ANNEX

ANNEX

1. Member List of the Study Team

1-1 First Field Survey

Specialty	Name	Period	Title
1. Leader	Ako MUTO	4/18～4/29	Health Team, Project Management Group III, Grant Aid Project Management, JICA
2.Technical Adviser	Mitsuaki MATSUI	4/18～4/29	Expert Service Division, Bureau of International Cooperation, International Medical Center of Japan
3. Project Manager / Architectural Planning	Keiichi IDE	4/18～5/17	Yokogawa Architects and Engineers, Inc.
4. Architectural Design	Masao OKUI	4/18～5/17	Yokogawa Architects and Engineers, Inc.
5. Utility Planning	Takashi YOSHIMOTO	4/25～5/14	Yokogawa Architects and Engineers, Inc.
6. Medical Equipment / Maintenance Planning	Masanori ABE	4/18～5/17	Daiichi Health Care Facility Consultants Inc.
7. Procurement / Quantity Survey	Kisen MISAWA	4/25～5/14	Yokogawa Architects and Engineers, Inc.
8. Architectural Design (Voluntary Participation)	Shoichi TASHIRO	4/25～5/14	Yokogawa Architects & Engineers, Inc.

1-2 Second Field Survey

Specialty	Name	Period	Title
1. Leader	Takashi MATSUMOTO	7/5～7/10	Assistant Resident Representative JICA India Office
2.Technical Adviser	Mitsuaki MATSUI	7/4～7/12	Expert Service Division, Bureau of International Cooperation, International Medical Center of Japan
3. Project Manager / Architectural Planning	Keiichi IDE	7/4～7/12	Yokogawa Architects and Engineers, Inc.
4. Architectural Design	Masao OKUI	7/4～7/12	Yokogawa Architects and Engineers, Inc.
5. Medical Equipment / Maintenance Planning	Masanori ABE	7/4～7/12	Daiichi Health Care Facility Consultants Inc.

1-3 Explanation of Draft Final Report

Specialty	Name	Period	Title
1. Leader	Ako MUTO	10/12～10/21	Health Team, Project Management Group III, Grant Aid Project Management, JICA
2.Technical Adviser	Mitsuaki MATSUI	10/13～10/22	Expert Service Division, Bureau of International Cooperation, International Medical Center of Japan
3. Project Manager / Architectural Planning	Keiichi IDE	10/12～10/22	Yokogawa Architects and Engineers, Inc.
4. Architectural Design	Masao OKUI	10/12～10/20	Yokogawa Architects and Engineers, Inc.
5. Medical Equipment / Maintenance Planning	Masanori ABE	10/12～10/20	Daiichi Health Care Facility Consultants Inc.

2. Study Schedule

2-1 First Field Survey

April 18, 2004 -- May 17, 2004 (30 days)

	Date	Time	Activities
01	4/18	14:25	Official members and consultant members leave Narita JL-471 (Ide, Okui, Abe)
	(Sun)	20:00	Arriving in Delhi
02	4/19	09:30	Courtesy call to JICA India Office
	(Mon)	15:00	Courtesy call to Ministry of Health
		16:00	Courtesy call to Department of Economic Affairs, Ministry of Finance
03	4/20	11:30	Leaving Delhi IC-877
	(Tue)	13:30	Arriving in Bhubaneswar
		15:30	Field survey in SVP PG Institute
04	4/21	10:30	Courtesy call and discussions with Ministry of Health and Family Welfare,
	(Wed)		Orissa State Government
		12:30	Capital Hospital Bhubaneswar
		15:30	Kalinga Hospital
05	4/22	09:00	Field survey in the Institute
	(Thr)	11:30	Discussions with the Institute
06	4/23	09:00	Field survey in the Institute
	(Fri)	11:30	Discussions with the Institute (Facility)
		15:00	Discussions with the Institute (Equipment)
07	4/24	11:00	Discussions with the Ministry of Health
	(Sat)	15:00	Discussions with the Institute
08	4/25		Data filing
	(Sun)	14:25	Consultant members leave NaritaJL-471 (Yoshimoto, Misawa, Tashiro)
		20:00	Arriving in Delhi
09	4/26	09:00	Team meeting
	(Mon)	14:00	Discussions with the Institute
		11:30	Leaving Delhi IC-877 (Yoshimoto, Misawa, Tashiro)
		13:30	Arriving in Bhubaneswar
		15:30	Investigation of SVP PGIP premises
10	4/27	10:30	Signing on the minutes with Ministry of Health (Muto, Ide)
	(Tue)		Discussions with the Institute (Matsui)
		14:15	Leaving Bhubaneswar IC-878 (Muto, Matsui, Ide)
		16:30	Arriving in Delhi
		17:30	Report to the Japanese Embassy
		08:00	Discussions with the Institute (Okui, Abe)
		15:00	Discussions with Dept. of Works (Okui), Discussions with the Institute (Abe)
		16:00	Discussions with OERC (Okui), Discussions with the Institute (Abe)
		10:00	Discussions with the Institute (Yoshimoto, Misawa, Tashiro)
		16:00	Discussions with OERC
11	4/28	09:00	Discussion with local geotechnical consultant (Ide)
	(Wed)	15:00	Report to Dept. of Economic Affairs, Ministry of Finance (Muto, Matsui, Ide)
			Report to JICA India Office
		16:00	Official members leave Delhi
		09:00	Discussions with the Institute (Equipment) (Abe)
		10:00	Discussions with Dept. of Works (Okui), Discussions with the Institute (Facility)
			(Yoshimoto, Misawa, Tashiro)
		12:00	Field survey in the Institute (Yoshimoto, Misawa, Tashiro)

	Date	Time	Activities
12	4/29		Official members return to Narita
	(Thr)	08:30	Contract with the local geotechnical consultant (Ide)
		11:30	Leaving Delhi IC-877
		13:30	Arriving in Bhubaneswar
		15:30	Discussions with the Institute
		09:00	Discussions with the Institute (Equipment: Abe, Facility: Okui, Yoshimoto, Misawa, Tashiro)
		10:30	Field survey in the Institute (Okui, Yoshimoto, Misawa, Tashiro)
13	4/30	08:30	Discussions with the Institute (Ide, Abe, Yoshimoto)
	(Fri)		Discussions with OERC
		10:00	Field survey in the Institute (Misawa, Tashiro)
			Preparation of questionnaire, facility planning (Okui)
14	5/1	09:30	Observation of SCB Medical College (all the consultant members)
	(Sat)	14:30	Discussions with the Institute (Ide, Abe)
			Preparation of questionnaire (Okui)
			Field survey (infrastructure) in the Institute, discussion with the telecommunication corporation (Yoshimoto)
			Field survey in the Institute (Misawa, Tashiro)
15	5/2		Data filing
	(Sun)		
16	5/3	10:00	Discussions on hospital operation systems (Ide, Okui, Abe)
	(Mon)	16:00	Data filing
		10:00	Field survey (infrastructure) in the Institute (Yoshimoto)
		12:00	Cuttack sewage plant
		15:00	Discussions with OERC
		16:00	Discussions with electric power corporation
		10:30	Field survey in the Institute (Misawa, Tashiro)
17	5/4	09:30	Discussions with Orissa State Government (Ide, Abe)
	(Tue)	12:00	Discussions with OHSDP
		15:00	Discussions with the Institute
		10:00	Field survey (infrastructure) in the Institute (Yoshimoto)
		14:00	Discussions with a telephone manufacturer
		10:00	Observation of construction site (Misawa, Tashiro)
		13:00	Field survey (construction situations) with a local consultant
		15:00	Field survey (material & equipment supply)
18	5/5	10:00	Observation of incinerator &microwave (Abe, Yoshimoto)
	(Wed)		Discussions on construction situations (Misawa, Tashiro)
		11:30	Dept. of Information and Public Relations (Ide, Abe, Yoshimoto)
			Discussions with the Orissa State Government (Ide)
		14:30	Discussions with the Institute (Ide, Abe)
		15:00	Investigation of sewage ditch (Yoshimoto)
		16:00	Discussions with a local consultant (Misawa, Tashiro)
19	5/6		Discussions with the Institute (Ide, Abe)
	(Thr)	10:00	Discussions with Cuttack Development Authority (Yoshimoto, Misawa, Tashiro)
		15:00	Field survey of medical gas supply
20	5/7	10:00	Request for climatologic data at the Meteorological Office (Ide, Abe)
	(Fri)		Investigation of water disaster records at the Cuttack Municipal Corporation (Okui)
		11:30	Discussions at the Cuttack Development Authority (Yoshimoto, Misawa, Tashiro)
		15:00	Discussions with Directorate of Health Services (Ide, Abe)
			Discussions with the Institute
21	5/8	09:30	Discussions with the Institute (Ide, Abe)
	(Sat)		Field survey (construction situations) (Yoshimoto, Misawa, Tashiro)
			Facility Planning (Okui)

	Date	Time	Activities
22	5/9	AM	Data filing, preparing the interim report draft
	(Sun)	14:00	Discussions with the Institute (Ide, Okui, Abe)
		14:15	Leaving Bhubaneswar IC-878 (Yoshimoto, Misawa, Tashiro)
		16:00	Arriving in Delhi
23	5/10	09:00	Discussions with the Institute
	(Mon)		Questionnaire on the hospital operation system, prioritization of facilities, review on geotechnical investigations
			(Delhi, under a 24-hour curfew due to local election)
			Data filing (Yoshimoto, Misawa, Tashiro)
24	5/11	10:00	Field survey (local consultant), data filing
	(Tue)	14:00	Discussions with the Institute
			Purpose of ICU, Receiving request letters
		10:00	Field survey (construction sites)
25	5/12	09:30	Discussions with the Institute (Ide, Abe)
	(Wed)		Review on the boring test result, Receiving the final list of requested equipment
		14:15	Leaving Bhubaneswar IC-878
		16:30	Arriving in Delhi
		10:00	Field survey (construction situations)
26	5/13	09:30	Visit to JICA India Office
	(Thr)	10:00	Observation of Kalawati Saran Children's Hospital
		PM	Data filing and report preparation (Ide, Okui, Abe)
		21:05	Leaving Delhi JL-472 (Yoshimoto, Misawa, Tashiro)
27	5/14	08:30	Returning to Narita (Yoshimoto, Misawa, Tashiro)
	(Fri)	11:00	Discussions with the local consultant
		15:00	Report to JICA India Office
		16:30	Report to the Japanese Embassy
28	5/15	AM	Field survey (construction sites: Ide, Okui, equipment suppliers: Abe)
	(Sat)	PM	Data filing
29	5/16	10:00	Receiving geotechnical survey drawings (Ide)
	(Sun)		Data filing
		21:05	Leaving Delhi JL-472
30	5/17	08:30	Returning to Narita
	(Mon)		

2-2 Second Field Survey

July 4, 2004 – July 12, 2004 (12 days)

	Date	Time	Activities
01	7/4	14:25	Mr. Matsui and consultant members leave Narita JL-471 (Ide, Okui, Abe)
	(Sun)	19:40	Arriving in Delhi
02	7/5	11:30	Mr. Matsumoto joins the team. Study team leaves Delhi IC-877
	(Mon)	13:30	Arriving in Bhubaneswar
		15:30	Courtesy call to Department of Ministry of Health and Family Welfare, presentation of the interim report
		18:30	Team meeting
03	7/6	11:00	Courtesy call to the honorable Minister, discussions
	(Tue)	13:30	Discussions with the Institute
		14:15	Matsumoto leaves Bhubaneswar for Delhi
		18:30	Team meeting
04	7/7	09:00	Discussions with the Institute (Facility)
	(Wed)	20:00	Team meeting
05	7/8	09:00	Discussions with the Institute (Equipment)
	(Thr)	13:30	Matsumoto returns to Bhubaneswar and joins the discussions with the Institute.
		18:30	Team meeting
06	7/9	11:00	Preparation of the minutes of discussions (draft)
	(Fri)	15:00	Signing on the Minutes of Discussions at the state government
		17:00	Discussions with the Institute (technical cooperation)
		19:00	Team meeting
07	7/10	08:30	Observation of the Institute (Matsui, Abe)
	(Sat)	09:00	Discussions with the local consultant (Ide, Okui)
		11:30	Discussions with the Institute (facility & equipment planning)
		14:15	Matsumoto leave Bhubaneswar for Delhi IC-878
		20:00	Meeting with Deputy Superintendent of the Institute at hotel (Matsui, Ide)
08	7/11	09:00	Preparation of additional questionnaire on equipment (Matsui, Ide, Abe)
	(Sun)	11:00	Meeting with Deputy Superintendent of the Institute at hotel
		14:15	Leaving Bhubaneswar IC-878
		16:15	Arriving in Delhi
		21:05	Leaving Delhi JL472 (Matsui, Ide, Okui, Abe)
09	7/12	08:30	Returning to Narita
	(Mon)		

2-3 Explanation of Draft Final Report

October 12, 2004 – October 22, 2004 (11 days)

