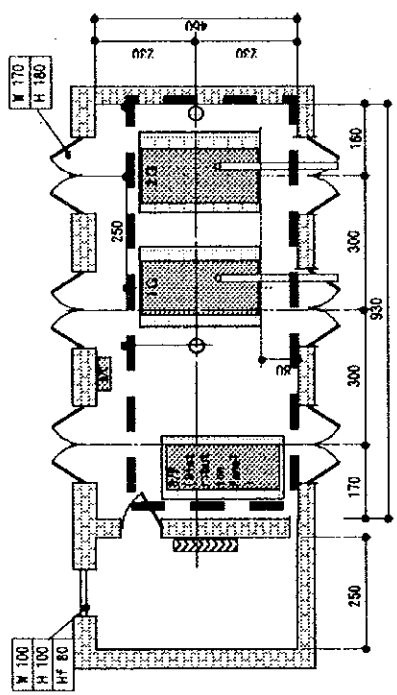
Existing Layout

Name of SUM: 1 Khangai



Layout Plan

Name of SUM: 1 Khangai



※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

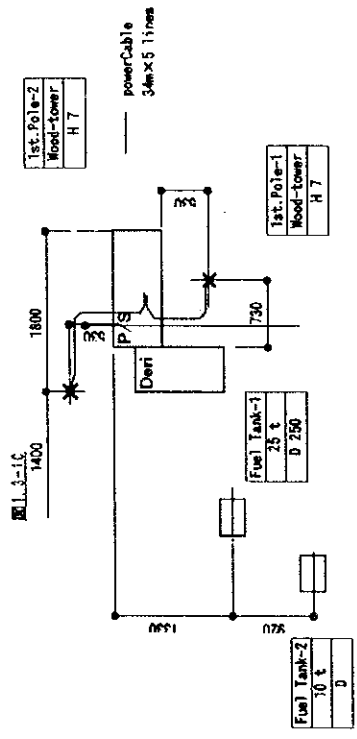
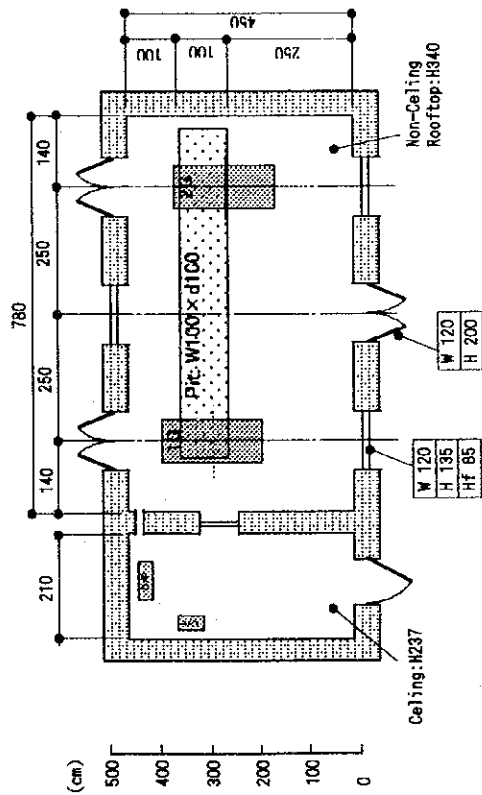


Figure 2.6-1 Layout Drawing of Khangai

Existing Layout

Name of SUM: 2 Tsakhir



Layout Plan

Name of SUM: 2 Tsakhir

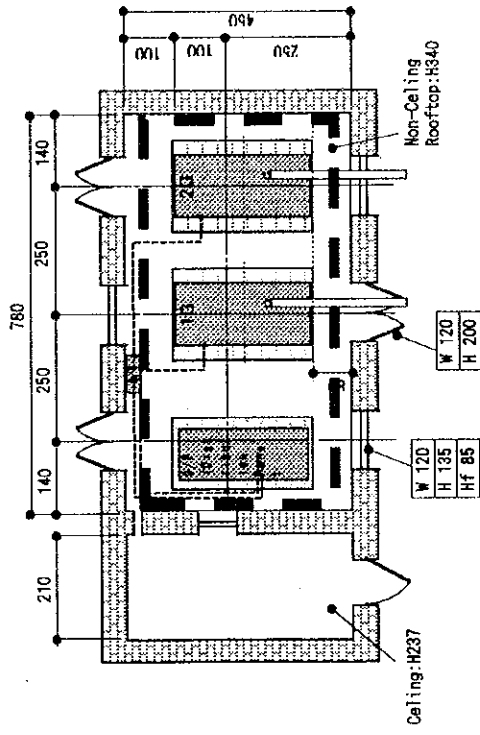
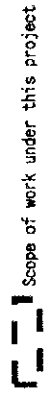
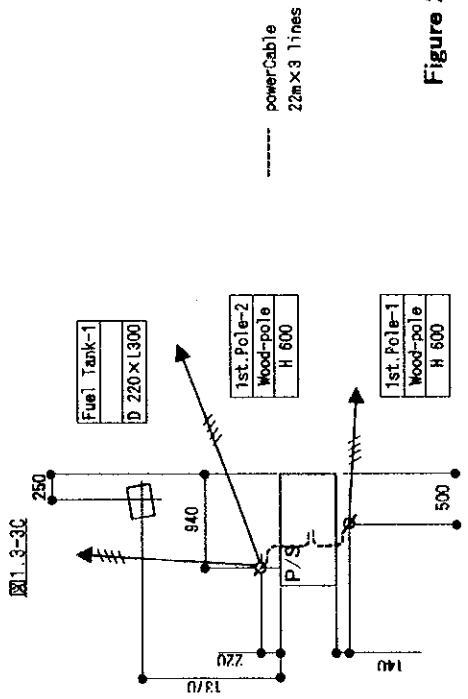


Fig. 3-3C

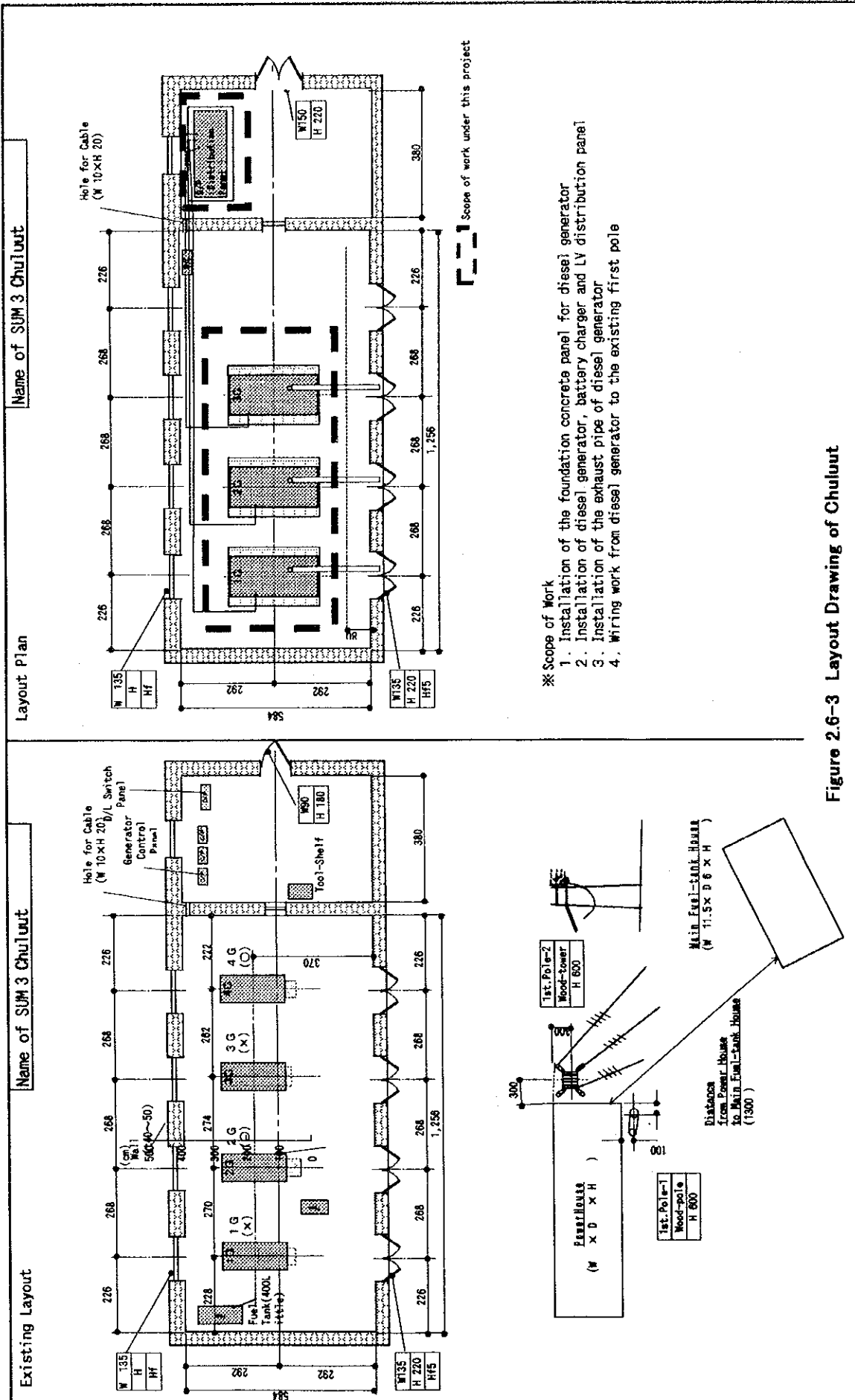


Scope of work under this project

※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-2 Layout Drawing of Tsakhir



Existing Layout

Layout Plan

Scope of work under this project

Name of SUM 3 Chuluut

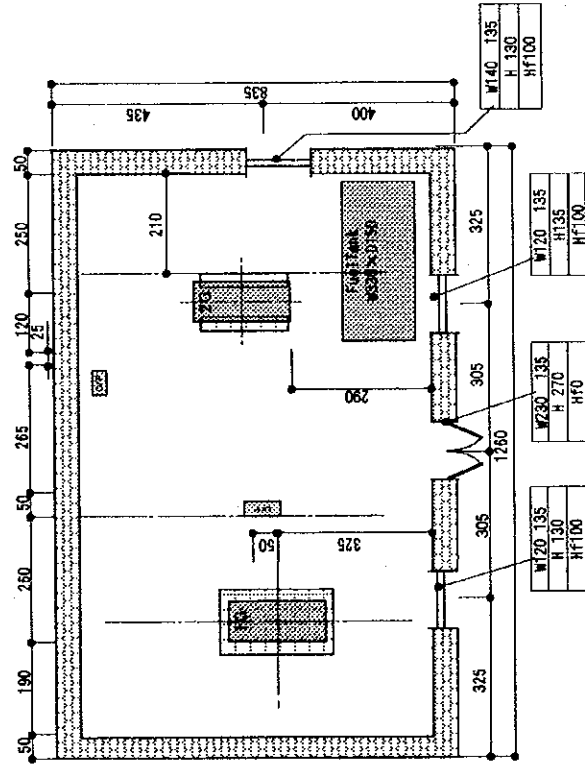
Name of SUM 3 Chuluut

- ※ Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

Figure 2.6-3 Layout Drawing of Chuluut

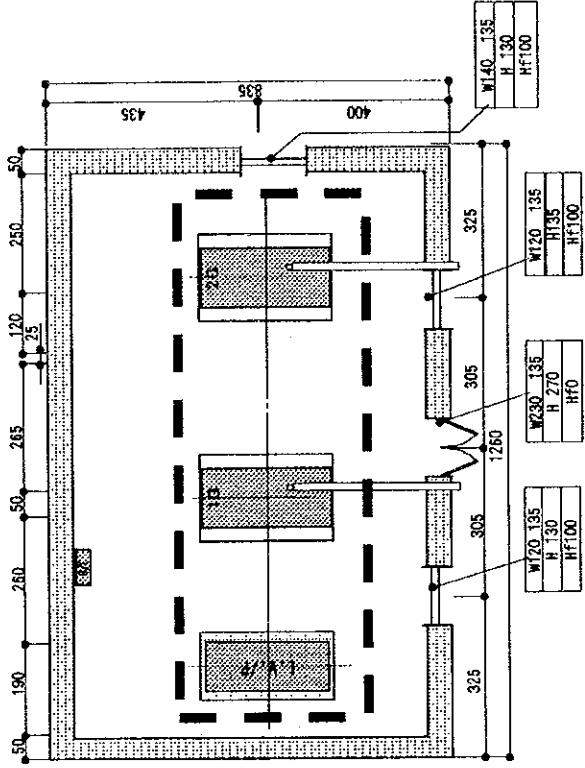
Name of SUM: 4 Ulzhit

Existing Layout



Layout Plan

Name of SUM: 4 Ulzhit



Scope of work under this project

※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

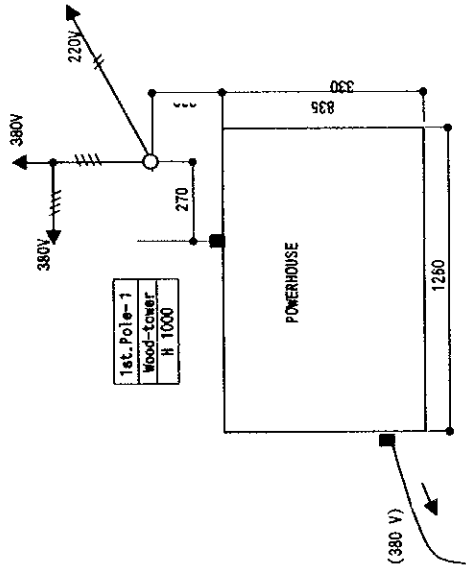
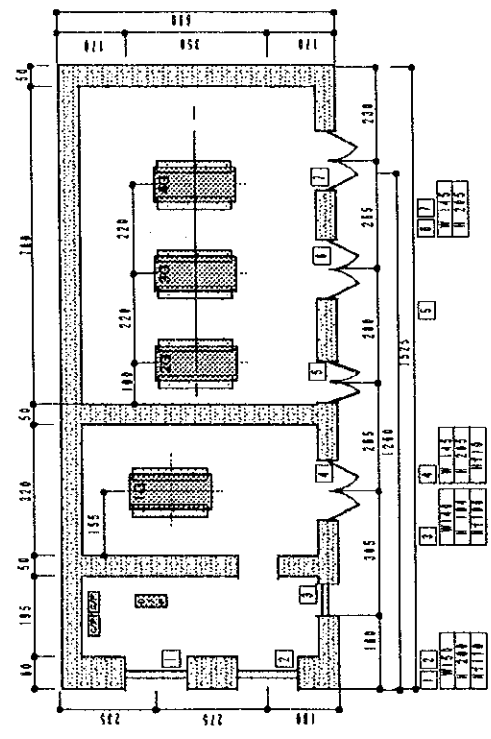