	Date	Time	Activities
01	10/12	14:25	Leader Muto and consultant members leave Narita JL-471 (Ide, Okui, Abe)
	(Tue)	19:40	Arriving in Delhi
02	10/13	09:30	Courtesy call to JICA Office and discussions
	(Wed)	11:00	Courtesy call to the Japanese Embassy and discussions
		15:30	Courtesy call to the Ministry of Finance and discussions
		10:55	Matsui leaves Narita JL-717
03	10/14	09:40	Matsui arrives in Bhubaneswar S-2316
	(Thr)	11:30	Muto and consultant members leave Delhi
		13:30	Arriving in Bhubaneswar
		15:30	Visit to UNICEF Office (Official members, Ide)
		16:30	Discussions with Joint Secretary Mr. Senapati
		17:30	Courtesy call to Chief Secretary at the State Government (Official members, Ide)
		18:30	Team meeting
04	10/15		Discussions with the Institute
	(Fri)	09:00	Observation tour of the Institute
		10:30	Presentation of the Draft Final Report
		18:30	Team meeting
05	10/16		Discussions with the Institute
	(Sat)	09:00	Draft Final Report
		18:30	Team meeting
06	10/17		Preparation of draft minutes of discussions, data filing
	(Sun)		
07	10/18		Discussions with the Institute
	(Mon)	09:00	Draft Final Report and Equipment specifications (draft)
		18:30	Team meeting
08	10/19	11:00	Discussions on the draft minutes (Muto, Ide)
	(Tue)	11:30	Courtesy call to Minister of Health and Family Welfare (Muto, Ide)
		12:00	Courtesy call to Chief Minister (Muto, Ide)
		16:30	Signing on the Minutes of Discussions at the State Government (Muto, Ide)
		10:30	Discussions with the local consultant (Okui)
		14:15	Leaving Bhubaneswar for Delhi (Okui, Abe)
		21:05	Leaving Delhi JL-472 (Okui, Abe)
09	10/20		Data Filing
	(Wed)	14:15	Leaving Bhubaneswar
		16:15	Arriving in Delhi
		08:30	Okui and Abe return to Narita
10	10/21	00:05	Muto leaves Delhi TG316 (via Bangkok)
	(Thr)	16:00	Returning to Narita TG676
		10:30	Observation of Kalawati Salan Children's Hospital (Matsui, Ide)
		14:30	Report to JICA India Office
		15:30	Report to Ministry of Health and Family Welfare, signing on the minutes
		17:00	Report to Ministry of Finance
		21:05	Leaving Delhi JAL472
11	10/22	08:30	Returning to Narita
	(Fri)		

3. List of Parties Concerned in the Recipient Country

	Name	Department/Title
Central Government of India		
	Ms. Chaudhuri	Under Secretary, Department of Economic Affairs, Ministry of Finance
	Mr. Dheeraj Bhatnagar	Director, Department of Economic Affairs, Ministry of Finance
	Mr. Prashant, IAS	Director, Department of Economic Affairs, Ministry of Finance
	Dr. Rajesh Bhushan	Director (International Health), Department of Health, Ministry of Health and Family Welfare
Orissa State Government		
	Mr. Naveen Pattnaik	Chief Minister
	Mr. Subash Pani	Chief Secretary
	Mr. Shri Bijayashree Routray	Honorable Minister of Health and Family Welfare
	Mr. Manoranjan Saran	Pvt. Secretary to Chief Minister
Department of Health and Family Welfare		
	Mr. R. N. Senapati	Commissioner & Secretary
	Mr. Gangadhar Singh	Joint Secretary
	Mr. Rajanikanta Dey	Joint Secretary
	Mr. B. C. Jena	Additional Secretary
	Dr. B. C. Das	Director, Medical Education & Training
	Dr. S. C. Mohapatra	Director of Medical Education & Training
	Dr. B. K. Das	Director of Family Welfare
	Dr. P. K. Senapati	Director of Health Services
	Mr. Harekrishna Bhol	F.A.-cum-Joint Secretary, Health and Family Welfare
	Dr. Suresh Chandra Mishra	Project Medical Officer, OHSDP
	Eng. B. C. Tripathy	Executive Engineer, OHSDP
Policy & Strategic Planning Unit		
	Dr. Jyotsna Patnaik, M. S.	Officer on Special Duty
	Mr. K. Ananda Reddy	Reform Facilitator
Sector Reform Cell (Sector Investment Programme)		
	Dr. H. N. Patnaik	Project Director
	Dr. Shiba Kumar Rath	Consultant
SVP PG Institute of Paediatrics		
	Dr. Aswini Kumar Mohanty	Professor, Head of Department of Paediatrics & Superintendent
	Dr. Bijoy Kumar Behera	Deputy Superintendent
	Dr. H. K. Mohanty	Professor and H.O.D. of Paediatric Surgery
	Dr. Niranjan Parida	Professor of Paediatric Surgery
	Dr. S. L. Das	Associate Professor of Paediatrics
	Dr. D. Samal	Associate Professor of Paediatrics
	Dr. Pravakar Mishra	Assistant Professor of Paediatrics
	Dr. Arakhita Swain	Assistant Professor of Paediatrics
	Dr. Ajit Kumar Das	Assistant Professor of Paediatrics
	Dr. P. K. Jean	Lecturer in Paediatrics
	Dr. J. R. Champatiray	Lecturer in Paediatrics
	Dr. A. K. Goel	Lecturer in Paediatrics
	D. S. K. Jena	Lecturer in Paediatrics
	Dr. M. C. Murmu	Lecturer in Paediatrics
	Dr. K. N. Majhi	Lecturer in Paediatrics
	Dr. Sucharita Mohanty	Lecturer in Biochemistry
	Dr. Kalyani Parida	Radiodiagnosis
	Dr. D. P. Mohanty	Lecturer in Anesthesiology
	Dr. P. K. Mohanty	Lecturer in Paediatric Surgery

	Name	Department/Title
	Dr. Shreela Mishra	Lecturer in Pathology
	Dr. Sonali Mandal	Specialist, Paediatric Medicine
	Dr. D. R. Satpathy	Specialist, Paediatric Medicine
	Dr. S. Panda	Assistant Surgeon, Paediatric Medicine
	Dr. Debishankar Acharya	Assistant Surgeon, Paediatric Medicine
	Mr. Madhusudan Naik	Asst. Clinical Psychologist, Psychiatry
	Mr. Lagnajit Ray	Administrative Officer
Kalinga Hospital Ltd.		
	Dr. Sarat Ch Panda	MS (General Surgery, Deputy Medical Superintendent)
SCB Medical College		
	Dr. Dhirendra Kumar Roy	Professor & HOD of Surgery Principal & Dean
	Dr. N.K. Mohanty	Superintendent
Capital Hospital Bhubaneswar		
	Dr. Niranjan Pradhan M.D.	Chief Medical Officer
Department of Works, Government of Orissa		
	Mr. C.V.K. Shastri	Electrical Engineer
	Mr. Jagannath Dhal	Electrical Engineer
	Mr. S. K. Halder	Assistant Civil Engineer
	Mr. S. K. Samal	Assistant Civil Engineer
	Mr. P. K. Pradhan	Junior Civil Engineer
	Mr. B. R. Rath	Junior Civil Engineer
Orissa Electricity Regulatory Commission (OERC)		
	Mr. Shital Kumar Jena	Commissioner
Cuttack Municipal Corporation		
	Mr. Nibedita Pradhan	Mayor
Cuttack Development Authority		
	Mr. Purna Chandra Naik	Secretary
	Mr. S. M. Pattnaik	Planning Member
Fire Department, Govt. of Orissa		
Orissa	Mr. S.P.B. Mohanty	State Fire Prevention Officer
Cuttack	Mr. Manoranjan Bhol	Fire Station Officer
Kalawati Saran Children's Hospital		
	Dr. Shashi Saini	Additional Medical Superintendent
	Dr. A. K. Dutta	Director-Professor & Head, Paediatrics
UNICEF Orissa Office		
	Dr. A. R. Chandrasekaran	Project Officer, Health
	Dr. Ashish Kumar Sen	APO-Safe Motherhood & Women's Health
	Dr. Niranjan Kar	Ex Director of Health Service
Japanese Embassy		
	Tomoyuki Nakano	First Secretary
JICA		
	Toshifumi Sakai	Resident Representative
	Kozo Ito	Assistant Resident Representative
	Takashi Matsumoto	Coordinator
	Mr. R. Dinakar	Coordinator

4.Minutes of Discussions

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF SARDAR VALLVBHAI PATEL POST GRADUATE INSTITUTE OF PAEDIATRICS IN THE STATE OF ORISSA

In response to a request from the Government of India (hereinafter referred to as "India"), and based on the results of preliminary study conducted in July 2003, the Government of Japan decided to conduct a Basic Design Study on a Project for Improvement of Sardar Vallvbhai Patel (hereinafter referred to as "S.V.P.") Post Graduate Institute of Paediatrics in the State of Orissa (hereinafter referred to as "the Project") and entrusted the Basic Design Study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to India the Basic Design Study Team (hereinafter referred to as "the Team"), headed by Ms. Ako MUTO, Health Team, Project Management Group III, Grant Aid Management Department, JICA. The team stayed in the country from April 18 to May 16, 2004.

The Team held discussions with the officials concerned of the Government of India and conducted a field survey in 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.

Bhubaneswar, 27 April, 2004
New Delhi, 28 April, 2004

Ms. Ako Muto
Leader
Basic Design Study Team
Japan International Cooperation Agency

Mr. R.N. Senapati, I.A.S.
Commissioner-Cum-Secretary
Department of Health and Family Welfare
Government of Orissa

Dr. Aswini Kumar Mohanty
Superintendent
S.V.P. Post Graduate Institute of Paediatrics
Government of Orissa

Mr. V. Vum Lun Mang, I.A.S.
Deputy Secretary
Department of Economic Affairs
Ministry of Finance
Government of India

Mr. Rajesh Bhushan, I.A.S.
Director, Department of Health
Ministry of Health and Family Welfare
Government of India

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve paediatrics medical services provided by S.V.P. Post Graduate Institute of Paediatrics.

2. Project site

The site of the Project is in the premises of S.V.P. Post Graduate Institute of Paediatrics, Cuttack, Orissa State, India.

3. Responsible and Implementing Agency

The Responsible Agency is Department of Health and Family Welfare, Government of Orissa and the Implementing Agency is S.V.P. Post Graduate Institute of Paediatrics. The Organizational Chart is attached as Annex-1.

4. Items requested by the Indian Side

After discussions with the Team, the components of the facilities described in Annex-2 in the Project site plan described in Annex-3 and the equipment described in Annex-4 were finally requested by the Indian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval. However, the final components of the Project will be decided after further review in Japan.

5. Japan's Grant Aid Scheme

5-1. The Indian side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-5 and Annex-6.

5-2. The Indian side will take the necessary measures, as described in Annex-7, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Study

6-1. The consultants will proceed to further studies in India until May 16, 2004.

6-2. JICA will prepare the draft report in English and dispatch the Team in order to explain its contents around September 2004.

6-3. In case that the contents of the report are accepted in principle by the Indian side, JICA will complete the Basic Design Study Report and send it to India around November, 2004.

7. Other relevant issues

7-1. The Indian side confirmed that this project is state project and all relevant matters related to the Project such as Banking Arrangement/Authorization to Pay, exemption of local taxes, etc.

will be done by Government of Orissa. If there are any measures to be taken by Central government such as Customs Clearance, Tax Exemption including *Ad valorem* duty on importing material for constructing the facilities and on importing the equipment, etc., the Government of Orissa will request Central Government for such measures at suitable time.

7-2. The Indian side explained that Expenditure/Finance Committee's clearance was not applicable to this Project, whereas clearances required at the State level would be obtained promptly.

7-3. Both sides confirmed that counterpart fund shall not affect the necessary budgetary allocation for this Project and the Government of Orissa will take necessary procedure for counterpart fund promptly.

7-4. It is the responsibility of the Government of Orissa to provide sufficient number of medical and paramedical staff, and security, cleaning and maintenance services etc., to operate and maintain the facilities and equipment provided by this Project. The Team recommended S.V.P. Post Graduate Institute of Paediatrics to allocate appropriate number of well trained health personnel to I.C.U.s.

7-5. It is the responsibility of the Government of Orissa to allocate to S.P.V. Post Graduate Institute of Paediarics necessary budget for operation and maintenance cost such as water and electricity charges for facilities, repairs, spareparts, reagents, consumables and periodical or annual maintenance contracts after delivery for the equipment provided by the Project.

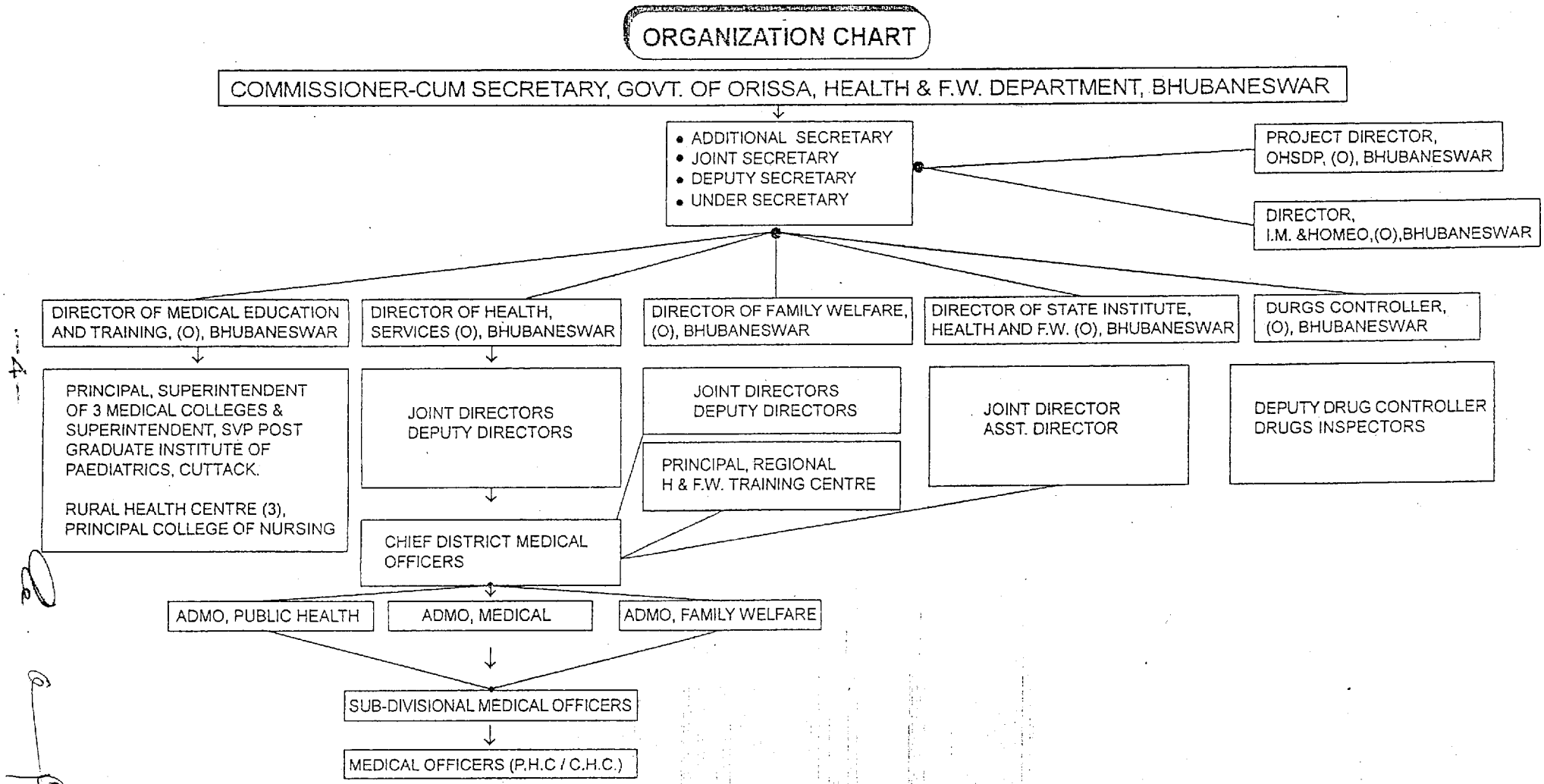
7-6. The team explained and the Government of Orissa accepted that warranty period of the equipment provided by this Project is one year and warranty is applicable only for the problem caused by defect.

7-7. S.V.P. Post Graduate Institute of Paediatrics promised that certain measures, such as exemption of user charges, should be taken in deserving cases.

List of Annexes

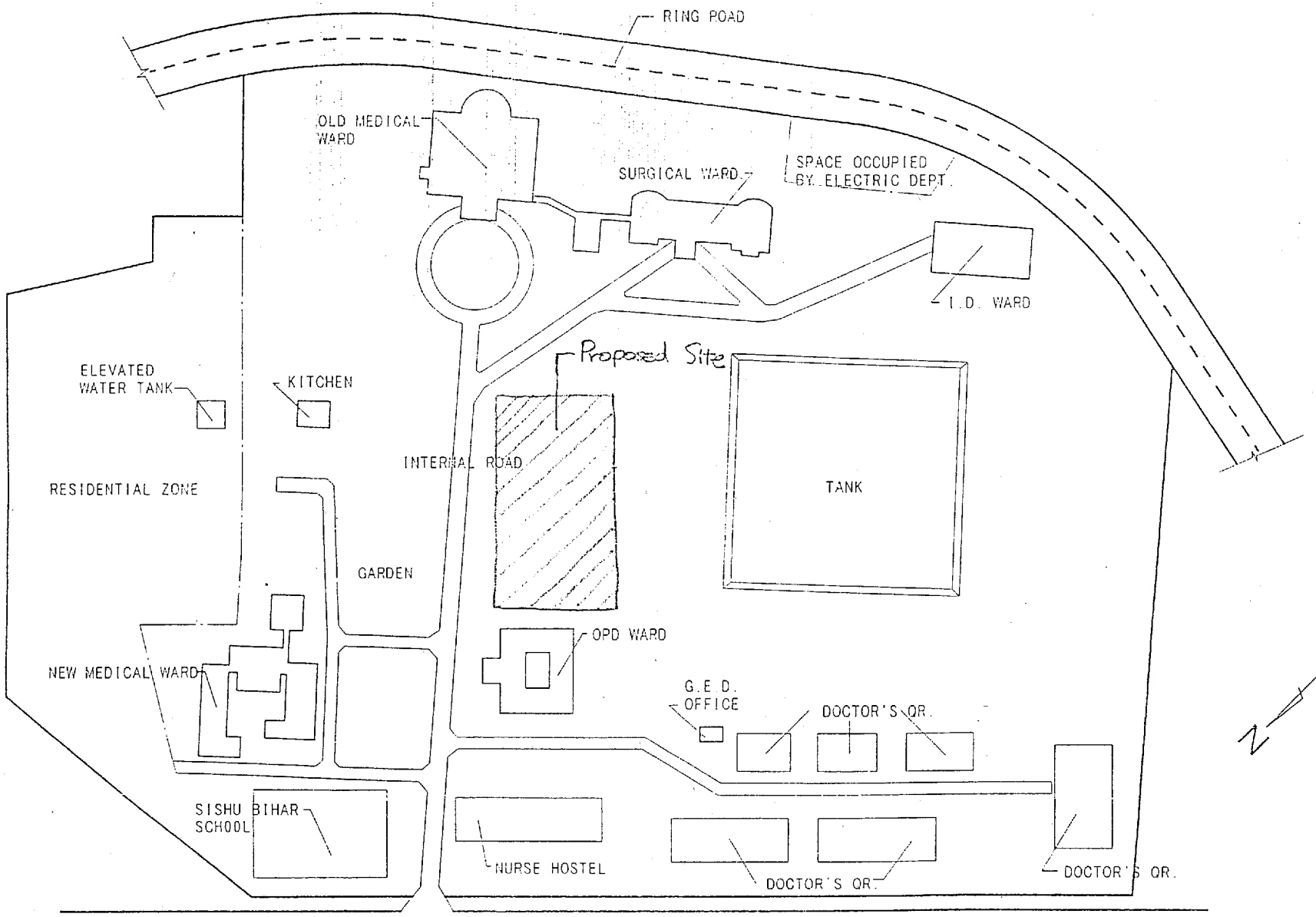
Annex-1	Organization Chart
Annex-2	Modified Project Component of Facilities
Annex-3	Project Site Plan
Annex-4	List of Requested Equipment
Annex-5	Japan's Grant Aid Scheme
Annex-6	Flow Chart of Japan's Grant Aid Procedures
Annex-7	Major Undertakings to be taken by Each Government

ORGANIZATION CHART



Annex - 1

- Workshop..... Neutral
- Central Store..... Neutral
- OPD..... Basically Positive
- Casualty..... Basically Positive
- C.S.S.D..... Positive
- O.T. Complex..... Positive
- Paediatric Surgery Ward (20 Beds) with Doctors' Room ..... Concept is positive, number is neutral.
- ICU. ..... PICU-20 ..... Ditto
  NICU-10..... Ditto
  SICU-04 ..... Ditto
- Neonatal Ward (40 Beds) ..... Ditto
- Medical Ward to move 65 beds from Old (as 350 years) Medical Ward ..... Low Priority
- Central Laboratory ..... Basically Positive
- Radio Diagnosis / Image Section ..... Basically Positive
- Doctors Consulting / Teaching Room (10) ..... Low Priority
- Play Room ..... Low Priority
- Family Attendants Rest Shed ..... Neutral
- Oxygen Plant ..... Low Priority
- Central Supply Facilities for Oxygen, Medical Air & Suction..... Neutral



SITE PLAN OF SVP POST GRADUATE INSTITUTE OF PAEDIATRICS, ORISSA (1/1,500)

(CURRENT)

Annex-IV

Annex-4

List of Requested Equipment

S. No.	Name of Equipment
1	Automatic Film Processor
2	General X-Ray Machine
3	Manual Film Processing Tank
4	Portable X-Ray Machine
5	LCD Projector
6	Anesthesia Apparatus
7	Automatic Hand Dryer
8	Cold Light Source (Ceiling Type)
9	Cold Light Source (Stand Type)
10	Electric Surgery Apparatus
11	Major Operation Instrument Set "NID-A"
12	Mayo Instrument Table
13	Minor Operation Instrument Set "NID-B"
14	Operation Table
15	Resuscitation Unit
16	Suction Unit
17	Fogging Machine for Sterilization
18	Apnea Monitor
19	Baby Bassinate
20	Blood Gas Analyzer
21	Ultrasound Guided Biopsy Kit for Existing Ultrasound Machine
22	ECHOcardiographic Probe for 2D-ECHO for Existing Ultrasound Machine
23	Infant Incubator, Portable Type
24	Infant Ventilator, Portable Type
25	Infusion Pump
26	Neonate Monitor (Multi-parameter)
27	Low Pressure Continuous Suction Unit
28	Oxygen Analyzer
29	Oxygen Head Box
30	Perpex Heat Shield

31	Phototherapy Unit (Double Surface)
32	Pulse Oximeter
33	Radiant Heat Warmer
34	Syringe Pump
35	Chemistry Auto Analyzer
36	Bilirubinometer
37	Micro Centrifuge
38	Refrigerator
39	ICU Bed "NID-C"
40	Patient Bed
41	Mobile Resuscitation Unit
42	Suction Unit
43	Ambulance, Airconditioner, Diesel
44	Boiling Sterilizer
45	High-pressure Steam Sterilizer
46	Table Top Steam Sterilizer
47	Working Table
48	ECG
49	Fiberoptic Endoscope for Peadiatric(Broncho)
50	Fiberoptic Endoscope for Peadiatric(Gastroscope)
51	Fiberoptic Endoscope for Peadiatric(Colonoscope)
52	Electronic Height Scale for Paed. & Infant
53	Infant Treatment Table
54	Instrument Cabinet
55	IV-Stand
56	Laryngoscope Set
57	Oxygen Cylinder with Flow Meter
58	Ultrasonic Nebuliser
59	Ultrasound Diagnostic Machine with Additional Neonatal Probe
60	Electronic Weighing Scale for Paed & Infant
61	X-ray Film Viewer
62	Bedside Multi-parameter Monitor for PICU
63	Bedside Multi-parameter Monitor for NICU
64	Bedside Multi-parameter Monitor for SICU
65	Ventilator (Paediatric)

66	Ventilator (Neonatal)
67	Ventilator for SICU
68	Defibrilator
69	Ambubag with Face Mask & Oxygen Reserver
70	Emergency Cart
71	Wheel Chair
72	Stretcher
73	Blood Cell Counter
74	Urine Analyzer
75	Coagulometer
76	Automatic Immunological Analyzer
77	Fluorescence Microscope
78	Microwave Apparatus for Biomedical Waste Management
79	Waste Shredder
80	CT Scanner (Spiral)
81	Protection Materials against X-ray Irradiation
82	Oxygen Cylinder (Big)

Japan's Grant Aid

The Grant Aid Scheme 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 regulation of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Japan's Grant Aid Procedures

(1)The Japan's Grant Aid Program is executed by the following procedures.