Figure 2.6-4 Layout Drawing of Ulzhit

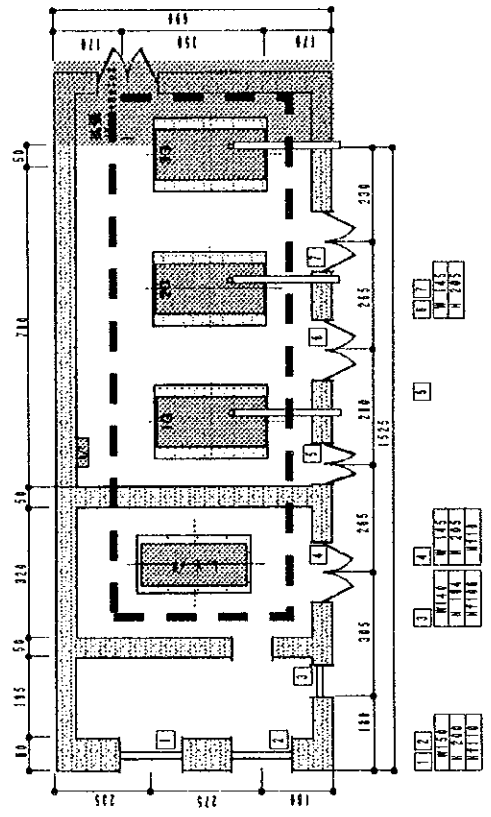
Existing layout

Name of SUM: s Undurshil



Layout Plan

Name of SUM: s Undurshil



Scope of work under this project

- ※ Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

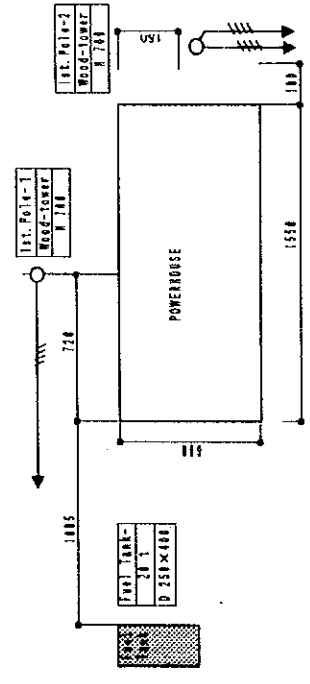
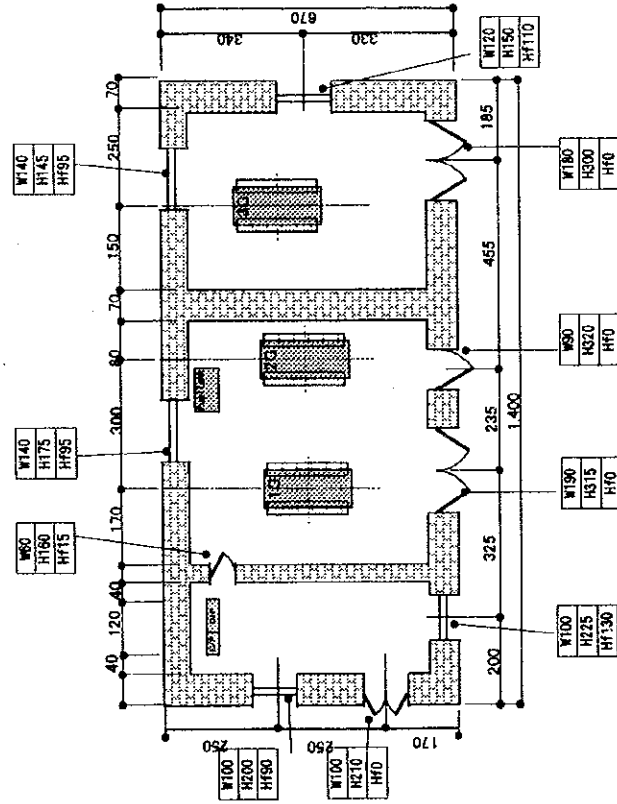


Figure 2.6-5 Layout Drawing of Undurshil

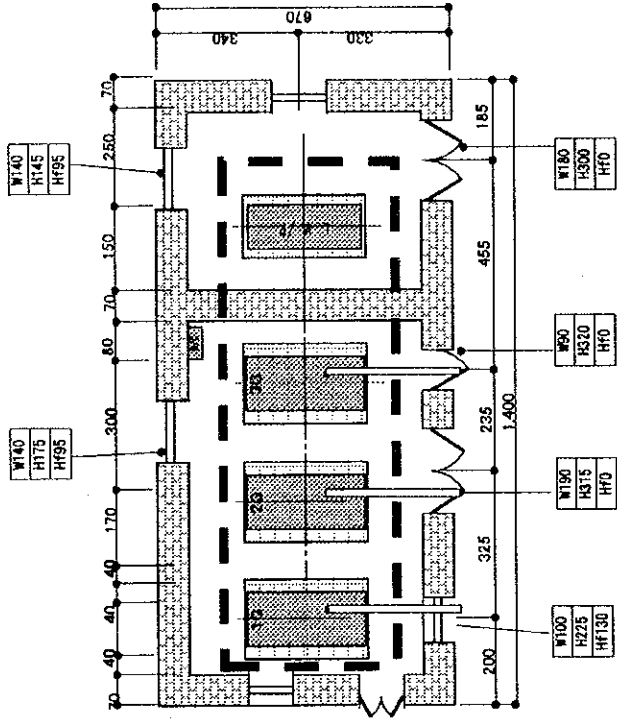
Name of SUM: 6 Bayanijargalan

Existing Layout



Layout Plan

Name of SUM: 6 Bayanijargalan

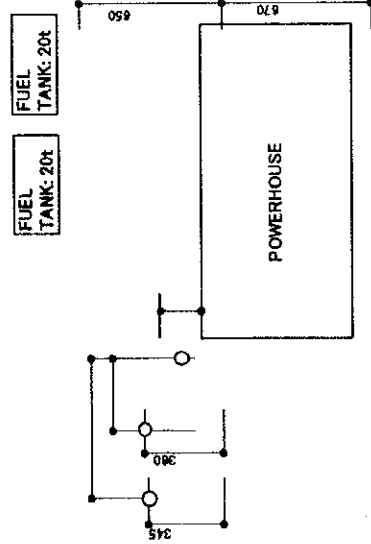


Scope of work under this project

※ Scope of Work

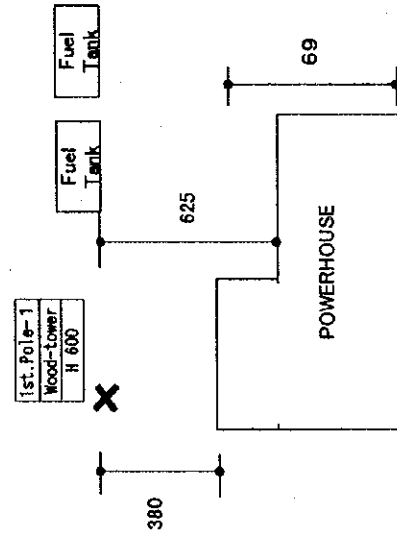
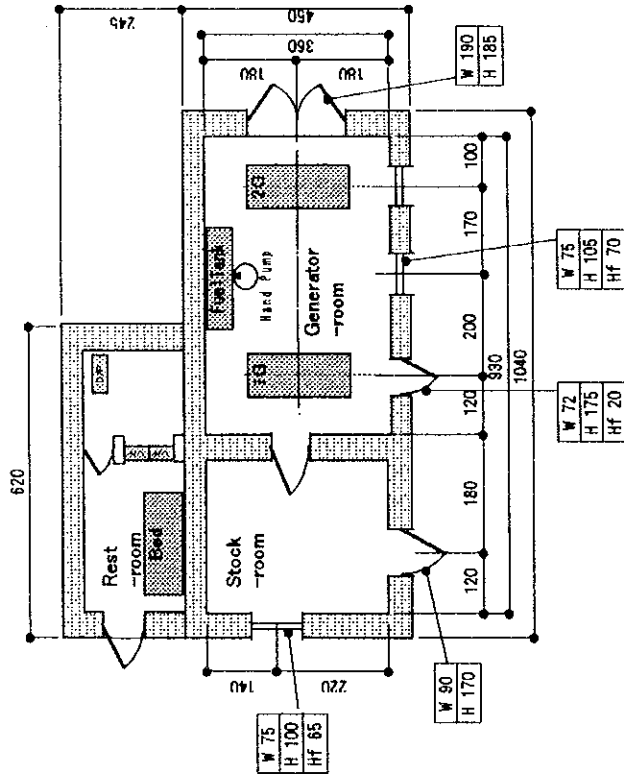
1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-6 Layout Drawing of Bayanijargalan



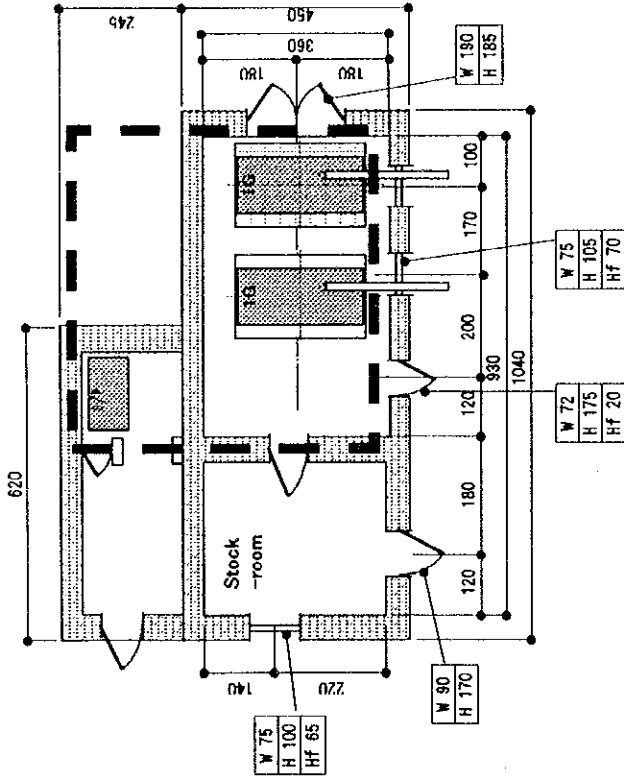
Name of SUM: 7 Garshar

Existing Layout



Layout Plan

Name of SUM: 7 Garshar



Scope of work under this project

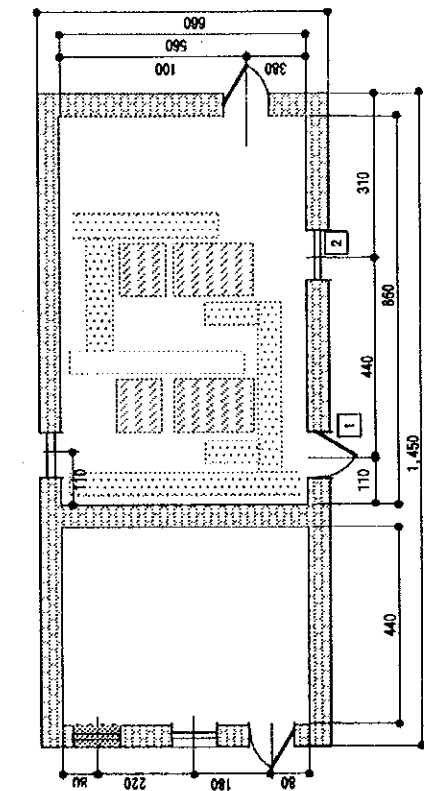
※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-7 Layout Drawing of Garshar

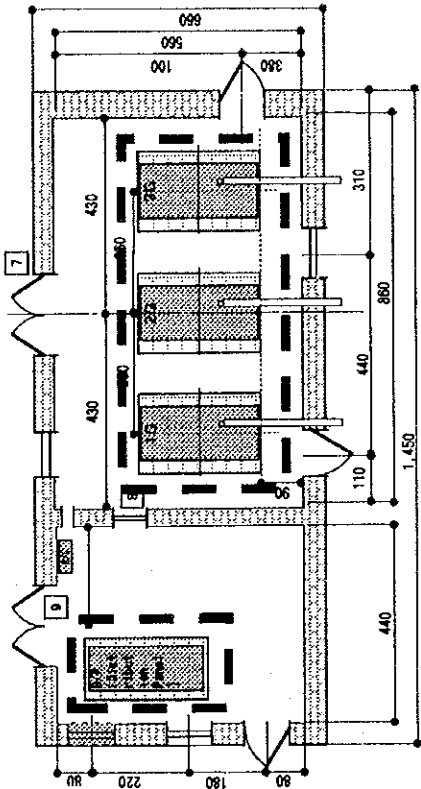
Name of SUM: Bayan Ovoo

Existing Layout



Layout Plan

Name of SUM: Bayan Ovoo



Scope of work under this project

\* Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

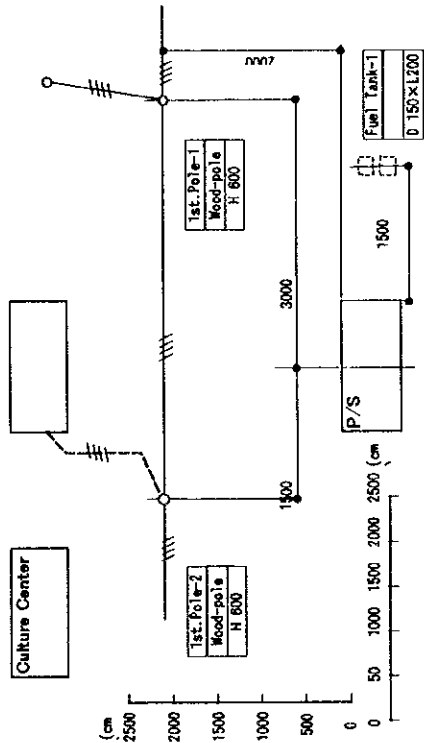


Figure 2.6-8 Layout Drawing of BayanOvoo

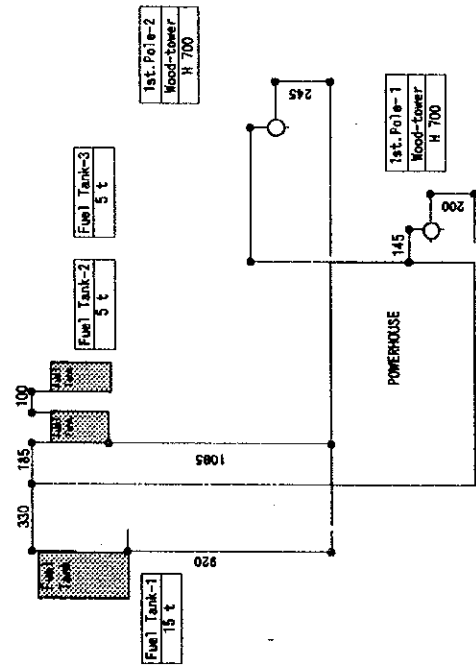
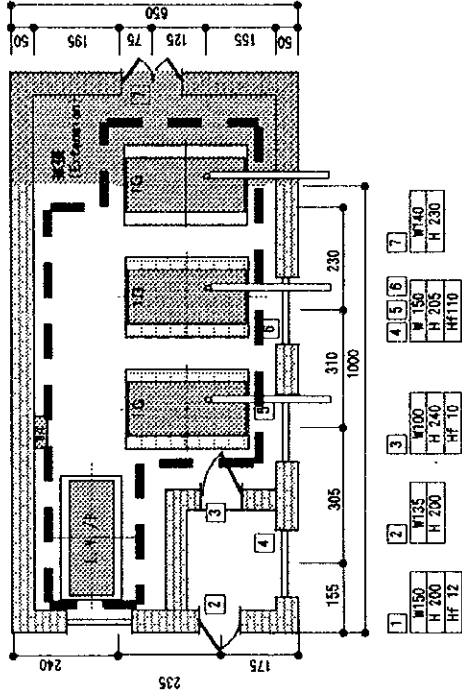
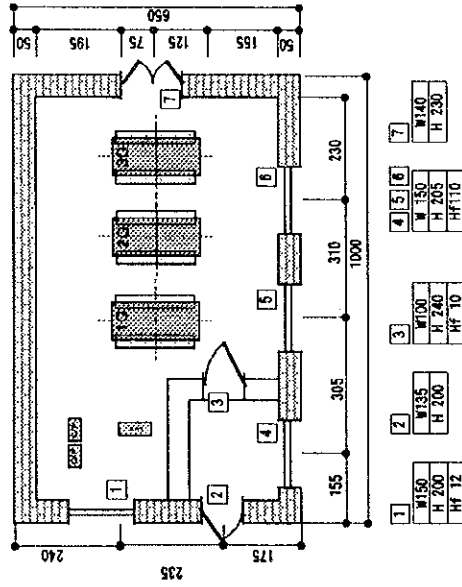