Application (request made by a recipient country)
Study (Basic Design Study conducted by JICA)
Appraisal & Approval (appraisal by the Government of Japan and approval by the Cabinet of Japan)
Determination of Implementation (Exchange of Notes between both Governments)
Implementation (implementation of the Project)

(2)Firstly, an application or a request for a Grant Aid project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA sends a Preliminary Study Team to the recipient country to confirm the contents of 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 approved by the cabinet becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Basic Design Study

(1)Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for appraisal of the project by the Japanese Government. 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 for the Grant Aid Scheme from a technical, social and economical point of view,
c) Confirmation of items agreed on by the both parties concerning a basic concept of the Project,
d) Preparation of a basic design of the Project,
e) Estimation of cost 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 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 through 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 the interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is (are) recommended by JICA to a recipient country to also work in the Project's implementation after Exchange of Notes, in order to maintain technical consistency between the Basic Design and detailed Design.

3. Japan's Grant Aid Scheme

(1) Exchange of Notes (E/N)

Japan's Grant Aid is extend in accordance with the Notes exchanged by the two Government concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid etc., are confirmed.

(2)"The period of the Grant Aid" means one Japanese fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However, in case of delays in delivery, installation of 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.

(3) Under the Grant, 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 may be used for the purchase of products or services of a third country.

However the prime contractors, namely, consulting, contractor 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.)

(4) Necessity of the "Verification"

The Government of the 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 tax payers.

(5)Undertakings Required to 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:

a) To secure land necessary for the sites of the project, and to clear, level and reclaim the land prior to commencement for the construction,

b) To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

c) To secure buildings prior to the installation work in case the installation of the equipment,

d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

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

f) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(6)Proper Use

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

(7) Re-export

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

(8) Banking Arrangement (B/A)

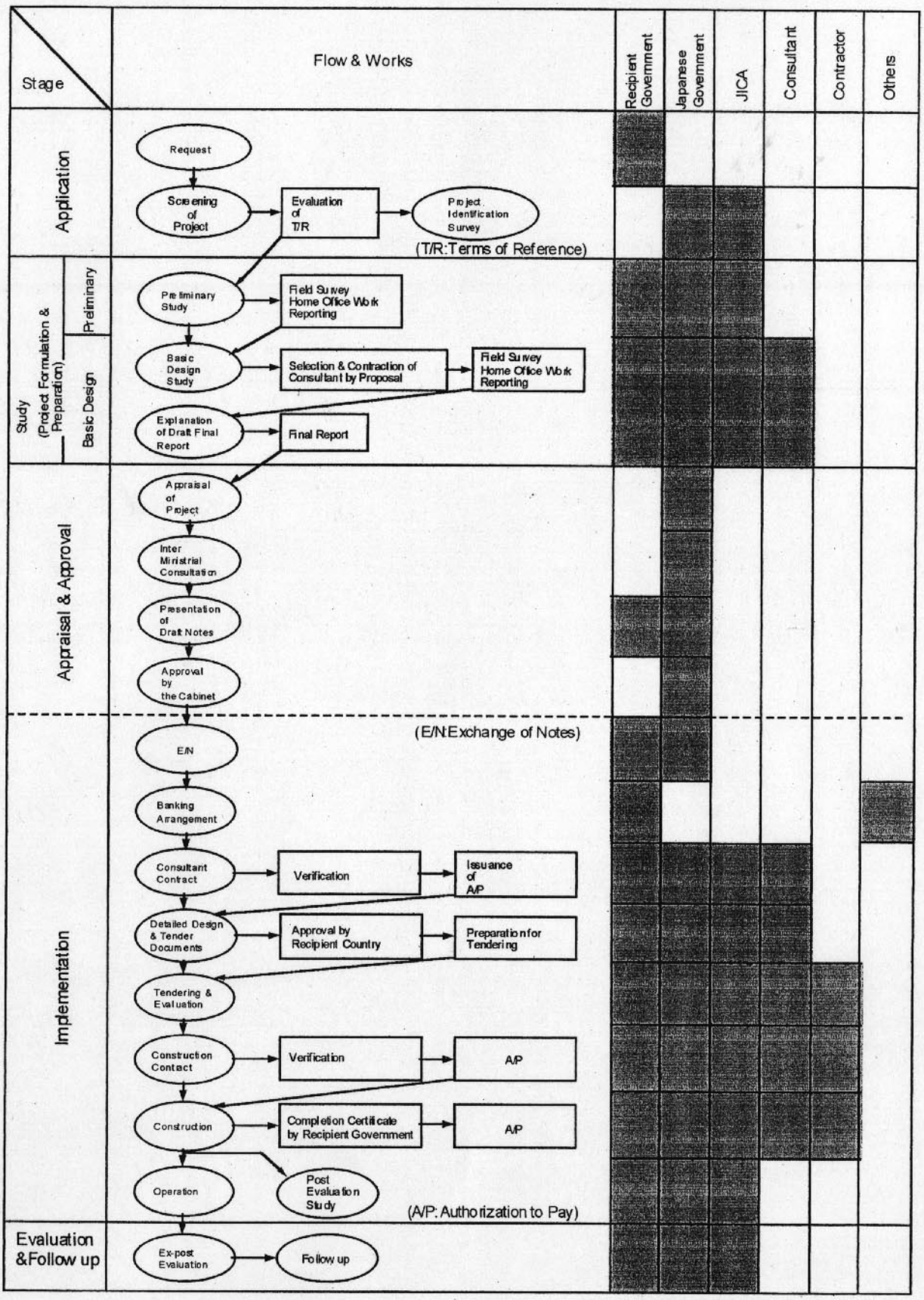
a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments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

(9)Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

Flow Chart of Japan's Grant Aid Procedures



Annex-7

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct building facilities	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site (receiving and elevated tanks)	●	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others to the site)		●
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		●
	b. The MDF and the extension after the frame/panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to the Japanese bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)*
10	To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contact, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to pay)
*to be specified in the contract

MINUTES OF DISCUSSIONS
ON THE SECOND BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF SARDAR VALLABHBHAI PATEL POST GRADUATE INSTITUTE OF PAEDIATRICS IN THE STATE OF ORISSA

In response to a request from the Government of India (hereinafter referred to as "India"), and based on the results of preliminary study conducted in July 2003, the Government of Japan decided to conduct a Basic Design Study on a Project for Improvement of Sardar Vallabhbhai Patel (hereinafter referred to as "S.V.P.") Post Graduate Institute of Paediatrics in the State of Orissa(hereinafter referred to as "the Project") and entrusted the Basic Design Study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to India the Basic Design Study Team and to follow up on this study, the Second Basic Design Study Team (hereinafter referred to as "the Team") was sent to India, headed by Mr. Takashi MATSUMOTO, Assistant Resident Representative, JICA India Office. The team stayed in the country from July 4 to 11, 2004.

The Team held discussions with the officials concerned of the State Government of Orissa, India and conducted a field survey in the study area.

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

Bhubaneswar, 9 July, 2004

Takashi Matsumoto

Mr. Takashi Matsumoto
Leader
Basic Design Study Team
Japan International Cooperation Agency

Mr. R.N. Senapati, I.A.S.
Commissioner-Cum-Secretary
Department of Health and Family Welfare
Government of Orissa

Dr. Aswini Kumar Mohanty
Superintendent
S.V.P. Post Graduate Institute of Paediatrics
Government of Orissa

ATTACHMENT

1. Interim Report

The team explained the Interim Report and the Indian side understood the contents of the report.

2. Items requested by the Indian Side

After discussions with the Team, the components of the facilities described in Annex-1 and the equipment described in Annex-2 were finally requested by the Indian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval. However, the final components of the Project will be decided after further review in Japan.

3. Schedule of the Study

3-1. JICA will prepare a draft report in English and dispatch another Team in order to explain its contents around October 2004.

3-2. In case that the contents of the report are accepted by the Indian side, JICA will complete the Basic Design Study Report and send it to India around January, 2005.

4. Other relevant issues

4-1. Contents of the Minutes of Discussions signed on 27 and 28 April 2004

The Indian side and the Japanese side reconfirmed the contents of the Minutes of Discussions signed on 27 and 28 April 2004.

4-2. The State Government of Orissa committed to provide S.V.P Post Graduate Institute of Paediatrics with sufficient budget for operation and maintenance such as water and electricity charges , and costs for repairs, spare parts, reagents, consumables and annual maintenance contracts .

4-3. The State Government of Orissa promised to provide sufficient number of personnel -- medical, paramedical , and maintenance staffs etc., to operate and maintain the facilities and equipment provided by this Project.

4-4. S.V.P. Post Graduate Institute of Paediatrics also promised to allocate appropriate number of well-trained health personnel.

4-5. The State Government of Orissa and S.V.P. Post Graduate Institute of Paediatrics promised to ensure proper maintenace and full utilization of equipment and facilities.

4-6. S.V.P. Post Graduate Institute of Paediatrics promised to take necessary measures, such as exemption of user charges for examination , diagnosis , ICU accommodation, utilization of equipment and so on, in deserving cases.
S.V.P. Post Graduate Institute of Paediatrics promised to submit to the Team a detailed implementation plan for the exemption of user charges along with a projected financial plan of the Institute by the end of July, 2004.

4-7. The Government of Orissa understands that warranty period of the equipment provided through the Project is one year and warranty is applicable only for problems caused by defect.

4-8. S.V.P. Post Graduate Institute of Paediatrics requested training on maintenance and management of the equipment.

4-9. Both sides confirmed that the specification of equipment and any other technical information shall not be released before the tender to be held in the implementation stage of the Project.

List of Annexes

Annex-1	Facility Components of the Project
Annex-2	List of Requested Equipment
Annex-3	Necessary Measures to be Taken by the Indian Side

Annex-1 Facility Components of the Project

OPD:	Either OPD Rooms or Emergency Dept.
Central Diagnostic Dept:	OT Rooms
	CSSD
	Image Diagnosis Rooms
	Laboratories
Ward:	NICU
	Newborn Bedroom
	Surgical Ward
	S. Doctor Rooms
	PICU
	M. Doctor Rooms
	Medical Ward
	Playroom
Incidental Facilities:	Medical Gas Supply Facility
	Electrical Room
	Waste Treatment Room
	Elevator

(Acronyms like "S.Doctor Rooms" and "M.Doctors Rooms" are unclear)

Annex-2 List of Requested Equipment

(1) ICU (NICU, PICU)

S. No.	Name of Equipment	Requested Quantity
7	Automatic hand dryer	NICU-1, PICU-1.
25	Infusion Pump	Each ICU – 100% 0f Bed
27	Low pressure continuous suction unit	NICU-2 PICU-2
28	Oxygen Analyzer	NICU-2, PICU-2.
29	Oxygen Head Box	(For Paediatrics and Neonatal) NICU-8, PICU-10
31	Phototherapy Unit (Double surface)	NICU-8
33	Radiant Heat Warmer	NICU-2, PICU-3, (SICU-1)
34	Syringe Pump	Each ICU – 80% of Beds
36	Bilirubinometer	NICU-1,
38	Refrigerator	Each ICU-1
39	ICU Bed "NID-C"	PICU-17
41	Mobile Resuscitation Unit	NICU-1, PICU-1
54	Instrument Cabinet	Each ICU-1
56	Laryngoscope Set	Each ICU -100% of Beds
58	Ultrasonic Nebuliser	NICU-1, PICU-1
61	X-ray film viewer	NICU-2, PICU-2
62	Bedside multi-parameter monitor for PICU	1 for 1 Bed

63	Bedside multi-parameter monitor for NICU	1 for 1 Bed
65	Ventilator (Paediatric)	1 for 2 Beds, less Existing-1
66	Ventilator (Neonatal)	NICU- 60% of Beds
68	Defibrilator	PICU-1
69	Ambubag with face mask & Oxygen Reserver (For continuous manual ventilation are included)	Each ICU -100% of Beds
70	Emergency Cart	NICU-1, PICU-1

(2) New Born

S. No.	Name of Equipment	Requested Quantity
7	Automatic hand dryer	New Born-1
18	Apnea Monitor	New Born-10
23	Infant incubator, portable type	New Born
25	Infusion Pump	New Born- 50% of Beds
26	Neonate Monitor (Multi-parameter)	New Born -50%of Beds
28	Oxygen Analyzer	New Born-2
29	Oxygen Head Box	New Born-6
30	Perpex heat shield	New Born-30
31	Phototherapy Unit (Double surface)	New Born-10
33	Radiant Heat Warmer	New Born-20
34	Syringe Pump	New Born -40% of Beds
38	Refrigerator	New Born-1
41	Mobile Resuscitation Unit	New Born-1
54	Instrument Cabinet	New Born-1
55	IV-Stand	(40)

58	Ultrasonic Nebuliser	New Born-1
60	Electronic Weighing Scale for Paed & Infant	New Born-1
66	Ventilator (Neonatal)	New Born-1

(3) Imaging

S. No.	Name of Equipment	Requested Quantity
1	Automatic film processor	1
2	General X-Ray Machine	1
3	Manual film processing tank	1
4	Portable X-Ray Machine	1
21	Ultrasound guided biopsy kit for existing Ultrasound machine	1
22	ECHO cardio-graphic probe for 2D ECHO for existing Ultrasound machine	1
59	Ultrasonic diagnostic machine with additional Neonatal Probe	1
61	X-ray film viewer	10
80	CT Scanner(Spiral)	1
81	Protection materials against X-ray irradiation	2

(4) Laboratory

S. No.	Name of Equipment	Requested Quantity
20	Blood Gas Analyzer	1
35	Chemistry Auto Analyzer	1
36	Bilirubinometer	1
37	Micro centrifuge	1
46	Table Top Steam Sterilizer	1
73	Blood Cell Counter	1
74	Urine Analyzer	1
75	Coagulometer	1
76	Automatic Immunological Analyser	1
84	Blood Bank equipment	1

(5) O/T, Surgical Ward, CSSD

S. No.	Name of Equipment	Requested Quantity
6	Anesthesia apparatus	O/T-1
7	Automatic hand dryer	O/T-2

8	Cold light source (ceiling type)	O/T-1
9	Cold light source (stand type)	O/T-2
10	Electric Surgery Apparatus	O/T-1
11	Major operation instrument set "NID-A"	O/T-3
12	Mayo instrument table	O/T-2
13	Minor operation instrument set "NID-B"	O/T-3
14	Operation Table	O/T-1
16	Suction Unit	O/T-2 Surgical Ward-1
17	Fogging machine for sterilization	O/T-1
25	Infusion Pump	O/T-2 Surgical Ward-2
26	Neonate Monitor (Multi-parameter)	O/T-1
32	Pulse Oximeter	O/T-1, Surgical Ward-1
34	Syringe Pump	Surgical Ward-2
40	Patient Bed	Surgical Ward-2
41	Mobile Resuscitation Unit	O/T-2
45	High-pressure Steam Sterilizer	CSSD-1
47	Working Table	CSSD-1
49	Fiberoptic Endoscope for Paediatric (Broncho)	Suregery-1 (Rigged type)
50	Fiberoptic Endoscope for Paediatric (Gastroscope)	Suregery-1
53	Infant Treatment Table	Surgical Ward-1
54	Instrument Cabinet	O/T-4
55	IV-Stand	(40)
56	Laryngoscope Set	O/T-2, Surgical Ward-2
57	Oxygen cylinder with flow meter	Surgical Ward-3
61	X-ray film viewer	O/T-2
68	Defibrilator	O/T-1

69	Ambubag with face mask & Oxygen Reserver	(For continuous manual ventilation are included) O/T-2, Surgical Ward-2
70	Emergency Cart	O/T-2, Surgical Ward-1
71	Wheel Chair	Surgical Ward-1
72	Stretcher	(with Trolley) O/T-1, Recovery-1, Surgical Ward-1
83	Laparoscopic Surgery Unit	O/T-1

(6) OPD, Casualty, Ward

S. No.	Name of Equipment	Requested Quantity
7	Automatic hand dryer	ID-1, New Ward-1, Old Ward-1
16	Suction Unit	OPD-1, Casualty-1, ID-1, New Ward-3, Old Ward-3
23	Infant incubator, portable type	Casualty-1
24	Infant Ventilator, portable type	Casualty-1, Ambulance-1
25	Infusion Pump	Each Ward for 2(8), less existing-2
32	Pulse Oximeter	Old Ward-2, New Ward-2, ID-2
34	Syringe Pump	Each Ward for 2(8), less existing-5
38	Refrigerator	OPD-1
40	Patient Bed	Old Ward-15, New Ward-17, ID-6
41	Mobile Resuscitation Unit	Casualty-1, Ambulance-1
43	Ambulance, Aircondition, Diesel	(Equipment Set for Ambulance are remain)
48	ECG	(Portable), Casualty-1
52	Electronic Height Scale for Paed. & Infant	Infant Length-OPD / Casualty Stand type- OPD / Casualty
53	Infant Treatment Table	Old Ward/ New Ward/ID/ Cabin/ Casualty/ OPD
54	Instrument Cabinet	OPD-1,Casualty-1
55	IV-Stand	(40)

56	Laryngoscope Set	Casualty-2, OPD-2, Each Wards-2 Less existing-4
57	Oxygen cylinder with flow meter	Each Ward for 3
58	Ultrasonic Nebuliser	Old Ward-1, New Ward-1, ID-2, Casualty-1
60	Electronic Weighing Scale for Paed & Infant	For Neonatal OPD-2 For Pead-6 OPD/ Casualty/ Old Ward/ New Ward/ ID
61	X-ray film viewer	OPD-2/Casualty-1
69	Ambubag with face mask & Oxygen Reserver	(For continuous manual ventilation are included) Casualty-2, OPD-2, Each Wards-2 Less existing-10
70	Emergency Cart	Casualty-1, ID-1, Old Ward-1, New Ward-1
71	Wheel Chair	Casualty-1, ID-1, Old Ward-1, New Ward-1, OPD-1
72	Stretcher	(with Trolley) Casualty-1, ID-1, Old Ward-1, New Ward-1, OPD-1

(7) Others

S. No.	Name of Equipment	Requested Quantity
5	LCD Projector	Training/ Administration-1
78	Microwave apparatus for biomedical waste management	Waste Management -1
79	Waste shredder	Waste Management -1
82	Oxygen Cylinder (Big)	Central Oxygen Supply System-24
	Medical Furniture	For new hospital building

Annex-3 Necessary Measures to be Taken by The Indian Side

1,To clear, level and reclaim the site.

(1) To cut trees and take out obstacles

(2) To fill appropriate soil in the site for construction

(3) To relocate open ditch in the site

2,To obtain Building Permit .

3,To take necessary Procedure for Counterpart Fund.

4,To bear the commissions to the bank for the banking services based upon the B/A.

5,To exempt Tax and custom clearance of the products at the port of disembarkation.

6,After completion of the construction and installation of the equipment.

(1) To provide general furniture

(2) To allocate sufficient stuff to the Institute

(3) To allocate sufficient budget to the Institute

(4) To transfer existing Equipment

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF SARDAR VALLVBHAI PATEL POST GRADUATE INSTITUTE OF PAEDIATRICS IN THE STATE OF ORISSA
(Explanation of Draft Report)

In April and July 2004, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Improvement of Sardar Vallvbhai Patel Post Graduate Institute of Paediatrics (hereinafter referred to as "the Institute") in the State of Orissa (hereinafter referred to as "the Project") to India, and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Government of India and the State Government of Orissa (hereinafter referred to as "the Indian side") on the components of the draft report, JICA sent to India the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Ms. Ako MUTO, Health Team, Project Management Group III, Grant Aid Management Department, JICA, from October 12 to 23, 2004.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Bhubaneswar, 19 October, 2004
New Delhi, 21 October, 2004

Ms. Ako Muto
Leader
Draft Report Explanation Team
Japan International Cooperation Agency

Mr. R.N. Senapati, I.A.S.
Principal Secretary
Department of Health and Family Welfare
Government of Orissa

Dr. Aswini Kumar Mohanty
Superintendent
S.V.P. Post Graduate Institute of Paediatrics
Government of Orissa

Mr. Prashant I.A.S.
Director
Department of Economic Affairs
Ministry of Finance
Government of India

Mr. Rajesh Bhushan, I.A.S.
Director, Department of Health
Ministry of Health and Family Welfare
Government of India

ATTACHMENT

1. Components of the Draft Report

The Indian side agreed and accepted in principle the components of the draft report explained by the Team.

2. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Indian side around January 2005.

3. Other relevant issues

3-1 After discussing the Draft Report, the Indian side requested facilities and equipment described in Annex-1 and Annex-2. JICA will assess the appropriateness of the final request.

3-2 Both sides reconfirmed the contents of the Minutes of Discussions signed on 27 and 28 April 2004. Also, the Team and the Government of Orissa reconfirmed the contents of the Minutes of Discussions signed on 9 July 2004.

3-3 The Team emphasized strongly the necessity of collaboration among the departments of the Government of Orissa led by the Department of Health and Family Welfare in order to conduct the Government of Orissa's undertakings clarified in Annex-3. The Government of Orissa promised to take necessary action in suitable timing.

3-4 The Team and the Government of Orissa confirmed that the Government of Orissa should remodel the existing Institute buildings in order to realize the basic concepts of the Project written in the Draft Report.

3-5 The Government of Orissa promised to provide sufficient number of staff to operate and maintain the facilities and equipment provided by the Project. The Government of Orissa also promised to make necessary budgetary provision for operation and maintenance cost of the Project.

3-6 The Team and the Government of Orissa confirmed that some ICU beds, which number is clearly mentioned in the Draft Report, should be free of charge in the point of compassion to the underprivileged people and the regulations for the free bed availability should be stated clearly in the bylaws of the User's Society and be observed severely.

3-7 The Team strongly recommended the improvement of existing drainage system and waste management system, and provision ——→ for cleaning and sanitation of the campus of the Institute. The Government of Orissa promised to take necessary action promptly.

3-8 The Team and the Institute confirmed that the Institute should report the condition of facilities and equipment provided by the Project to the Embassy of Japan and JICA India Office every April for coming 5 years.

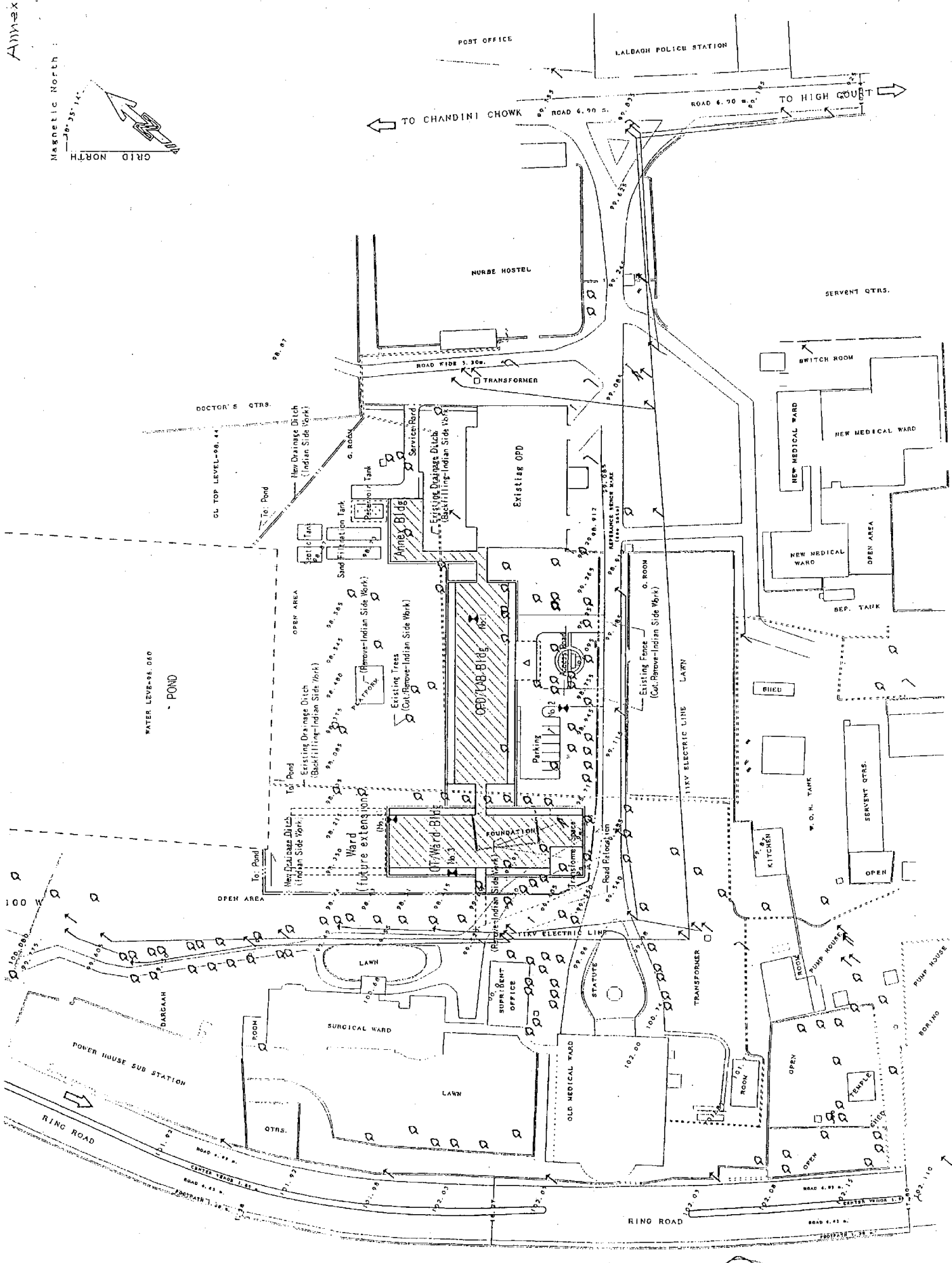
3-9 The Government of Orissa recognized the necessity of the consultant services for introduction of equipment management system, which was indicated in the Annex-5 of the Draft Report, as

one of the component of the Project.