Existing Layout

Layout Plan

Name of SUM: 9 Barunbayan-Ulaan

Name of SUM: 9 Barunbayan-Ulaan



--- Scope of work under this project

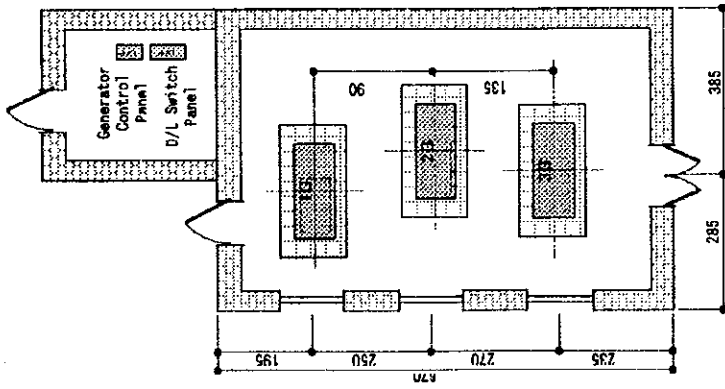
※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

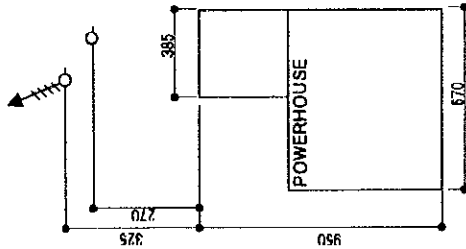
Figure 2.6-9 Layout Drawing of Barunbayan-Ulaan

Existing Layout

Name of SUHO Narintee!

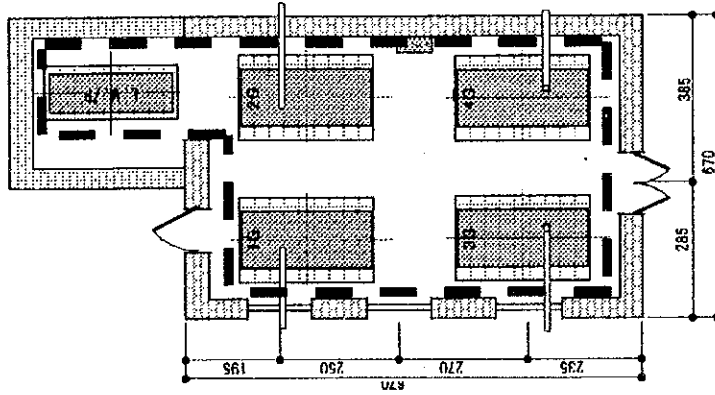


Layout of buildings



Layout Plan

Name of SUHO Narintee!



Scope of work under this project

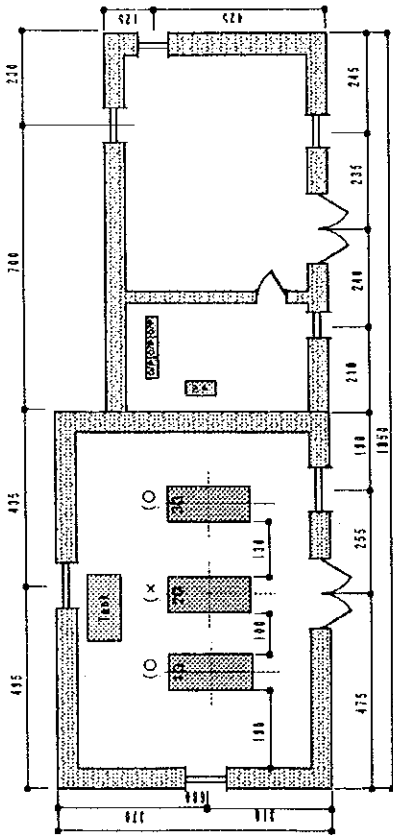
※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-10 Layout Drawing of Narintee!

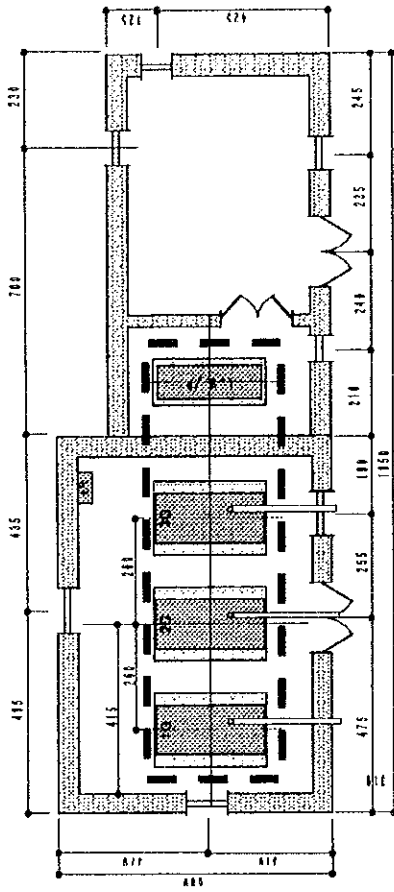
Existing Layout

Name of SUM: II Guchin-Uls



Layout Plan

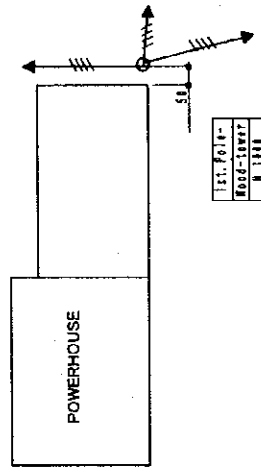
Name of SUM: II Guchin-Uls



Scope of work under this project

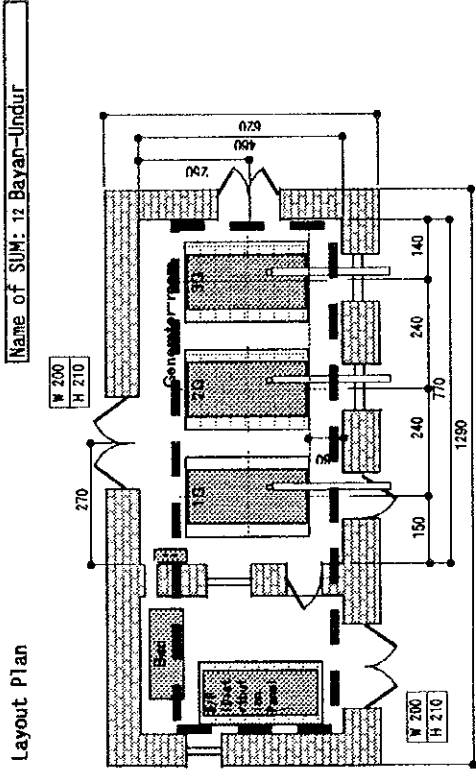
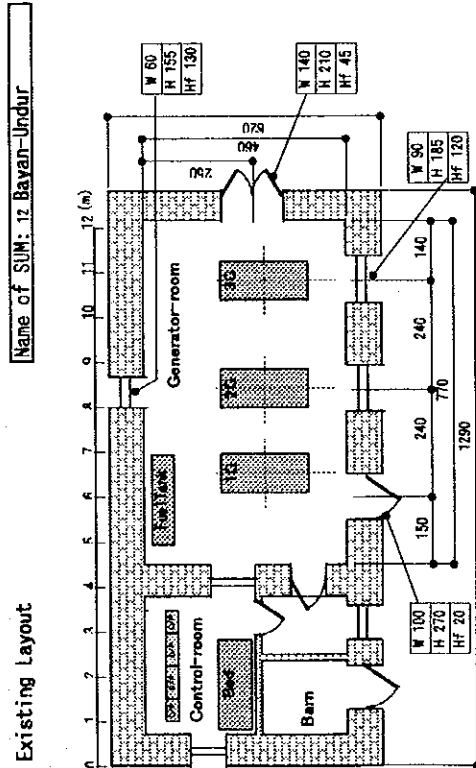
\* Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

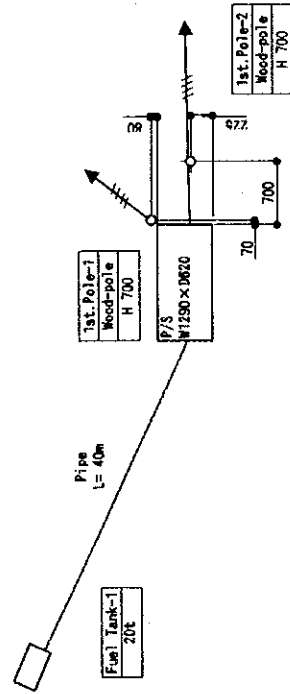


1:50.00  
MODE-LAYER  
M 1000

Figure 2.6-11 Layout Drawing of Guchin-Uls



Layout of buildings 2.1.3-12C



Scope of work under this project

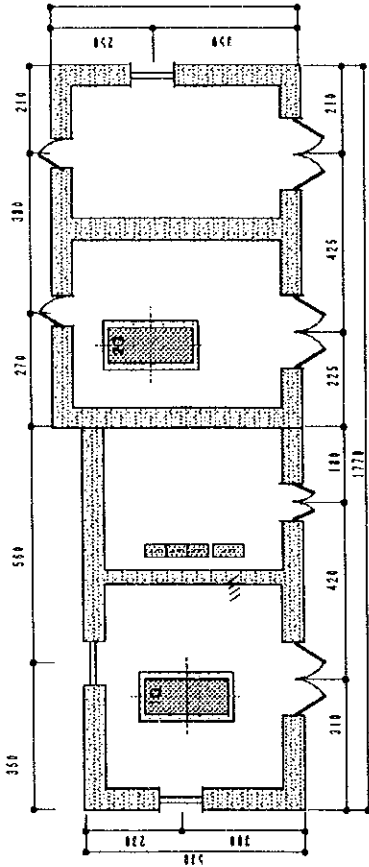
**※ Scope of Work**

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-12 Layout Drawing of Bayan-Undur

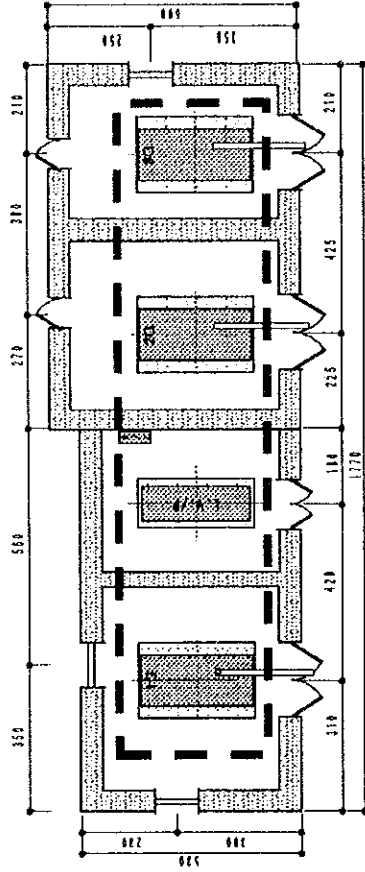
Existing Layout

Name of SUM: 13 Hairhandulaan



Layout Plan

Name of SUM: 13 Hairhandulaan



Scope of work under this project

\* Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and IV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

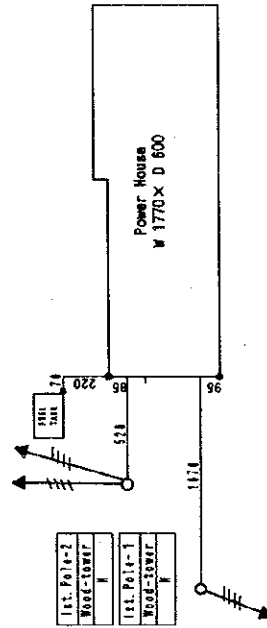
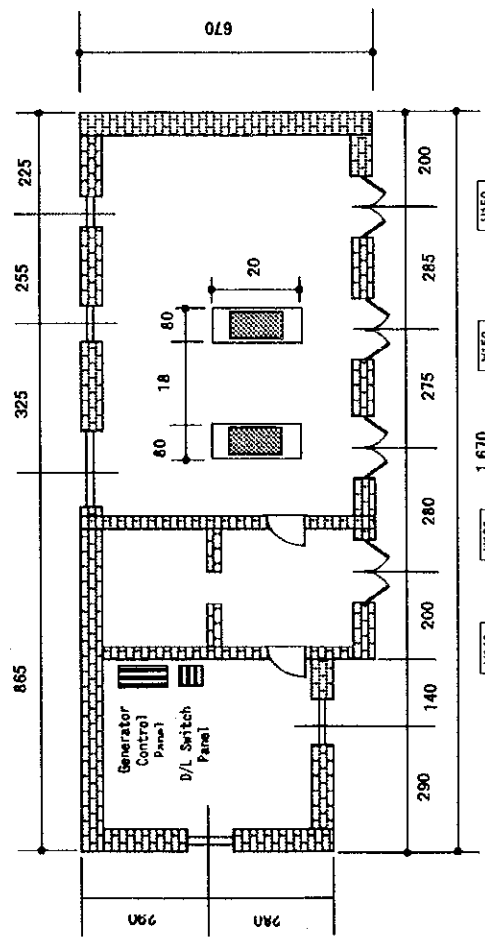


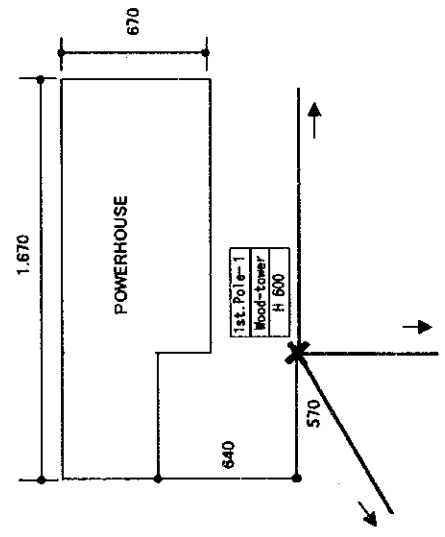
Figure 2.6-13 Layout Drawing of Hairhandulaan