3-10 For utilization of the facility and equipment and the sustainability of the Project, the Government of Orissa recognized the necessity of technical cooperation in the field of hospital management, facility operation, and equipment maintenance. The Team introduced the way of technical cooperation and explained that other official requests should be submitted through diplomatic channels such as the Embassy of Japan and JICA India Office. The Government of Orissa understood the above and promised to take actions in necessary cases.

Enclosures
Annex-1: Facility Plan
Annex-2: Equipment List
Annex-3: Undertakings by the Government of Orissa

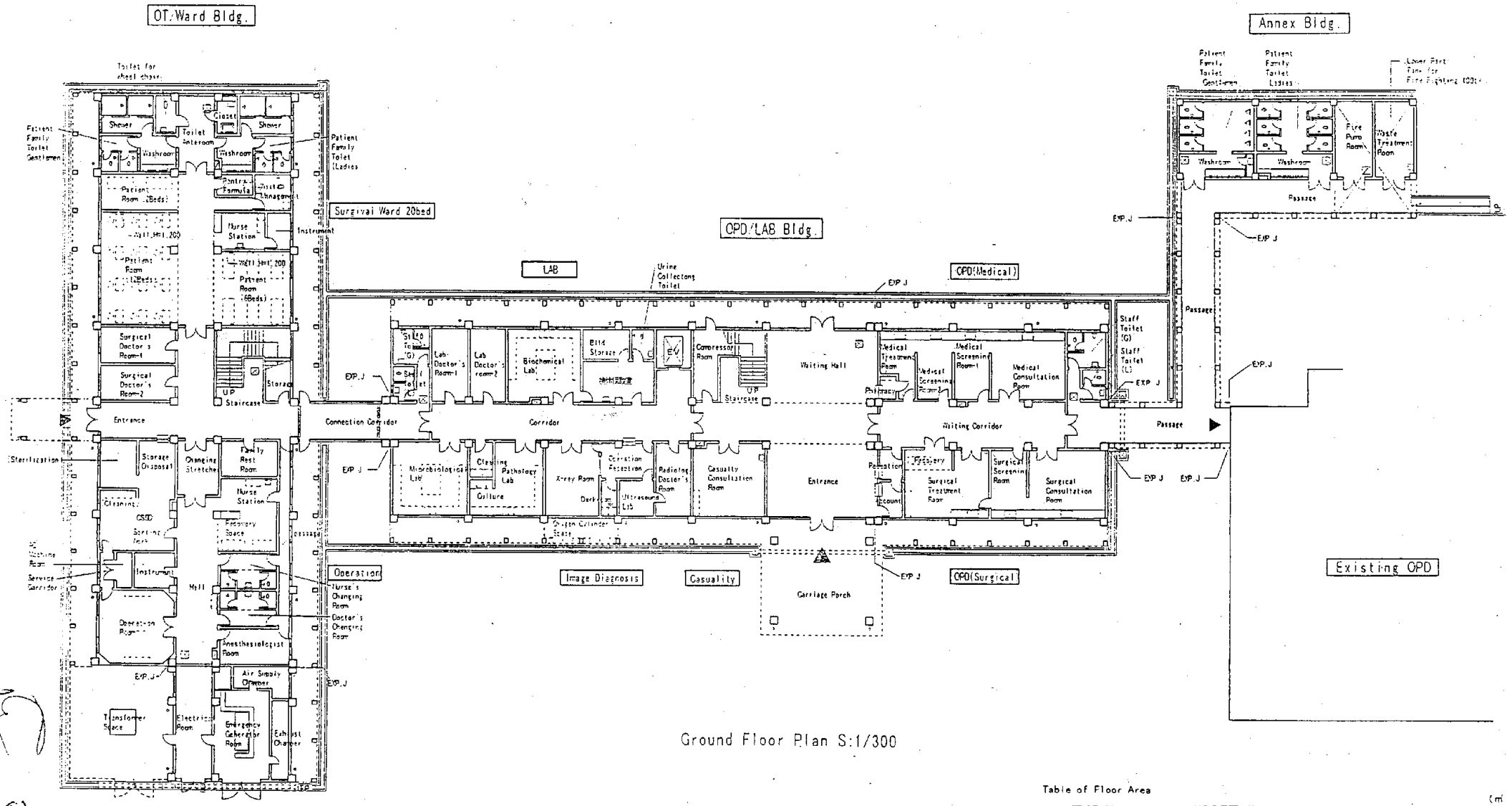
Annex - I



A-1-1

Remarks : ★ - Position of Boring

Plot Plan S.1/1,000



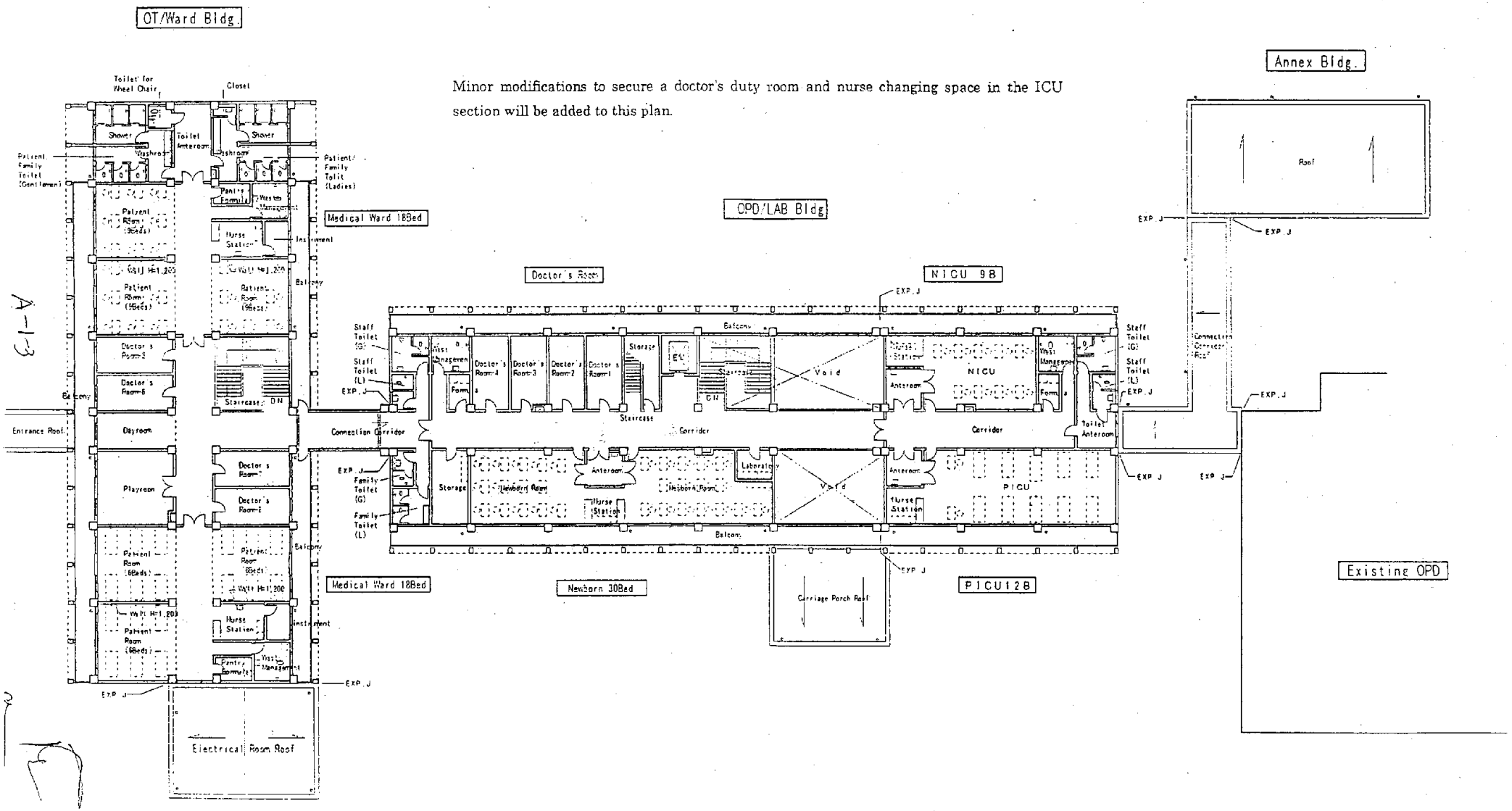
Ground Floor Plan S:1/300

Table of Floor Area

(㎡)

Name of Bldg.	Bldg. Area	Floor Area			Total Floor Area
		Ground Floor	First Floor	Penthouse	
OPD/LAB Bldg.	1,136.2	861.0	753.0	41.0	1,655.0
OT./Ward Bldg.	991.6	786.0	705.0	0	1,491.0
Annex Bldg.	110.4	110.4	0	0	110.4
Passage	129.0	0	0	0	0
Total	2,367.2	1,757.4	1,458.0	41.0	3,255.4

Minor modifications to secure a doctor's duty room and nurse changing space in the ICU section will be added to this plan.



First Floor Plan

Equipment Schedule

Equipment No.	Equipment Component No.	Equipment Name	Unit	Qty	Breakdown													
					NICU	PICU	Newborn	Imaging	Lab	OT	CSSD	OPD	Casualty	Medical Ward I	Medical Ward II	Surgical Ward	ID Ward	Others
2	2	General X-ray machine (300mA)	nos.	1				1										
3	3	Manual film processing tank	set	1				1										
4	4	Portable X-ray machine	nos.	1				1										
5	5-1	LCD Projector	nos.	1														1
	5-2	Computer for LCD Projector	nos.	1														1
6	6	Anesthesia apparatus	nos.	1						1								
7	7	Automatic hand dryer	nos.	5	1	1	1			1							1	
8	8	Cold light source (Ceiling type)	nos.	1						1								
9	9	Cold light source (Stand type)	nos.	2								1						
11	11	Major operation instrument set "NID-A"	set	3						3								
12	12	Mayo instrument table	nos.	1						1								
13	13	Minor operation instrument set "NID-B"	set	3						3								
14	14	Operation table	nos.	1						1								
16	16-1	Suction unit (Applicable to medical pipe system)	nos.	37	9	12	15			1								
	16-2	Suction unit (Electric)	nos.	9								2	1	2	2	1	1	
18	18	Apnea monitor	nos.	6			6											
20	20	Blood gas analyzer (with electrolyte analyzer)	nos.	1					1									
23	23	Infant incubator, portable type	nos.	2			1						1					
25	25	Infusion pump	nos.	22	9	12				1								
27	27-1	Low pressure continuous suction unit (Applicable to medical pipe system)	nos.	2	1	1												
	27-2	Low pressure continuous suction unit (Electric)	nos.	2	1	1												
28	28	Oxygen analyzer	nos.	3	1	1	1											
29	29	Oxygen hood box	nos.	6	2	2	2											
30	30	Perplex heat shield	nos.	21			21											
31	31-1	Phototherapy unit (upper part exposure)	nos.	16	7		9											
	31-2	Phototherapy unit (lower	nos.	16	7		9											

Equipment No.	Equipment Component No.	Equipment Name	Unit	Qty	Breakdown													
					NICU	PICU	Newborn	Imaging	Lab	OT	CSSD	OPD	Casualty	Medical Ward I	Medical Ward II	Surgical Ward	ID Ward	Others
		part exposure)																
33	33	Radiant heat warmer	nos.	21	9	3	9											
34	34	Syringe pump	nos.	13	6	7												
35	35	Chemistry auto analyzer	nos.	1					1									
37	37	Micro centrifuge	nos.	1					1									
38	38	Refrigerator	nos.	13	1	1	2					2	1	2	1	1	2	
39	39	ICU Bed "NID-C"	nos.	9		9												
40	40-1	Patient bed (large)	nos.	26										18		8		
	40-2	Patient bed (small)	nos.	39										27		12		
41		Mobile resuscitation unit	nos.	2			1						1					
45	45-1	High pressure steam sterilizer	nos.	1							1							
	45-2	Water softener	nos.	1							1							
46	46	Table top steam sterilizer	nos.	1					1									
47	47	Work table for CSSD (stainless steel)	nos.	1							1							
48	48	ECG (portable) 3 channels	nos.	1									1					
49	49	Fiberoptic endoscope for paediatric (Boncho)	set							1								
52	52-1	Electronic height scale (Infant)	nos.	3								2	1					
	52-2	Electronic height scale (Paed.)	nos.	3								2	1					
53	53	Infant treatment table	nos.	3								2	1					
54	54	Instrument cabinet	nos.	9	1	1	2			2		2	1					
	55	IV stand	nos.	77			21					2	1	23	8	10	12	
56	56-1	Laryngoscope handle for Neonatal	nos.	5	3					1			1					
	56-2	Laryngoscope handle for Paed.	nos.	10		3				1			1	1	1	1	2	
	56-3	Laryngoscope Blade set (Miller type)	set	10	6					2			2					
	56-4	Laryngoscope Blade set (Macintosh type)	set	20		6				2			2	2	2	2	4	
58	58	Ultrasonic nebulizer	nos.	8	1	1	1						1	1	1		2	
59	59	Ultrasonic diagnostic machine with additional neonatal probe	nos.	1				1										
60	60-1	Electronic weighing scale (Infant)	nos.	3			1					2						
	60-2	Electric weighing scale	nos.	8								2	1	2	1		2	

Equipment No.	Equipment Component No.	Equipment Name	Unit	Qty	Breakdown													
					NICU	PICU	Newborn	Imaging	Lab	OT	CSSD	OPD	Casualty	Medical Ward I	Medical Ward II	Surgical Ward	ID Ward	Others
		(Paed.)																
61	61-1	X-ray film viewer (stand type)	nos.	6	1	1	2	1		1								
	61-2	X-ray film viewer (table top)	nos.	12	1	1	2	1				6	1					
62	62	Bedside monitor (5 parameters)	nos.	23	9	12				1						1		
65	65	Ventilator (Paediatric)	nos.	3		2							1					
66	66	Ventilator (Neonatal)	nos.	3	3													
68	68	Defibrillator	nos.	2		1				1								
69	69-1	Ambubag for Neonatal	nos.	8	6								2					
	69-2	Ambubag for Paed.	nos.	18		6							2	2	2	2	4	
70	70	Emergency cart	nos.	10	1	1				1			1	2	1	1	2	
71	71	Wheel chair	nos.	8								2	1	2	1	1	1	
72	72	Stretcher (with trolley)	nos.	9						3		2	1	2	1	1	1	
73	73	Blood cell counter (18 parameters)	nos.	1					1									
78	78	Microwave apparatus for biomedical waste management	nos.	1														1
79	79	Waste shredder	nos.	1														1
81	81	Protection materials against X-ray irradiation	set	1				1										
82	82	Oxygen cylinder (big)	piec e	24														24
Ad-1		Oxygen flow meter (Applicable to medical pipe system)	nos.	37	9	12	15			1								
Ad-2		Washing machine with drier (for CSSD)	nos.	2							2							
Ad-3		Baby cod	nos.	21			21											
Ad-4		Examination table	nos.	5								5						
Ad-5	Ad-5-1	Refrigerator	nos.	1					1									
	Ad-5-2	Deep freezer	nos.	1					1									
	Ad-5-3	Cold box	nos.	2					2									
Ad-6		Hand washing water sterilizer	nos.	1						1								
Ad-7	Ad-7-1	Examination table (doctor)	nos.	6								6						
	Ad-7-2	Chair (doctor)	nos.	6								6						
	Ad-7-3	Rotary chair (patient)	nos.	6								6						
	Ad-7-4	Desk for nurse station	nos.	7	1	1	1			1				2		1		
	Ad-7-5	Chair for nurse station	nos.	14	2	2	2			2				4		2		

Equipment No.	Equipment Component No.	Equipment Name	Unit	Qty	Breakdown													
					NICU	PICU	Newborn	Imaging	Lab	OT	CSSD	OPD	Casualty	Medical Ward I	Medical Ward II	Surgical Ward	ID Ward	Others
	Ad-7-6	Loading Trolley	nos.	2							2							
	Ad-7-7	Sterilization drum - set	set	2							2							
	Ad-7-8	Laundry Cart	nos.	4							4							
	Ad-7-9	Medicine trolley	nos.	9	1	1	1							2	1	1	2	
	Ad-7-10	Chair (patient family)	nos.	86	9	12	30							45		20		
	Ad-7-11	Stainless steel sink unit (small), single sink	nos.	5				1		1				2		1		
	Ad-7-12	Stainless steel sink unit (medium), single sink	nos.	5	1		1							2		1		
	Ad-7-13	Stainless steel sink unit (medium), double sink	nos.	1					1									
	Ad-7-14	Stainless steel sink unit (large), double sink	nos.	3	1	1	1											
	Ad-7-15q	Stainless steel sink/hand wash (large)	nos.	1							1							
	G	Stainless steel sink/hand wash (medium)	nos.	1						1								
	Ad-7-18	Work table, wall type (ㅁ-shape) with sink	nos.	1					1									
	Ad-7-19	Work table, wall type (L-shape) with sink	nos.	1					1									
	Ad-7-20	Work table, wall type (large) with sink	nos.	1					1									
	Ad-7-21	Work table, wall type (medium) with sink	nos.	1					1									
	Ad-7-22	Lab work table (large)	nos.	2					2									
	Ad-7-23	Lab work table (medium)	nos.	1					1									
50	50	Fiberoptic Endoscope for Paediatric (Gastroscope)	nos.	1						1								
26	26	Neonatal monitor (Pulse Oximeter)	nos.	5			5											

Undertakings by the Government of Orissa

1. Site Preparation
   (1) Removal of Obstacles
      1) Toilet foundation (11m x 17m)
      2) Borehole(1nos.)
      3) Part of campus road(approximately 126㎡)

   (2) Trees and bushes (26 nos.)

   (3) Rerouting of open sewage ditches
      1) Excavation of new ditch
      2) Burying the existing ditches

2. Remodelling of the Existing Buildings
   (1) Old Medical Ward
      1) Interior wall repainting(approximately 1,048㎡)
      2) Equipment maintenance shop repairs

   (2) Existing Surgical Ward
      1) Interior wall repainting (appoximately 1,280㎡)
      2) OT room renewal

   (3) OPD Ward: connection corridor (unused toilet) renewal
      1) Concrete (approximately 4 m3)
      2) Mortar finish: floor (approximately 12㎡)
      3) Mortar finish: wall (approximately 48㎡)
      4) Painting: wall (approximately 48㎡)
      5) Painting: ceiling (approximately 12㎡)
      6) Wall demolishing (2 nos.)

   (4) New Medical Ward
      Interior painting (approximately 1,640㎡)

3. Planting
   (1) Turf (approximately 1,500㎡)
   (2) Bush (Height: 1.0m) (70 nos.)

5. Other Relevant Data

5-1 Calculation of Number of ICU Beds

1) Premises

a) In ICU only critical patients are provided with medical care. Critical patients mean such patients as so classified by doctors.

b) ICU care is charged in principle. Poor patient should, however, be exempted from the payment for ICU care or should be entitled to the reduction of the amount. Thus, the number of ICU beds is calculated based on the present needs at 100 % so as to accept all patients who require ICU care on condition that an effective system to reduce and exempt the fee is established by the completion of the building.

c) The following patient statistics of the Institute are used for the calculation: 1) ICU patients data from July 2003 to May 2004 provided by the Superintendent to the team during the field survey, 2) General inpatient data from April 2003 to March 2004 provided in the answers to the questionnaire, and 3) Surgical inpatient data of last some 15 months period until May 2004 provided by the head of surgery.

2) Calculation of Number of ICU beds

a) Basic Formula

Proposed Number of Beds = Number of Required Beds / Planned Bed Occupancy Rate

where, i) Number of Required Beds = Number of Critical Patients

x Average ICU stay / 365

ii) Planned Bed Occupancy Rate

A coefficient to give a room to the calculated number of required beds to comply with demand fluctuation that is set up at 90 % in the Project.

iii) Critical Patient = CP cared in ICU + CP cared in ward other than ICU

There should be two types of critical patients; cared for in ICU and cared for in general ward or newborn ward due to any reason.

= CP died + CP survived = CP died / Mortality Rate

There should be two types of critical patients; died in ICU or survived from ICU.

b) Number of Medical ICU Beds

i) Number of Patients Care for in ICU

According to the data of the last 10 months during 2003 to 2004, the numbers of ICU patients are 165 newborns (Death= 82, Survival= 83) and 216 infants (Death= 70, Survival= 146). Thus, annually they are calculated as follows:

Newborn····· 165 x 12 / 10 = 198

Infant····· 216 x 12 / 10 = 259

ii) Number of Critical Patients Cared for in Ward Other than ICU

Newborn Total Death = 344

Medical Patient Ratio = 606 / (8045 - 606) = 7.5 / 92.5

Total Death of Medical Patient = 344 x 92.5 % = 318

CP Cared for in Ward Other than ICU = 318 - 82 x 12/10 = 220

Infants Total Death = 380

Medical Patient Ratio = 606 / (8045 - 606) = 7.5 / 92.5

Total Death of Medical Patient = 380 x 92.5 % = 352

CP Cared for in Ward Other than ICU = 352 - 70 x 12/10 = 268

According to the mortality data shown in 1) above, they are calculated as 50 % for newborns and 33 % for infants. The mortality rate of critical patients died in wards other than ICU must be much higher than that of patients died in ICU.

Although there are no data that give the rates, the Institute could assume them based on the experience of doctors as follow: rate of newborn = 80 % and rate of infant = 60 %

As a result, the numbers of patients care for in wards other than ICU are calculated as follow: Newborn = 220 / 80 % = 275, Infants = 268 / 60 % = 447.

iii) Numbers of Critical Patients

Newborn 165 + 275 = 440

Infant 259+ 447 = 706

iv) Average ICU Stay

According to the ICU data mentioned above, average stays of patients in ICU are as follows:

Newborn survived = 7.3 days Newborn died = 5.0 days

Infant survived = 6.8 days Infant died = 2.7 days

The weighted average of ICU stay of newborns and infants are respectively calculated as follows:

Newborn = 7.3 x 83/165 + 5.0 x 82/165 = 6.2 days

Infant = 6.8 x 146/216 + 2.7 x 70/216 = 5.5 days

v) Numbers of Required Beds

The numbers of ICU beds required for newborns and infants are respectively calculated by substituting the result of 3/ and 4/ above for the basic formula mentioned in a) 1/ above as follows:

Newborn = 440 (patients) x 6.2(days/patient) / 365(day/bed) = 7.5 beds

Infant = 706 (patients) x 5.5(days/patient) / 365(day/bed) = 10.6 beds

c) Number of surgical ICU Beds

i) Patient Statistics (Sampled data for the last 15 months until May 2004)

Type of Patient			Number of Patients	
			Sampled	Revised
Operated Patients	Newborns	Need 120 hours care after OP	78	64
		Others	97	79
		Total	175	143
	Infants	Need 24 hours ICU care after OP	132	108
		Others	336	273
		Total	468	381
	Total		643	524
Non Operated Patients			100	82
Total			743	606

Revised number = The total number of surgical inpatients in the year 2004 is 606 and that of the sample is 743 and exceeds one year total. Breakdown values are, therefore, calculated based on the ratio 606/743 to get assumed annual data.

ii) Number of Critical Patients

As shown in the table above, the numbers of critical patients of surgery are assumed as follows: Newborn = 64 patients, Infant = 108 patients.

iii) Average ICU Stay

Average ICU stay days for surgical patients are calculated by quoting the values in the table above and adding one day for changing beds as follows:

Newborn = 120 hours / 24 hours + 1 = 6.0 days

Infant = 24 hours / 24 hours + 1 = 2.0 days

iv) Number of Required Beds

The numbers of required ICU beds for newborns and infants are respectively calculated by substituting the result of 2/ and 3/ above for the basic formula mentioned in a) 1/ above as follows:

Newborn = 64 (patients) x 6 (days/patient) / 365(day/bed) = 1.1 beds

Infant = 108 (patients) x 2(days/patient) / 365(day/bed) = 0.6 beds

As the result shows, the number of surgical ICU beds is too small to efficiently operate them independently. Thus, the surgical ICU beds shall be secured in the medical ICU that shall be operated under the cooperation of both departments.

d) Planned Number of Beds

As a result of the above, the planned numbers of beds are calculated as follows:

Newborn = 7.5 + 1.1 = 8.6..... 9 beds

Infant = 10.6 + 0.6 = 11.2..... 12 beds

5-2 Calculation of Newborn Beds

1) Premises

The number of newborn beds is calculated so that all newborn inpatients including surgical inpatients would be cared for either in ICU or the newborn bedroom. However, it will be judged by the specialist of the Institute whether all the surgical newborns would be cared for in the newborn ward among medical inpatients or in the general surgical ward separately.

2) Calculation of the Number of Newborn Beds

a) Basic Formula

The number of newborn beds is calculated by the following formula:

Planned Number of Newborn Beds

= Total Number of Beds Required for Newborn - NICU Beds

= TNBRN - NICU Beds

where,

i) TNBRN = Total Newborn Hospital Stay / 365 / Planned Bed Occupancy Rate

ii) NICU Beds = 9

iii) Planned Bed Occupancy Rate = 90 %

b) Total Newborn Hospital Stay

The total newborn hospital stay (TNHS) is calculated as follows:

TNHS = Number of Survival Patient x Survival Patient Hospital Stay

+ Number of Dead Patient x Dead Patient Hospital Stay

where,

i) According to the statistics of the last year, the average hospital stay of dead patients is 4.4 days and that of survival patient is 10.5 days.

ii) The number of dead patients was 344 in the last year.

iii) The number of survival patients

= total number of inpatients - number of dead inpatient = 1418 - 344 = 1074

As a result, the total newborn hospital stay is obtained by substituting the values of i), ii), and iii) above for the formula above as follows: 1074 x 10.5 + 344 x 4.4 = 12,794.

c) Total Number of Beds Required for Newborn (TNBRN)

The total number of beds required for newborn inpatients is obtained by substituting the values 12,790 above for the formula a) i) above as follows:

TNBRN = 12,790 / 365 / 0.9 = 38.9.....39 beds

Therefore, the planned number of newborn beds is 39 - 9 = 30 beds (including surgical).