Existing Layout

Name of SUM: 14 Bayangovi

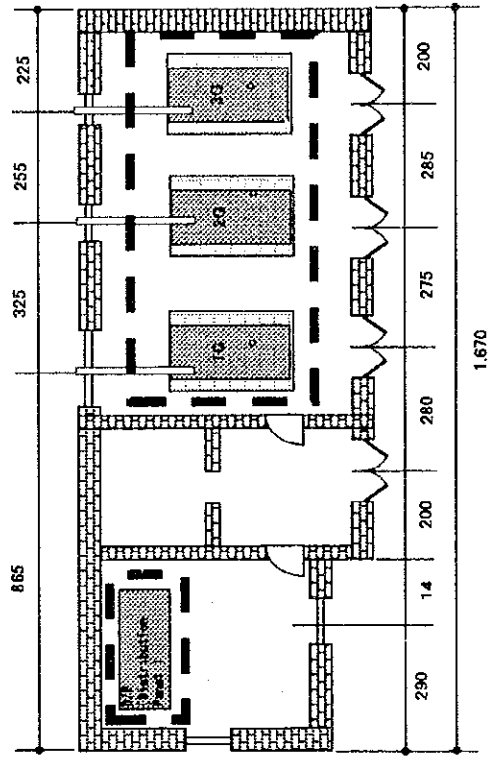


W140	H180	HFS
W150	H200	HFS
W150	H200	HFS
H150	H180	HFS



Layout Plan

Name of SUM: 14 Bayangovi



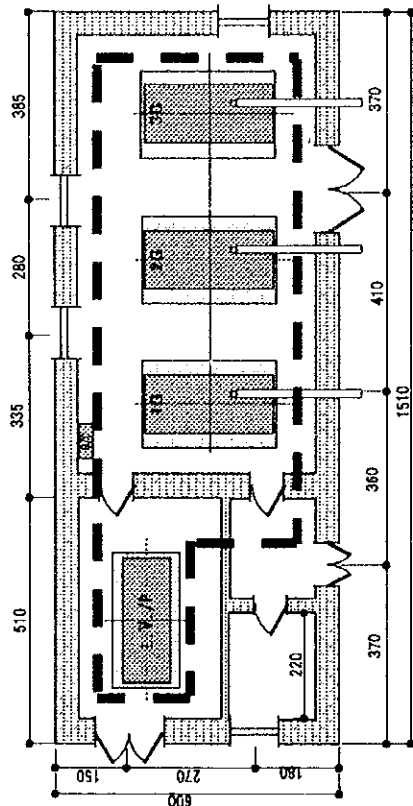
Scope of work under this project

- \* Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

Figure 2.6-14 Layout Drawing of Bayangovi

Name of SUM: 15 Bogd

Layout Plan



Scope of work under this project



※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Name of SUM: 15 Bogd

Existing Layout

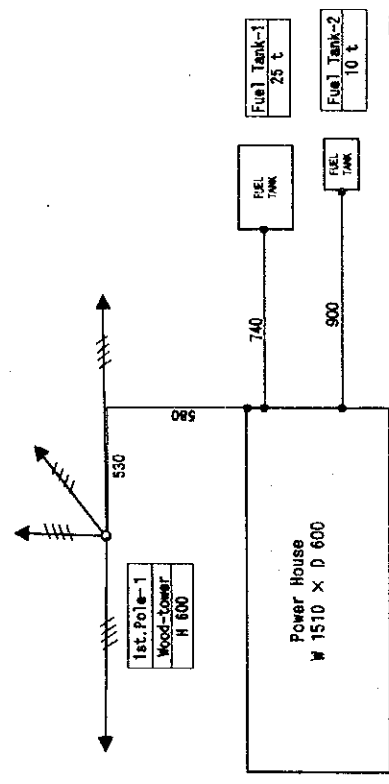
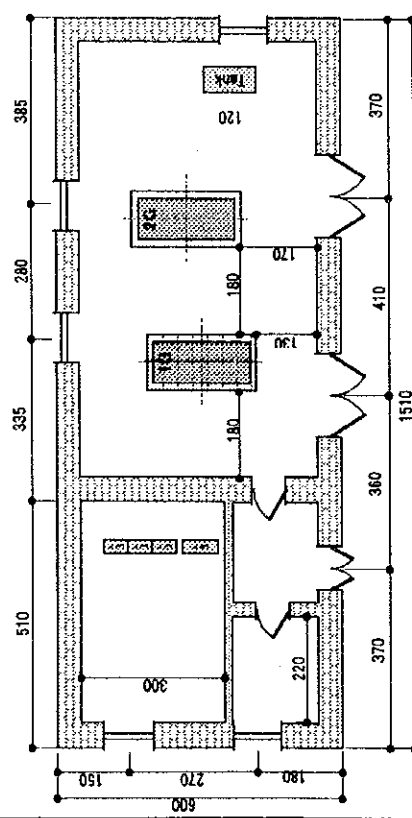
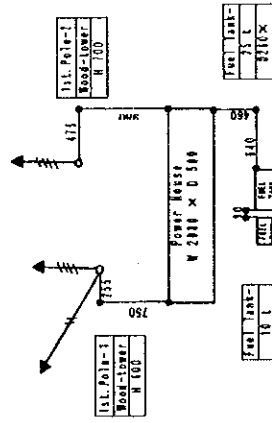
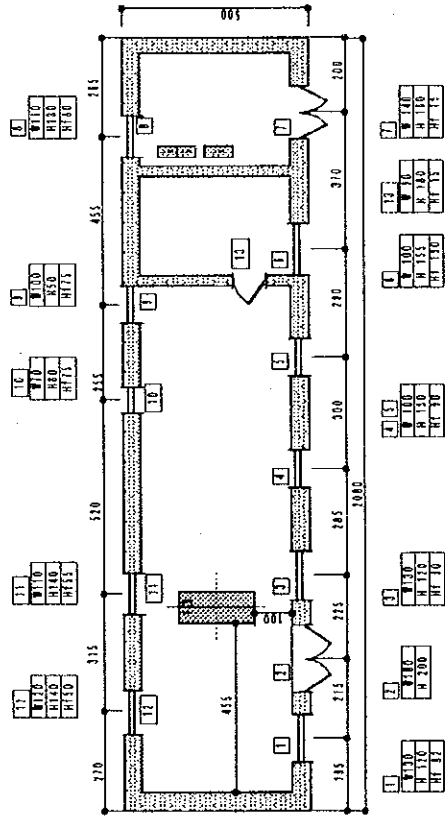


Figure 2.6-15 Layout Drawing of Bogd

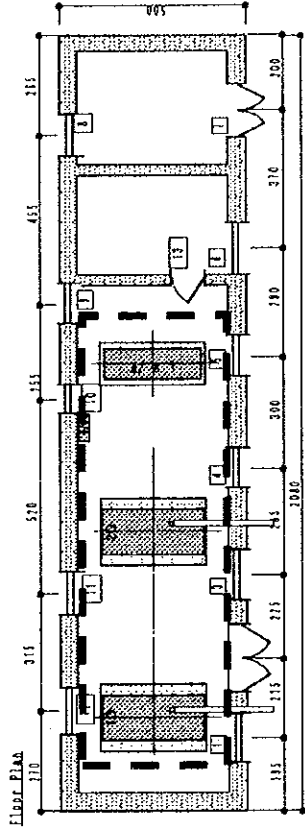
Existing Layout

Name of SJM: 11 Jinist



Layout Plan

Name of SJM: 11 Jinist



Scope of work under this project

Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-16 Layout Drawing of Jinist



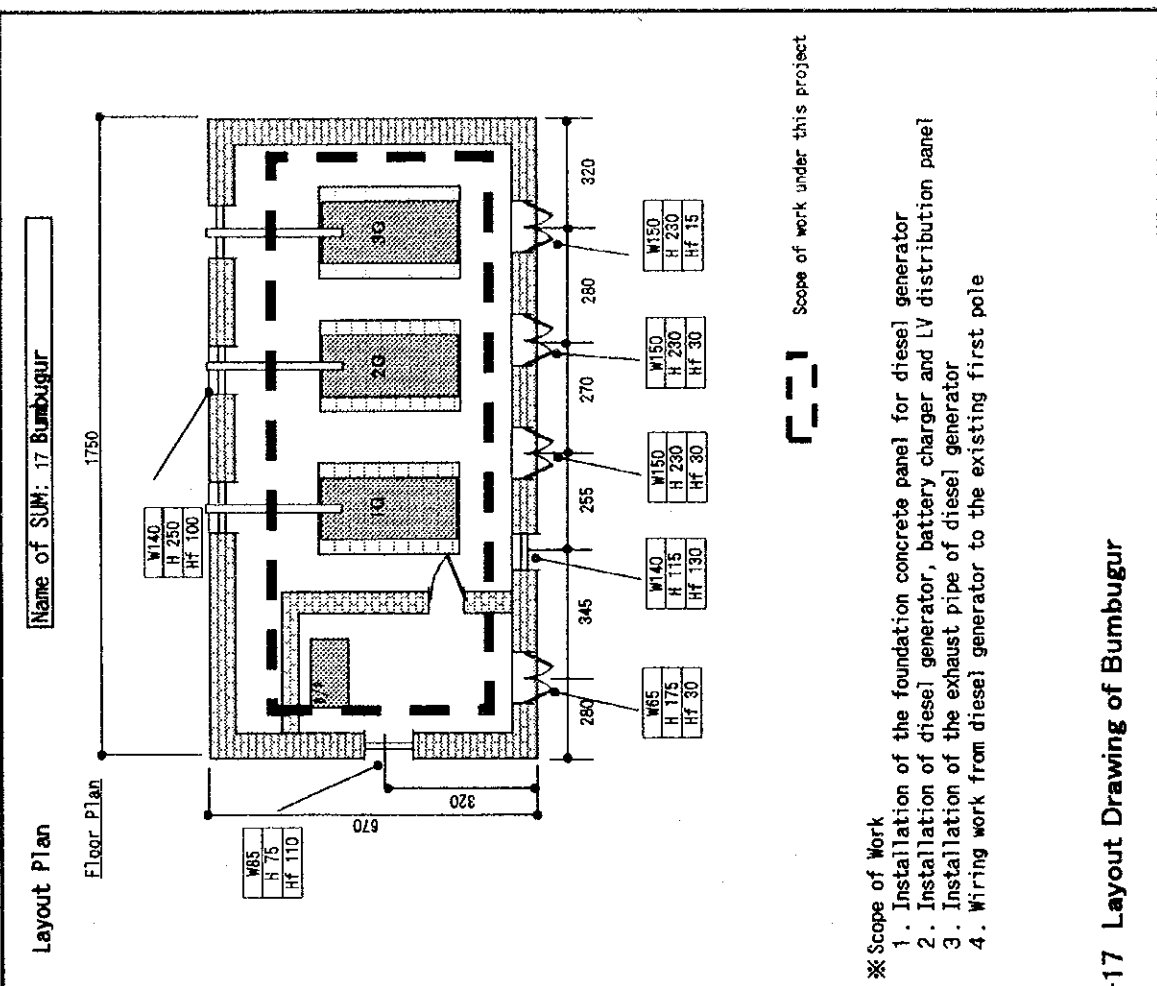
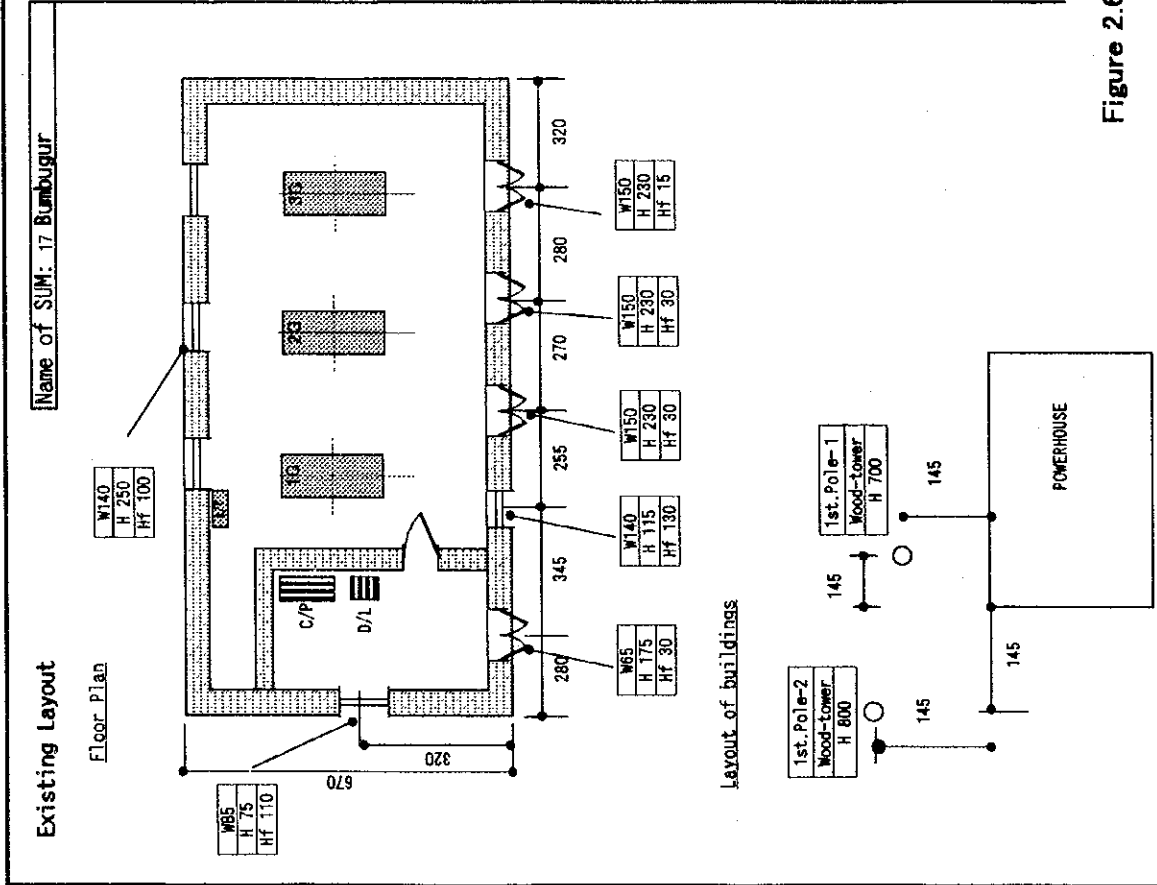
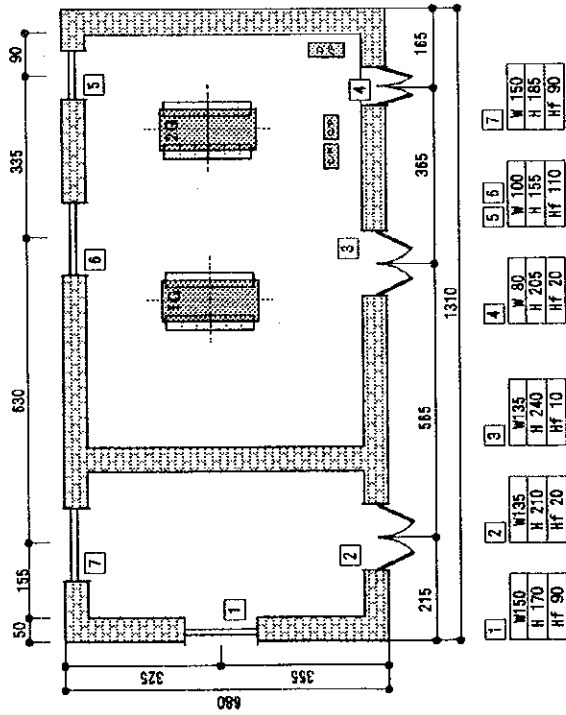


Figure 2.6-17 Layout Drawing of Bumbugur

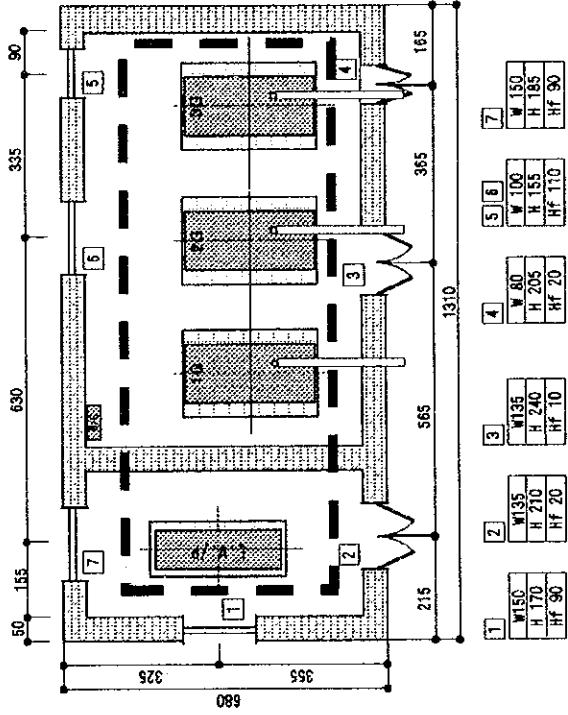
Existing Layout

Name of SUM: 18 Mandakh



Layout Plan

Name of SUM: 18 Mandakh



Scope of work under this project

- ※ Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

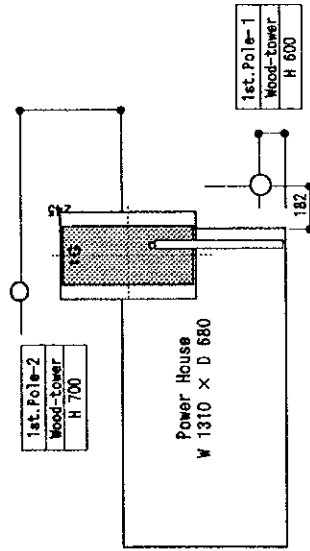
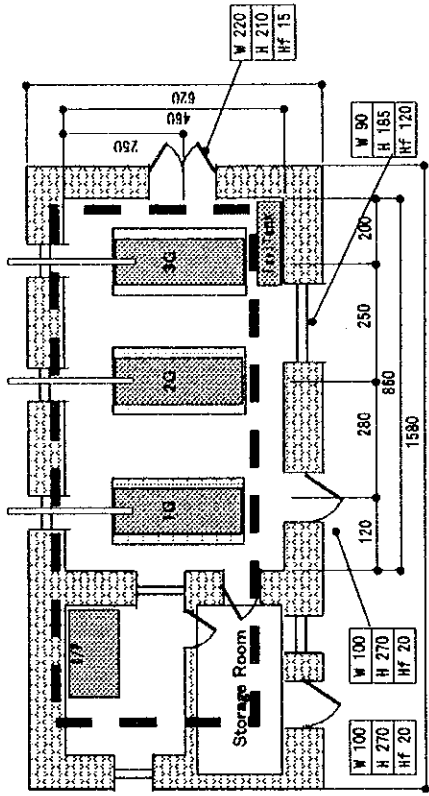


Figure 2.6-18 Layout Drawing of Mandakh

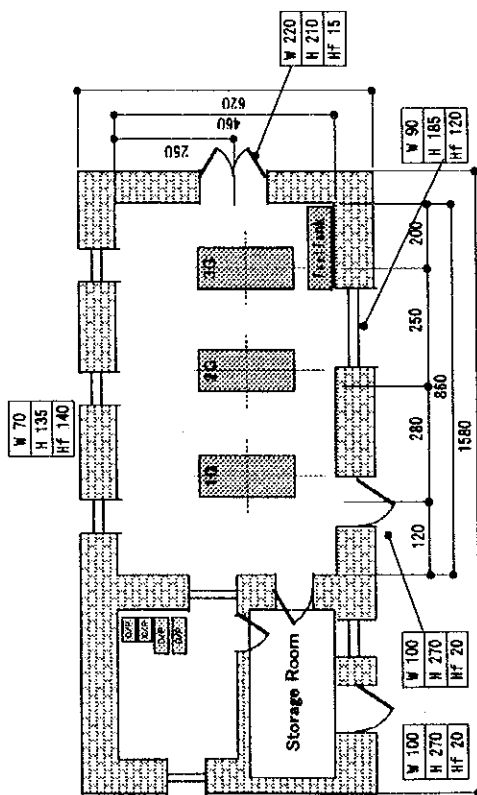
Name of SUM: 19 Sayhandulaaan

Layout Plan



Name of SUM: 19 Sayhandulaaan

Existing Layout



Scope of work under this project

- ※ Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

RI1.3-12C

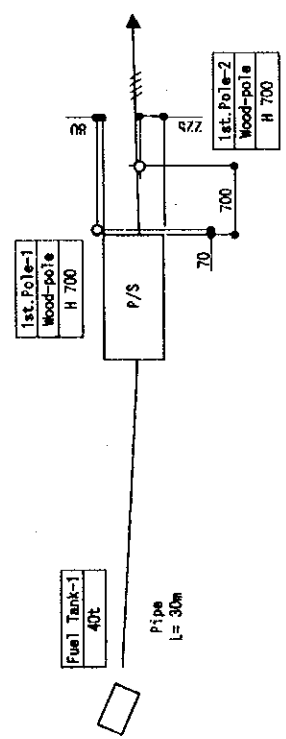
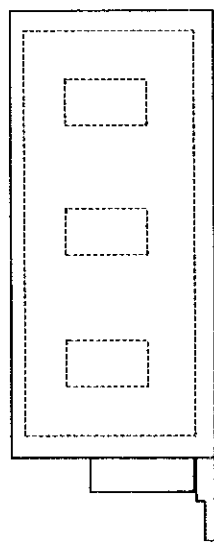
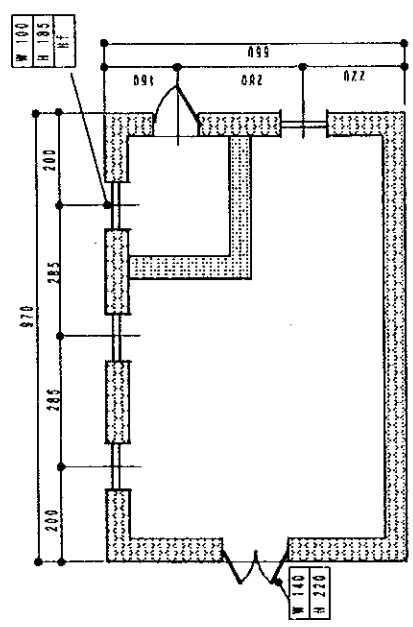


Figure 2.6-19 Layout Drawing of Sayhandulaaan

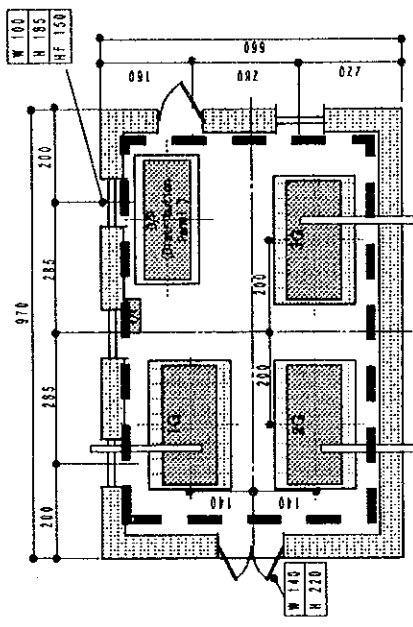
Existing Layout

Name of SOM: 20 Dariganga



Layout Plan

Name of SOM: 20 Dariganga



Scope of work under this project

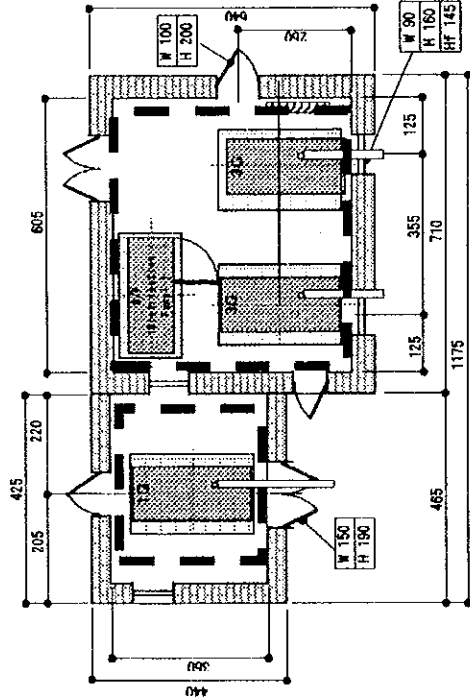
※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Figure 2.6-20 Layout Drawing of Dariganga

Name of SUM: 21 Ongon

Layout Plan



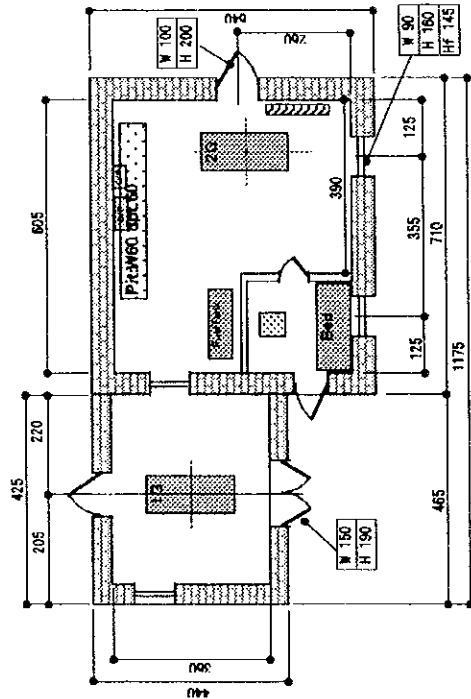
Scope of work under this project

\* Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

Name of SUM: 21 Ongon

Existing Layout



201.3-21LB

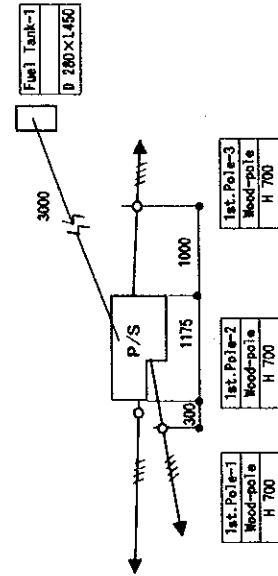
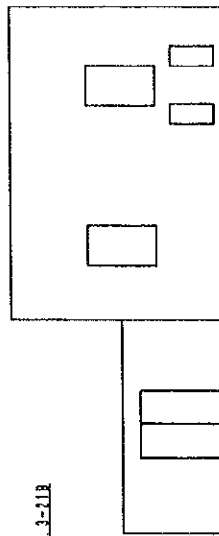
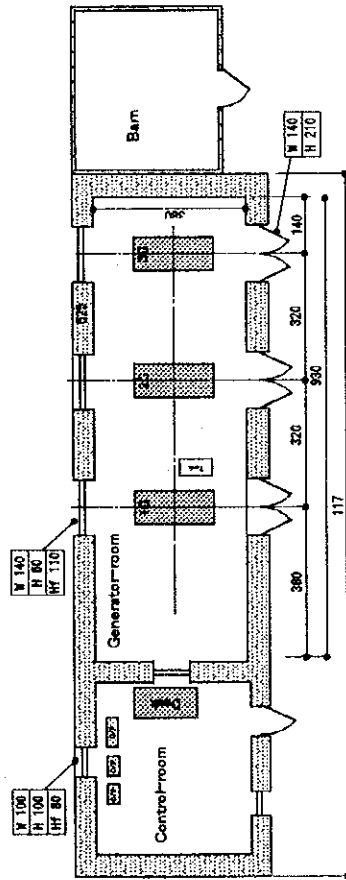


Figure 2.6-21 Layout Drawing of Ongon

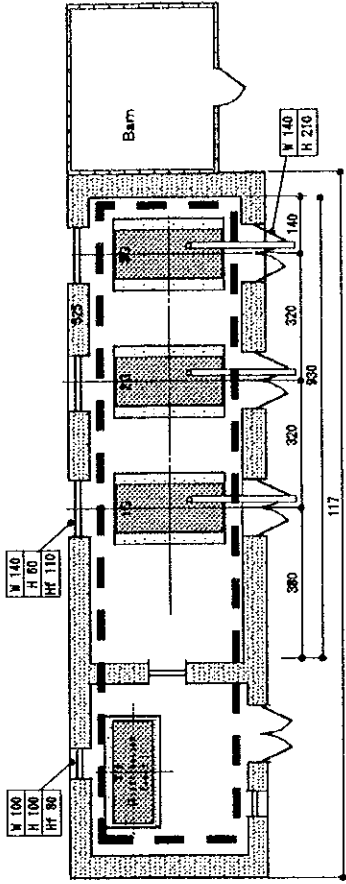
Existing Layout

Name of SUM: 22 Bayandelger



Layout Plan

Name of SUM: 22 Bayandelger



Scope of work under this project

- ※Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

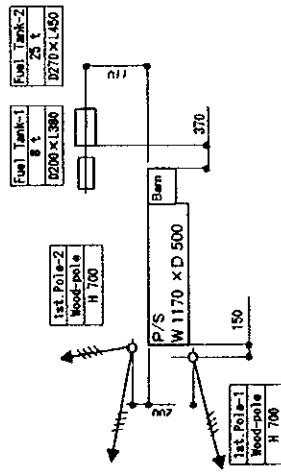
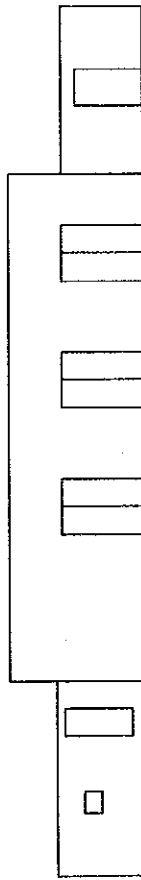
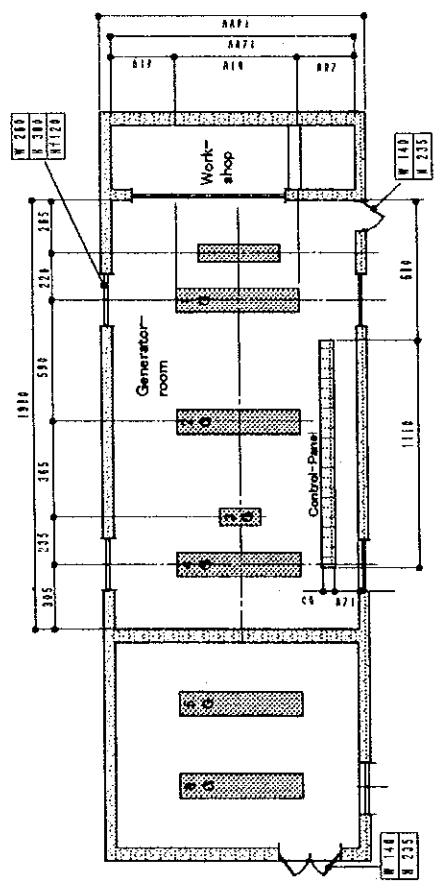


Figure 2.6-22 Layout Drawing of Bayandelger

Existing Layout

Name of SUM: 23 Tumentsoqt



Layout Plan

Name of SUM: 23 Tumentsoqt

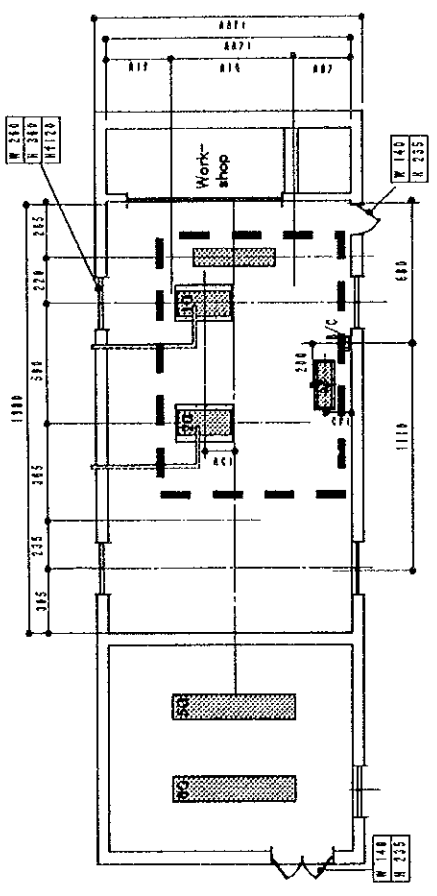
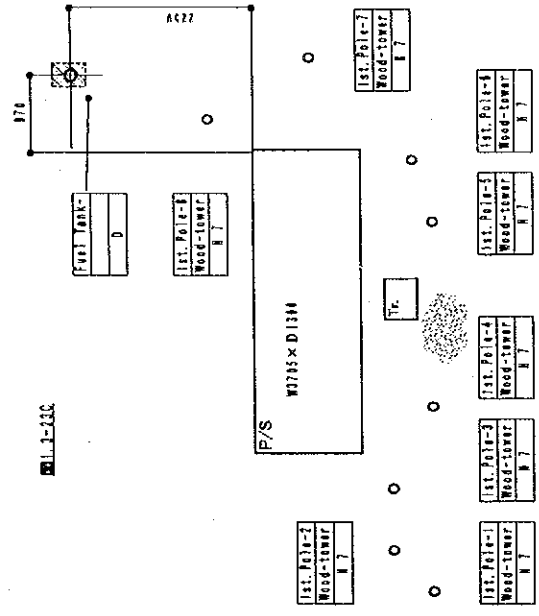


Fig. 2-21C



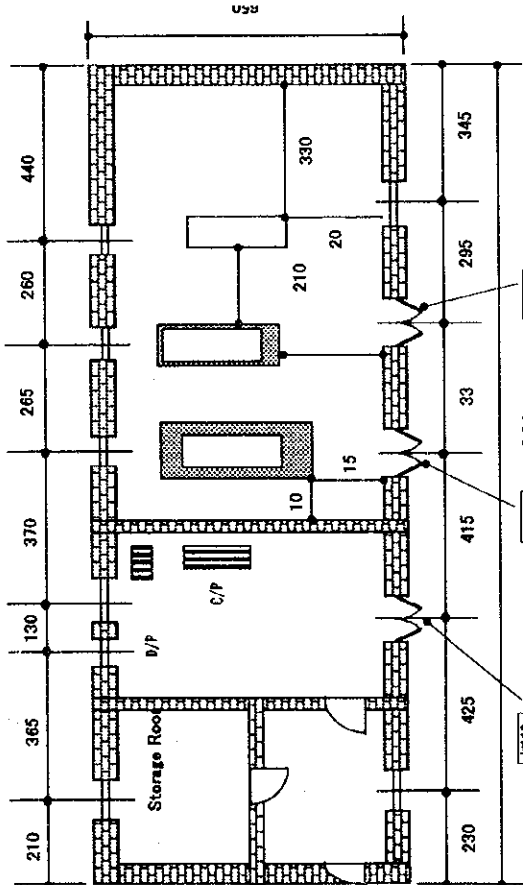
Scope of work under this project

- \* Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

Figure 2.6-23 Layout Drawing of Tumentsoqt

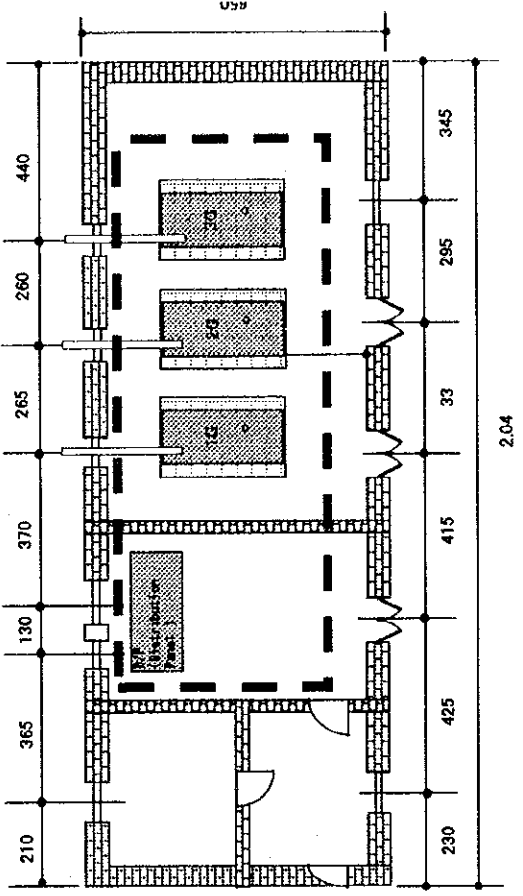
Existing Layout

Name of SUM: 24 Noyon



Layout Plan

Name of SUM: 24 Noyon



Scope of work under this project

※ Scope of Work

1. Installation of the foundation concrete panel for diesel generator
2. Installation of diesel generator, battery charger and LV distribution panel
3. Installation of the exhaust pipe of diesel generator
4. Wiring work from diesel generator to the existing first pole

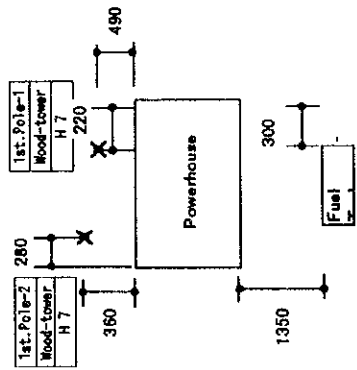
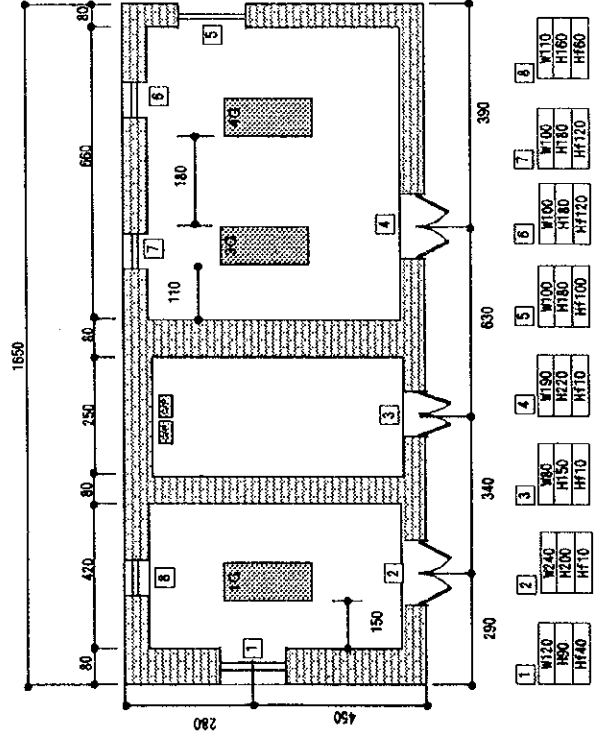


Figure 2.6-24 Layout Drawing of Noyon

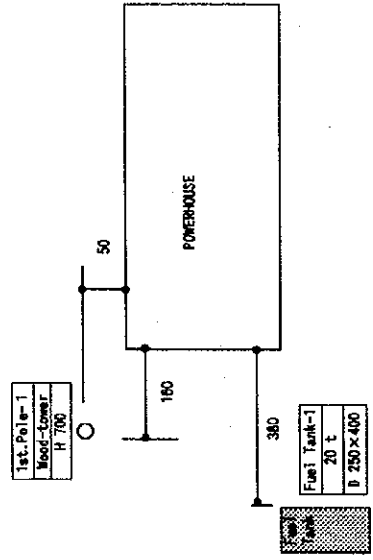


Existing Layout

Name of SUM: 25 Guryvanties

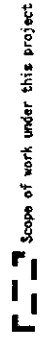
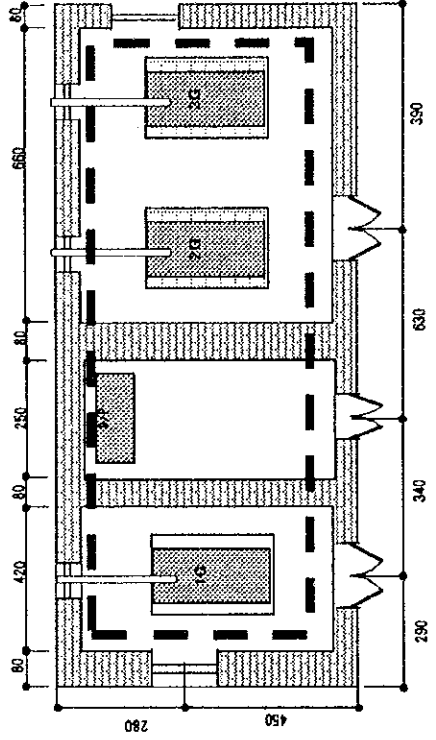


LAYOUT OF BUILDINGS



Layout Plan

Name of SUM: 25 Guryvanties



- ※ Scope of Work
1. Installation of the foundation concrete panel for diesel generator
  2. Installation of diesel generator, battery charger and LV distribution panel
  3. Installation of the exhaust pipe of diesel generator
  4. Wiring work from diesel generator to the existing first pole

Figure 2.6-25 Layout Drawing of Guryvanties

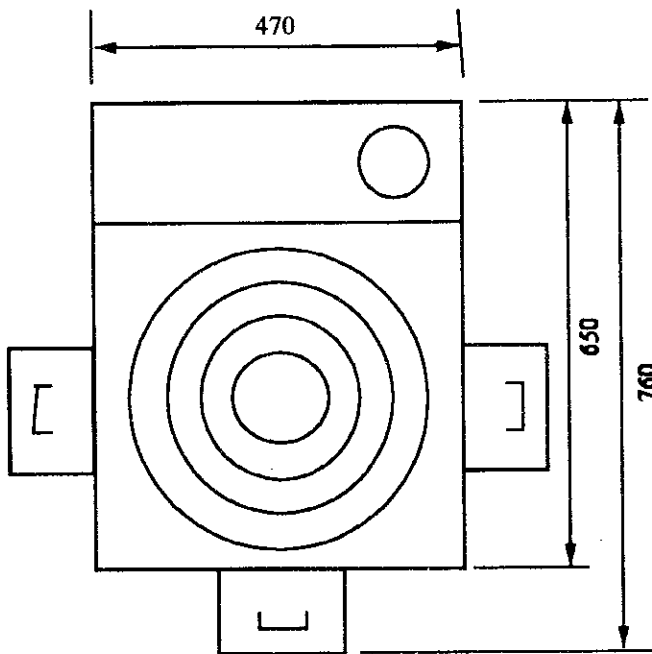
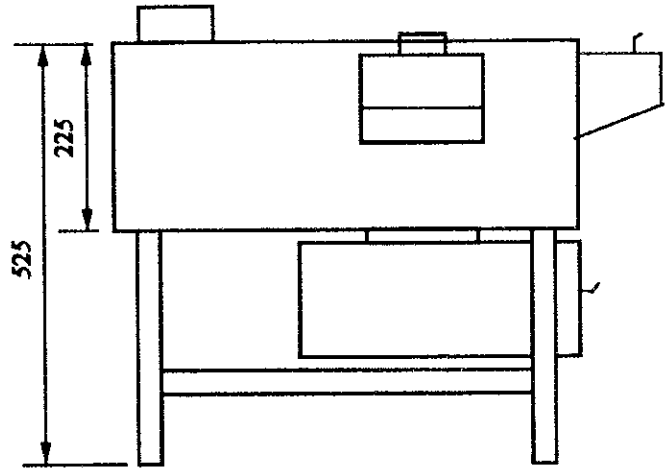
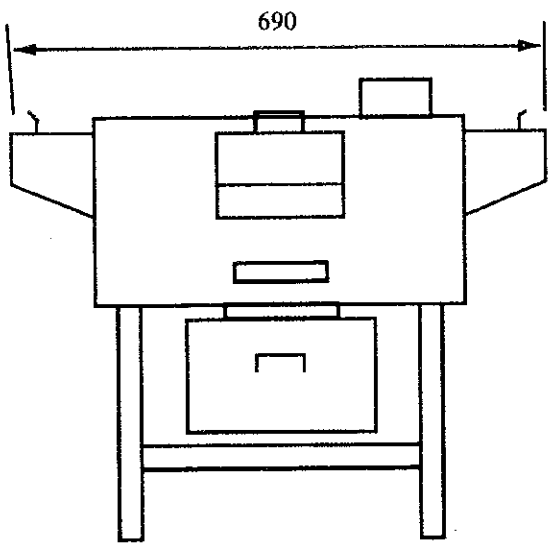
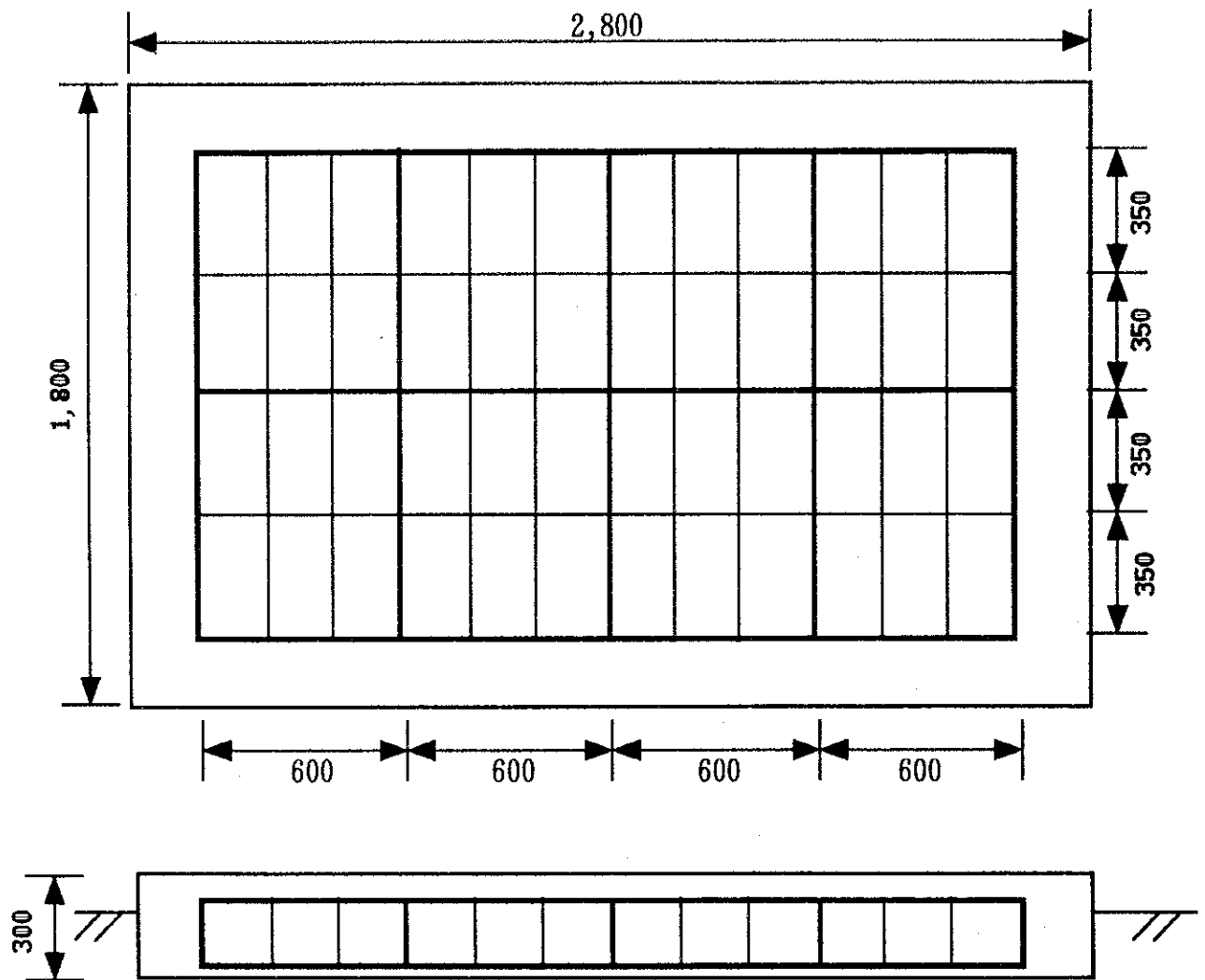


Figure 2.7 Outline View of Stove



基礎寸法 2,800mm x 1,800mm x 300mm (1.512 M3)

鉄筋  $\phi 19\text{mm}$  : 2,600mm x 6本  
 $\phi 19\text{mm}$  : 1,600mm x 10本  
 $\phi 10\text{mm}$  : 2,600mm x 4本  
 $\phi 10\text{mm}$  : 1,600mm x 16本

Figure 2.8 Pre-fabricated Foundation

## **APPENDICES**



## Appendix 1 Member of the Survey Team

### Member List

No.	In Charge	Name	Organization
1.	Leader	Hayao ADACHI	Development Specialist, Institute for International Cooperation, JICA
2.	Chief Consultant/ Operation and Maintenance Planner	Noriaki MATSUSHIMA	Nippon Koei Co., Ltd.
3.	Electricity Supply Planner	Kenzou MORI	Nippon Koei Co., Ltd.
4.	Equipment Planner-1	Hiromichi MOCHIZUKI	Nippon Koei Co., Ltd.
5.	Equipment Planner-2	Takamichi HASEGAWA	Nippon Koei Co., Ltd.
6.	Procurement Specialist / Cost Estimator	Akihisa MANITA	Nippon Koei Co., Ltd.
7.	Translator	Sanae ABIKO	Nippon Koei Co., Ltd.

## Appendix 2 Survey Schedule

Date	No.	Official	Team-A	Team-B
3-Jul	1		HANEDA-KANKUU-ULN	ULN
4	2		Day Off	ULN
5	3		Meeting with JICA, Embassy, MOID	ULN
6	4	AB1	ULN-Testserleg	Testserleg
7	5	AB2	Testserleg-Chuluut (3)	Chuluut
8	6	AB3	Chuluut-Khangai (1)-Tsakhir (2)-Tariat	Tariat
9	7	AB4	Tariat-Haraborin	Haraborin
10	8	AB5	Haraborin-ULN	ULN
11	9		Day Off	ULN
12	10		Study and Internal Meeting	ULN
13	11		Study and Internal Meeting	ULN-Sainsyand
14	12	A1	ULN-Undurkhaan	Undurkhaan
15	13	A2	Undurkhaan-Bayan Ovoo (8)-Tumensogt (23)	Sainsyand-Erdene (19)-Saihandulaan
16	14	A3	Tumensogt-Dariganga(20)	Saihandulaan-Mandakh (18)-Undulshil (5)-Bayanjargaran (6)
17	15	A4	Dariganga-Ongon (21)-Bayandelger (22)	Bayanjargaran-Mandalgovi-Ulzit (4)
18	16	A5	Bayandelger-Galshar (7)	Ulzit-Dalanzadgad
19	17	A6	Galshar-Baganor	Dalanzadgad-Noyon (24)
20	18	A7	Baganor-ULN	Noyon (Camp)
21	19	NRT-KANKUU-ULN	Interim report to JICA	Servey
22	20	Meeting with JICA, Embassy, MOID	Meeting with JICA, Embassy, MOID	Arvaybeer
23	21	Meeting of M/D with MOID	Meeting of M/D with MOID	Arvaybeer
24	22	Internal Meeting	Internal Meeting	Internal Meeting
25	23	Internal Meeting	Internal Meeting	Internal Meeting
26	24	ULN-Bayan Undur (12)	ULN-Bayan Undur (12)	Arvailkbeer-Hairkhandulaan (13)-Nariteel (10)-Shargaljuut
27	25	Bayan Undur-ULN	Bayan Undur-ULN	Shargaljuut-Bayanhongor-Bumbugur (17)-Bayanhongor
28	26	Discussion of M/D with MOID	Discussion of M/D with MOID	Bayanhongor
29	27	Sign of M/D	Sign of M/D	Bayanhongor
30	28	Report to JICA, Embassy	Report to JICA, Embassy	Bayankhongor
31	29	Internal Meeting	Internal Meeting	Internal Meeting
1	30	ULN-SOUL-NRT	ULN-SOUL-NRT	ULN-SOUL-NRT

### **Appendix 3 Member List of Party Concerned in the Recipient Country**

#### **1) Ministry of Infrastructure Department**

Mr. B. Batjav                      Director General  
Department for Coordination of Policy Implementation

Mr. S. Batrenchin                Project Coordinator  
Department Policy Implementation and Coordination

Mr. Ariunbold                    Energy Authority

Mr. Tsog                         Energy Authority

#### **2) Ministry of External Relations**

Mr. D. Boldbaatar                Foreign Trade and Cooperation Department

Ms. L. Nasanbuyan                Foreign Trade and Economic Cooperation Department



3 ) Aimags and objective Sums

Aimag	Sum	Name	Position
Arhangai	Aimag Center	L.Chadraabal	Chief of General Affairs
		M.Dondog	In Charge of Livestock Farming Industry
	Khangai	Luvsandagva	Headman's Assistant
		Dorjragchaa	Village Officer
		Batayer	Generator Operator
	Tsakbir	Ulziibat	Sum Chief
		Dondog	Chairman of Sum Assembly
		Sereenenkhorol	Chief of General Affairs
		Ganbat	Headman's Assistant
	Chuluut	Dorjderem	Sum Chief
		Sarantuya	Headman's Assistant
		Balgansuren	Chief of General Affairs
		Bat Erdene	Power Manager
		Ganbaatar	Chairman of Sum Assembly
		Dagvasumberel	National Tax Investigator
Sodovdorj		Generator Operator	
Boldbaatar		Generator Operator	
Dundgovi	Aimag Center	Huuhentaatar	Governor
		Baasanhuu	Vice-governor
		Tserendulam	Secretary
	Ulzit	Samdon	Sum Chief
	Undulshil	Budjav	Sum Chief
		Mishigdorj	Generator Operator
	Bayanjargalan	Munkhjargal	Sum Chief
		Erdenechimeg	Deputy Sum Chief

Aimag	Sum	Name	Position	
Hentii	Aimag Center	C.Enkhee	Governor	
		G.Khaltar	Chairman of Aimag Assembly	
		T.Gurtseden	In Charge of Infrastructure	
	Galshar	B.Enkhtaivan	Sum Chief	
		S.Janchivdorj	Electrical Engineer	
		Erdene Ochir	Manager of general Affaires	
	Bayan-Ovoo	Ochirbat	Sum Chief	
		Damdinsuren	Deputy Sum Chief	
		Bayanjargal	Electrical Engineer	
		Byambatjil	Chief Executive	
Uberhangai	Aimag Center	Batmuukh	Governor	
		Baruunbayan-Ulaan	Chairman of Sum Assembly	
	Harinteel	Buddori	Sum Chief	
		Jargalsaihan	Chairman of Sum Assembly	
		Byambagnren	In Charge of Accounts	
	Guchin-Us	Battulga	Chairman of Sum Assembly	
		Battar	In Charge of Energy	
	Bayan-Undur	Elbegzaya	Sum Chief	
		Davaadulam	Deputy Sum Chief	
	Hairhandulaan	Myaamar	Sum Chief	
		Tumurchudur	Deputy Sum Chief	
	Bayanhongor	Aimag Center	Bayarsaihan	Governor
			Zorigtbaatar	Manager of Economy and Finance
Bayangovi		Baasan Khum	Sum Chief	
		Erdene Munkh	Deputy Sum Chief	
		Enkibat	In Charge of Energy	

Aimag	Sum	Name	Position
	Bogd	Ulziiorshih	Sum Chief
		Gerlee	Deputy Sum Chief
		Javzandulam	Chairman of Sum Assembly
	Jinst	Tegshbayar	Deputy Sum Chief
		Naranbaatar	In Charge of Energy
	Bumbugur	Khaltar	Sum Chief
		Togtoh	Chairman of Sum Assembly
		Ochirhuyag	In Charge of Finance
Dornogovi	Aimag Center	Ishdorj	Governor
		Ukhnaa	Manager of Economy
		Mungentsetseg	Economy Specialty
	Mandakh	Dorjhuyag	Sum Chief
		Enkhbat	Generator Operator
	Erdene	Baatar	Chairman of Sum Assembly
		Jambaliin Sankhuu	Generator Operator
	Saihandulaan	Dolgor	Deputy Sum Chief
		Jargal	Generator Operator
Sukhbaatar	Aimag Center	Jargalsalkhan	Manager of Economy
		Sainchimeg	Economy Specialty
		Narantsatsralt	In Charge of Infrastructure
		Gantumur	In Charge of Infrastructure
	Dariganga	Batmunkh	Chief Sum
		Jadamba	Chief Executive
		Borkhuukhen	In Charge of Weather
		Borchuluun	In Charge of Accounts
	Tumentsogt	D.Dorj Ochir	Sum Chief
		S.Myanmardash	Deputy Sum Chief

Aimag	Sum	Name	Position
		N.Ulzii	Chief Executive
		J.Lkhagvasuren	Chief of P/S
		R.Arslanbaatar	In Charge of Statistics
		G.Erdenechimeg	In Charge of Power Accounts
		D.Erdenesukh	Generator Operator
	Ongon	Badarchin	Sum Chief
		Z.Daleental	Deputy Sum Chief
		O.Dalantal	Chairman of Sum Assembly
		D.Chor	Chief of Energy Center
	Bayandelger	Dashzeveg	Sum Chief
		Galdandorj	Chief of Power Service
		Avaadorj	Generator Operator
		Suren	Deputy Sum Chief
		Hurelee	In Charge of Accounts
Umnugovi	Aimag Center	Tsendsuren	Manager of Economy and Finance
		Tserenchimed	Manager of Sale and Economy
	Noyon	Dorjin	Sum Chief
		Ganbat	Deputy Sum Chief
		Suvgerkhum	Generator Operator
	Gurvantes	Jaalkhuu	Deputy Sum Chief
		Batbayar	In Charge of Energy

MINUTES OF DISCUSSIONS  
ON BASIC DESIGN STUDY  
ON THE PROJECT FOR REHABILITATION OF POWER PLANTS OF SUM CENTERS,  
PHASE III  
IN MONGOLIA

In response to a request from the Government of Mongolia, the Government of Japan decided to conduct a Basic Design Study on the Project for Rehabilitation of Power Plants of Sum Centers Phase III (hereinafter referred to be as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Mongolia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Hayato Adachi, Development Specialist, JICA, and is scheduled to stay in the country from July 3 to August 1, 1999.

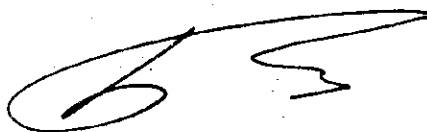
The Team held discussions with the officials concerned of the Government of Mongolia and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Ulaanbaatar, July 29, 1999



Hayato Adachi  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency



Bathuyag Batjav  
Director General  
Department for Coordination of  
Policy Implementation  
Ministry of Infrastructure Development



D. Boldbaatar  
Foreign Trade and Cooperation Department  
Ministry of External Relations

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to improve the living standard of people who lives in rural areas by means of rural electrification.

### 2. Project sites

The sites of the Project are 24 Sum Centers shown in Annex-1.

Erdene in Dornogovi Aimag was excluded from the project sites because the electric power grid has been connected to Erdene.

### 3. Responsible and Implementing Agency

(1) The Responsible Agency is Ministry of Infrastructure Development (Annex-2).

(2) The Implementing Agency is Department for Coordination of Policy Implementation, Ministry of Infrastructure Development and Sum Centers.

### 4. Items requested by the Government of Mongolia

After discussions with the Team, the following items were finally requested by the Mongolian side. Final components of the Project, however, will be decided after further study.

- Diesel generating facilities described in Annex-3 including spare parts for 3 years and operation & maintenance tools.
- Installation work including preparation of concrete foundation
- Execution of the soft component program

### 5. Japan's Grant Aid Scheme

(1) The Mongolian side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-4.

(2) The Mongolian side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project, as a condition for Japanese Grant Aid to be implemented.

### 6. Schedule of the Study

(1) The consultant will proceed to further studies in Mongolia until August 1, 1999.

(2) JICA will complete the final report and send it to the Government of Mongolia by December 1999.

7. Other relevant issues

- (1) The Government of Mongolia will allocate the necessary budget and personnel for the execution of the Project.
- (2) The Government of Mongolia will maintain and operate properly and effectively the facilities purchased under the Project.
- (3) The ownership of equipment to be provided by the Japan's Grant Aid belongs to Ministry of Infrastructure Development.
- (4) The Government of Mongolia assured that all the necessary refurbishment works of the power houses and dismantling work of the existing power plants in the sum centers would be completed by June 2000.
- (5) In designing the unit generator output and number of units for each sum, JICA will follow the same method as "the Project for Rehabilitation of Power Plants of Sum Centers Phase II".
- (6) The Government of Mongolia mentioned that service teams for maintenance and repair of the generators are planned to be stationed in 3 Aimags (Sukhbaatar, Uvurkhangai, Dondgovi) in addition to 6 Aimags to be established under Phase II. The Mongolian side also requested for procurement of maintenance vehicles with repairing tools for the three Aimag mobile repairing teams.
- (7) The Mongolian side requested the consultant services for (a) operation and maintenance of generating facilities at Ulaanbaatar, (b) operation and management of power supply utilities at Ulaanbaatar or Aimag centers, as one of the components of the Grant Aid.
- (8) The Government of Mongolia takes responsible for the following matters related to the consultant services written above;
  - Provision of appropriate sites and facilities for seminar and training
  - Supporting works related to the seminar and training
  - Collection of monitoring sheets
  - All the transportation cost and hotel expenses of trainees

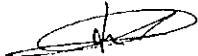
Annex-1 : Project Sites

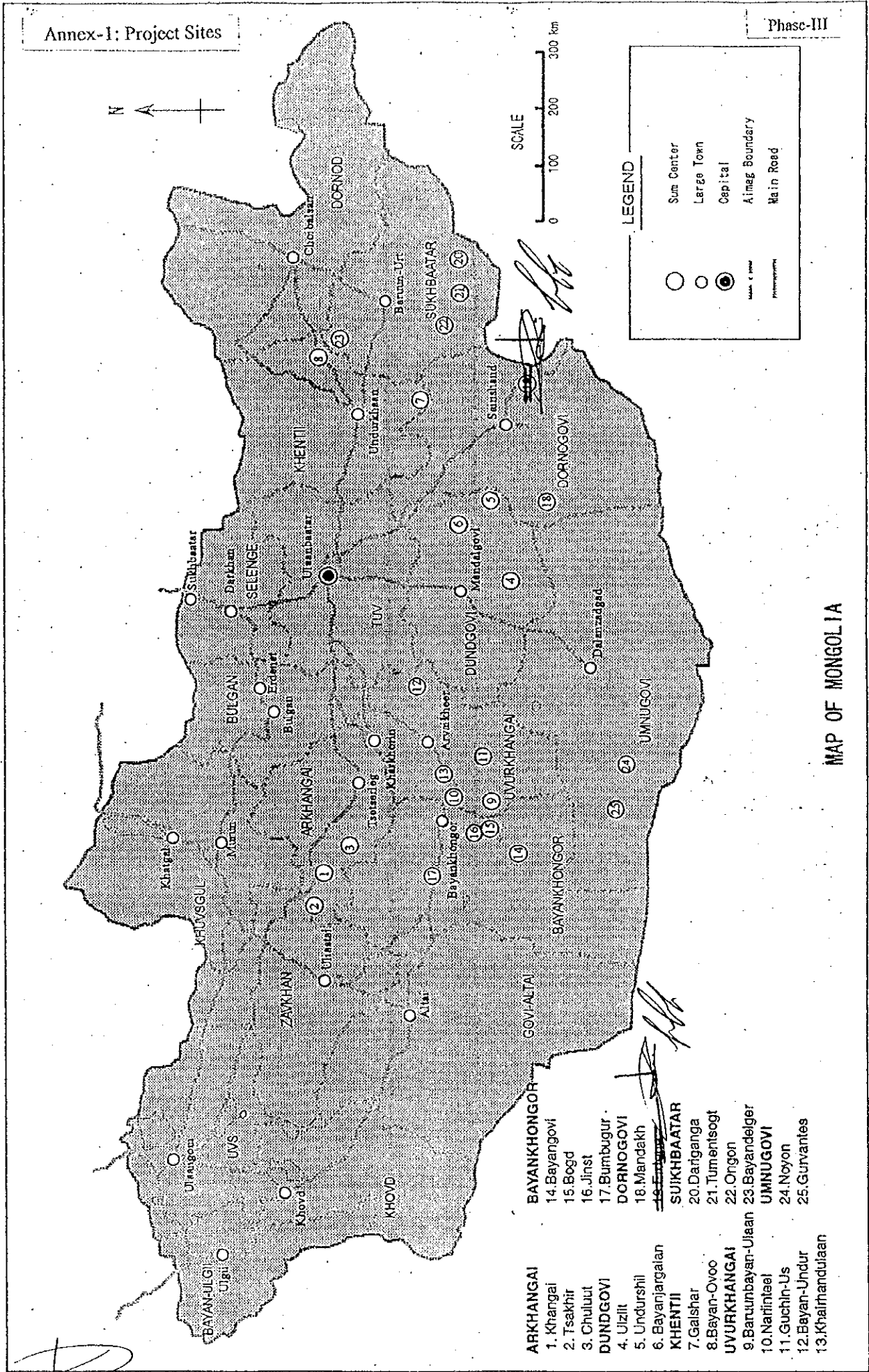
Annex-2 : Responsible and Implementing Agency

Annex-3 : Items requested by the Government of Mongolia

Annex-4 : Japan's Grand Aid Scheme

Annex-5 : Necessary measures to be taken by the Government of Mongolia





- |                     |                     |
|---------------------|---------------------|
| <b>ARKHANGAI</b>    | <b>BAYANKHONGOR</b> |
| 1. Khangai          | 14. Bayangovi       |
| 2. Tsakhir          | 15. Bogd            |
| 3. Chuluut          | 16. Jinist          |
| <b>DUNDGOVI</b>     | 17. Bumbugur        |
| 4. Ulzilk           | <b>DORNOGOVI</b>    |
| 5. Undurshil        | 18. Mandakh         |
| 6. Bayanjargalan    | 19. Bayankhongor    |
| <b>KHENTII</b>      | 20. Dariganga       |
| 7. Galshar          | 21. Tumentisogt     |
| 8. Bayan-Ovoo       | 22. Ongon           |
| <b>UVURKHANGAI</b>  | 23. Bayandeiger     |
| 9. Barunbayan-Ulaan | <b>UMNUGOVI</b>     |
| 10. Narinteel       | 24. Noyon           |
| 11. Guchin-Uus      | 25. Gurvantes       |
| 12. Bayan-Undur     |                     |
| 13. Khalthandulaan  |                     |

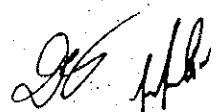
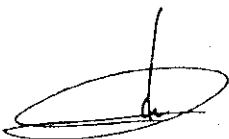
MAP OF MONGOLIA

*[Handwritten signatures]*

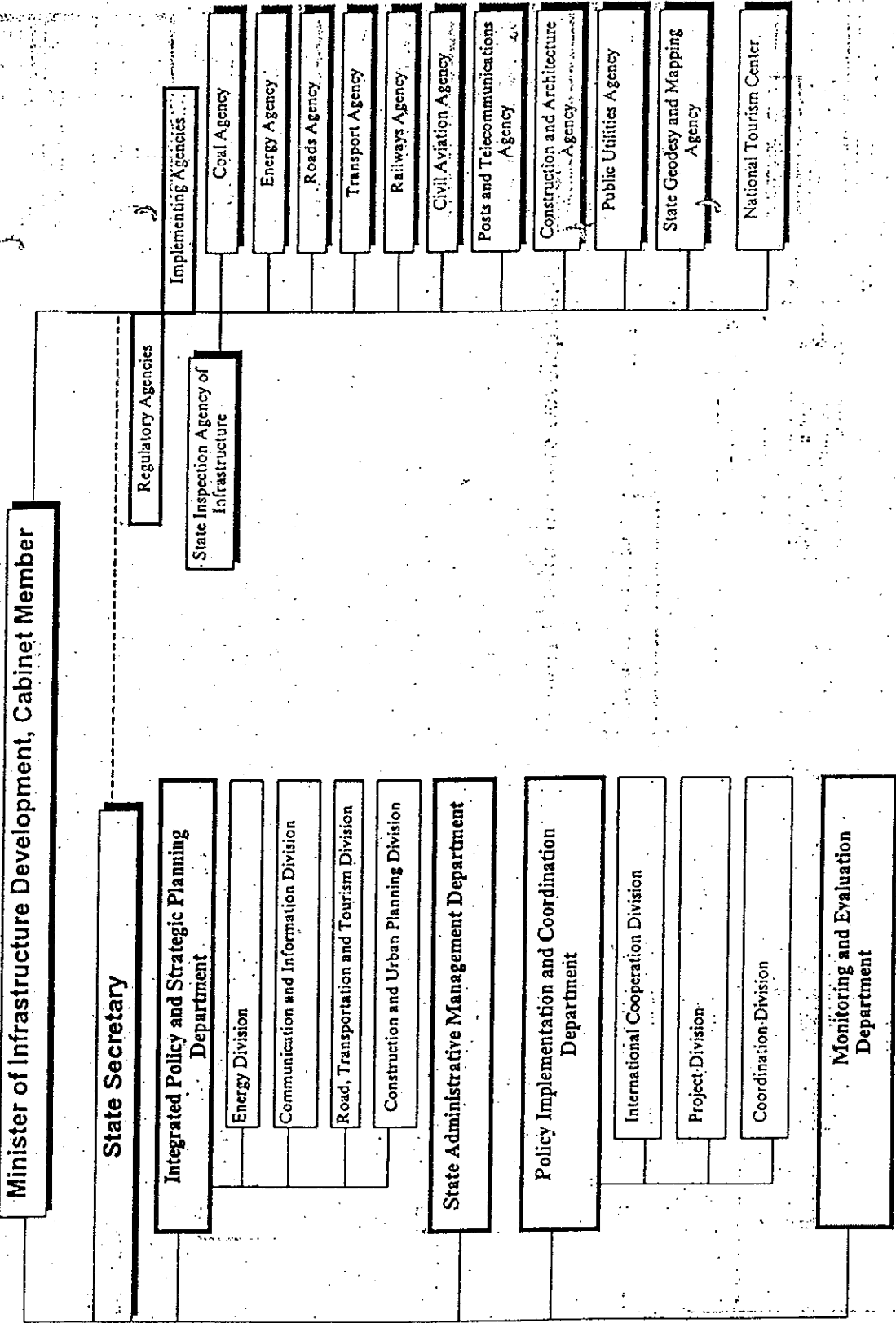


Annex-2: Responsible and Implementing Agency

Refer to attached Organization Chart of Ministry of Infrastructure Development)



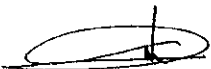
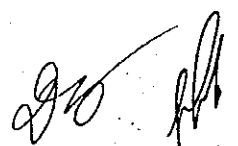
# Organizational Chart of the Ministry of Infrastructure Development, Mongolia



## Annex-3: Items requested by the Government of Mongolia

No.	Aimag	Sum Center	100kW	60kW
1	ARKHANGAI	Khangai	-	2
2		Tsakhir	-	2
3		Chuluut	-	3
4	DUNDGOVI	Ulziit	2	-
5		Undurshil	-	3
6		Bayanjargalan	-	3
7	KHENTII	Galshar	2	-
8		Bayan Ovoo	-	3
9	UVURKHANGAI	Baruunbayan-Ulaan	-	3
10		Nariinteel	-	4
11		Guchin-Us	-	3
12		Bayan-Undur	-	3
13		Hairhandulaan	-	3
14	BAYANHONGOR	Bayangovi	-	3
15		Bogd	-	3
16		Jinst	-	2
17		Bumbugur	-	3
18	DORNOGOVI	Mandakh	-	3
19		Erdene *	-	-
20	SUKHBAATAR	Dariganga	-	3
21		Ongon	2	-
22		Bayandelger	3	-
23		Tumentsogt	3	-
24	UMNUGOVI	Noyon	-	3
25		Gurvantes	-	3

Note: \* Erdene in Dornogovi Aimag was excluded from the project sites because the electric power grid has been connected to Erdene.

Annex-4: Japan's Grand Aid Scheme

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

- Application (Request made by the recipient country)
- Study (Basic Design Study conducted by JICA)
- Appraisal & Approval (Appraisal by the Government of Japan and Approval by the Approval by the Cabinet of Japan)
- Determination of Implementation (The Note exchanged between the Governments of Japan and the recipient country)
- Implementation (Implementation of the Project )

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid.

If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study) using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the study

The aim of the Basic Design Study (hereafter referred to as "the Study") conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows :

- a) Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.

- b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- d) Preparation of a basic design of the Project.
- e) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

## 2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The selected firm(s) carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consultant firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

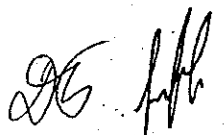
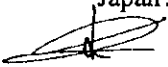
## 3. Japan's Grant Aid Scheme

### 1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

### 2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two



Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals." (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

- (1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.
- (2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- (3) To secure buildings prior to the procurement in case the installation of the equipment.
- (4) To ensure all the expenses and prompt excursion for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

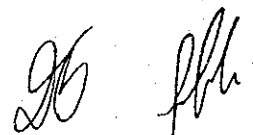
8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

9) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

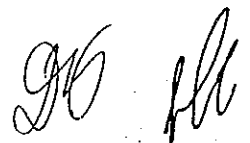


Annex-5:

NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF MONGOLIA

The following necessary measures should be taken by the Government of Mongolia on condition that the Grant Aid by the Government of Japan is extended to the Project:

- 1.To provide data and information necessary for the Project.
- 2.To secure land necessary for the execution of the Project.
- 3.To bear advising commissions of A/P and payment commissions to a Japanese bank for its banking services based upon the Banking Arrangement.
- 4.To ensure prompt unloading, tax exemption, customs clearance at the port of disembarkation in Mongolia and prompt internal transportation of the materials and equipment for the Project purchased under the Grant Aid.
- 5.To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Mongolia with respect to the supply of the products and services under the verified contracts.
- 6.To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contract, such facilities as may be necessary for their entry into Jordan and stay therein for the performance of their work.
- 7.To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary.
- 8.To maintain and use properly and effectively the facilities constructed under the Project.
- 9.To bear all the expenses, other than those to be borne by the Japan's Grant Aid within the scope of the Project.
- 10.To assign exclusive counterpart engineers and technicians for the Project.
- 11.To coordinate and solve any issues related to the Project which may be raised from third parties or inhabitants in the Project area during implementation of the Project.





## Appendix 5 Cost Estimation Borne by the Recipient Country

No.	Item	Q'ty	Unit Price	Budget
1	Remove of Old Generator	62	Tg. 300,000	Tg. 18,600,000
2	Repairing of Power Station	25	Tg. 300,000	Tg. 7,500,000
3	Digging for Concrete Foundation Panel	70	Tg. 100,000	Tg. 7,000,000
<b>Total</b>				<b>Tg. 33,100,000</b>







JICA