5-3 User's Charge Rates

As of July 2004

HAEMATOLOGY	in Rs.
Differential count	10
Total Platelate Count	10
Total White cell count	10
Sicklining	20
Haemoglobin	05
Packed cell volume	10
Reticulocyte count	20(10)
Malaria Test	10
Microfilaria	10
Bleeding time	05
Cloting time	05
Malaria PF/PV	170
ESR	10
PS comment	10
SEROLOGY	
VDRL	20
Widal	40
ASO	50
CRP	50
Mycodot	80
G6 PD	70
Australia Antigen	50
BIOCHEMISTRY	
FBS	20
PPBS	20
Urea	20
Creatinine	20
Cholesterol	20
Protein	20
Albumin	20
SGOT	20
SGPT	20
Alkaline Phosphate	20
Bilirubin	20
Sodium	20
Potassium	20
Phosphorus	30
Calcium	30
CYTOLOGY	
Sputum AFB	20
GM stain	20
Throat swab GM stain	20
Albert stain	20
Nasal smear LS stain	20
GM stain	20
Fluid cytology	30
Fluid Chemical Analysis (Sugar Protein)	50

RADIOLOGY	in Rs.
X-Ray (6"1/2 x 8"1/2)	40
X-Ray (8" x 10")	40
X-Ray (10"x12")	50
Barium Meals (1st Film)	50
(extra Film)	40
X-Ray Portable	100
ECG	50
Ultrasound	150
Ultrasound with Photo	200
URINE ANALYSIS	
Routine test	10
Bile Salt	10
Bile pigment	10
Urobilinogen	10
Ketonebodies	10
Chyle	10
24 hrs. Urine protein	20
STOOL ANALYSIS	
Routine test	10
Occult blood	10
Sugar	10
OTHERS	
Blood Gas Analyser	150(100)
Pulse Oximeter	25
Radiant Warmer	50
Phototherapy Unit	50
Monitor	50
Bilirubinometer	20
Ventilator	200
Endoscope	200
Cuttery	50
Pulse Oximeter (O.T.)	50
Chest tube	50
Blood Sugar (Glucometer)	30
ICU (per day)	200(150)
Newborn Unit (Admission)	50
Cabin (per day)	150(100)
Infusion Pump	25
Syringe Pump	25
AMBULANCE	
One person (inside city)	75
More than one person	30
For outside per k.m.	3

Figures in ( ) indicate the rates before June 2004.

5-4 Validation of Free ICU Beds

1) Calculation of Charged Beds and Free Beds in ICU

The number of ICU beds is 9 in NICU and 12 in PICU calculated as calculated in Annex-1. They are total number of free and charged beds.

Holders of poverty line card share 47% of the population in Orissa. Accordingly, the number of charged beds and free beds can be calculated as follows:

NICU	Charged beds	9 beds x 53%	=	4.77 beds
	Free beds	9 beds x 47%	=	4.23 beds
PICU	Charged beds	12 beds x 53%	=	6.36 beds
	Free beds	12 beds x 47%	=	5.64 beds

2) Validation of Free ICU Beds

Theoretically, if the income of User's Charge from NICU and PICU charged beds exceeds the total ICU expenses including the free beds, the ICU or the Institute can be operated properly. Based on the above-calculated number of charged and free beds, the feasibility of free beds is validated as follows:

a) NICU

A: Annual operation costs

Personnel

Nursing sister = 6,000Rs/day×12 months×9/(9+12)=30,857Rs/year

(Serving for NICU and PICU)

Nurse = 4,000Rs/day×12 months×8= 389,000Rs/year

Nurse aide =2,000Rs/day×12 months×8 = 192,000Rs/year

AMC (from Table-1) = 235,803Rs/yaer

A: TOTAL 847,660Rs/year

B: Annual revenue of User's Charge

Equipment fee (from Table-1) = 591,959Rs/year

Hospitalization fee 4.77 beds×200Rs/beds×365days/year=348,210Rs/year

B: TOTAL 940,169Rs/year

As shown above, B. surpasses A., which means the revenue of User's Charge will be sufficient for operation of NICU (9 beds) including the free beds.

b) PICU

A: Annual operation costs

Personnel

Nursing sister = 6,000Rs/day×12 months×12(9+12)=41,143Rs/year

Nurse = 4,000Rs/day×12 months×8= 389,000Rs/year

Nurse aide = 2,000Rs/day×12 months×8 = 192,000Rs/year

AMC (from Table-1) = 266,057Rs/yaer

A: TOTAL 888,200Rs/year

B: Annual revenue of User's Charge

Equipment fee (from Table-2) = 567,868Rs/year

Hospitalization fee 6.36 beds×200Rs/beds×365days/year=464,280Rs/year

B: TOTAL 1,041,148Rs/year

As shown above, B. surpasses A., which means the revenue of User's Charge will be sufficient for operation of PICU (12 beds) including the free beds.

Table-1 Expected AMC Costs of ICU Equipment

ICU	Equipment	Qty	AMC Unit Cost	AMC Cost
NICU	Suction Unit	9	Rs. 340	Rs. 3,060
	Infusion Pump	9	1,060	9,540
	Syringe Pump	6	840	5,040
	Low Pressure Continuous Suction Unit	2	360	720
	Bedside Monitor	9	9,000	81,000
	Ventilator	2	25,000	50,000
	Radiant Heat Warmer	9	2,500	22,500
	Phototherapy Unit	7	2,000	14,000
	Ultrasonic Nebulizer	1	1,800	1,800
	Blood Gas Analyzer	1	75,000×9/21	32,143
	(Shared use with PICU)			
	Bilirubinometer	1	16,000	16,000
			Total	235,803
PICU	Suction Unit	12	Rs. 340	Rs. 4,080
	Infusion Pump	12	1,060	12,720
	Syringe Pump	7	840	5,880
	Low Pressure Continuous Suction Unit	2	360	720
	Bedside Monitor	12	9,000	108,000
	Ventilator	3	25,000	75,000
	Defibrillator	1	10,000	10,000
	Radiant Heat Warmer	2	2,500	5,000
	Ultrasonic Nebulizer	1	1,800	1,800
	Blood Gas Analyzer	1	75,000×12/21	42,857
	(Share use with NICU)			
			Total	266,057

Table-2 Revenue of User's Charge from ICU Equipment Use (Annual)

ICU	Equipment	Unit Price (Rs/day)	Qty of Charged Beds	Use Rate times/day person	Annual Income
NICU	Infusion Pump	25	4.77	1	Rs. 43,526
	Syringe Pump	25	4.77	0.6	26,116
	Bedside Monitor	50	4.77	1	84,053
	Ventilator	200	4.77	0.3	104,463
	Radiant Heat Warmer	50	4.77	1	87,053
	Phototherapy Unit	50	4.77	0.8	69,642
	Blood Gas Analyzer	150	4.77	0.6	156,695
	Bilirubinometer	20	4.77	0.5	17,411
	Total				591,959
PICU	Infusion Pump	25	6.36	1	Rs. 58,035
	Syringe Pump	25	6.36	0.6	34,821
	Bedside Monitor	50	6.36	1	116,070
	Ventilator	200	6.36	0.3	139,284
	Radiant Heat Warmer	50	6.36	0.17	19,732
	Blood Gas Analyzer	150	6.36	0.6	208,926
	Total				576,868

BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF SARDAR VALLAVBHAI PATEL POST GRADUATE INSTITUTE OF PAEDIATRICS, ORISSA STATE
INDIA

OPERATION TRAINING AND MAINTENANCE GUIDANCE FOR EQUIPMENT (SOFT COMPONENT WORKS)

October 2004

Consortium of
Yokogawa Architects & Engineers, Inc. and
Daiichi Health Care Facility Consultants Inc.

CONTENTS

1. Background

1-1 Current Operation and Maintenance Conditions

There is no departments or technical specialist in the Institute that is responsible for equipment maintenance. Only two central storage staffs under the deputy superintendent keep the equipment management book and repair records, etc. The nurses of the departments where the equipment is used do routine management and maintenance. Report of failure and/or request for repairs from the user departments are often delayed, which cause the equipment left out of order. Lack of proper routine maintenance due to poorly demarcated role sharing of equipment management causes the equipment left out of order or unused in short of consumables and spare parts, etc. The current operation and maintenance conditions of the equipment the Institute holds are not efficient or effective.

1-2 Operation and Maintenance Programme by the Institute

Being well aware that current management and maintenance of the equipment is undesirable, the Institute has concluded the Annual Maintenance Contracts for the equipment recently purchased with the revenue from User's Charge, and plans to establish the management and maintenance system to consolidate the equipment management for efficient utilisation. Specifically, the Institute will employ an equipment engineer or a technician with the revenue from User's Charge, who will be appointed under direct supervision of the deputy superintendent to deal with management and maintenance of the medical equipment. For the equipment that requires special skills for maintenance, AMC will be concluded with the supplier/agency to ensure regular maintenance to avoid suspension of the equipment operation.

1-3 Necessity for Operation and Maintenance Training and Guidance

In order to realize efficient utilization of both the supplied and existing equipment, a systematic management and maintenance is indispensable. The management and maintenance system is composed of numbering system of the equipment, renovation of the equipment management book, accessories and consumption inventory record, and failure report format and repair request format for the equipment users, etc.

Equipment maintenance consists of routine maintenance by the users, and periodical maintenance/repairs by the expertise. At present, however, equipment users randomly check or clean the equipment before or after the usage. All the repairs have to be commissioned to the suppliers/agencies, because there is no exclusive equipment maintenance staff in the Institute. Though AMC covers regular maintenance of some equipment, the management system is not well functioned. Appointment of an engineer specialised in equipment maintenance will enable an efficient inspection and maintenance

system. The operation training and maintenance guidance for equipment is necessary to support the equipment operation and maintenance programme by the Institute, as mentioned above, in order to establish an efficient equipment management system in the Institute.

2. Objectives

2-1 Goal

The operation training and management guidance for equipment aims to support the establishment of equipment operation and maintenance system by the Institute. It also aims to contribute to the improvement of Institute's capability for systematic equipment operation and maintenance.

2-2 Objectives

(1) Support of consolidated management of equipment and accessories, and support of management/maintenance records

To support creating equipment management book or accessories/consumables inventory book, maintenance manuals and maintenance and repair records, and to transfer the operation and maintenance skills and know how.

To support the establishment of operation and maintenance system in the Institute to realize proper inventory management, maintenance, and repairs.

(2) Support to demarcate equipment management and maintenance responsibilities in the Institute

To formulate the operation and maintenance bylaws for the clear demarcation of responsibilities.

(3) Support to establish the preventive maintenance system

To support the establishment of daily maintenance system like cleaning, check before and after each use, and the AMC system between the Institute and the equipment suppliers/agencies.

Preventive maintenance can minimise the equipment failure, reduce the maintenance costs and more importantly, ensure the safety in equipment operation.

Preventive maintenance by the users includes cleaning, inspections before and after operation, etc., which, if carried out regularly, effectively prevent serious malfunctions or breakdown of the equipment. Preventive maintenance by expertise includes regular maintenance, exchange of parts, and instructions to the users, etc. It aims to keep good

performance of the equipment. All the instruments that require highly technical skills shall be commissioned to the equipment suppliers/agencies for regular maintenance by AMC.

(4) Support to establish the swift trouble solution system

To support the establishment of reporting system of equipment failures, repair request, etc. for swift trouble solution.

Equipment manuals will be attached to the equipment supplied through the Project that specify daily inspections to prevent minor troubles, operation manuals to prevent wrong usage, proper maintenance method of equipment, management of spare parts and accessories, etc.

Currently maintenance situation is elementary level; mostly repairs when the equipment is in failure. Guidance and training will be given to establish an integrated trouble solution system.

3. Expected Accomplishments

Following accomplishments are expected, when the operation training and maintenance guidance for equipment is implemented.

(1) Equipment management book and inventory book of accessories, spare parts and consumables will be developed through the consolidated management, and maintenance recording system
(2) Responsibility for the equipment will be clarified through demarcation of responsibilities.
(3) Failure and non-operating rates of equipment will reduce by introducing preventive maintenance system.
(4) Swift trouble solution system will enable prompt repairs, and quick resolutions for other problems.

The operation training and maintenance guidance services will enable the reduction of maintenance expenses, safety equipment operation, elongation of equipment life, effective and efficient utilization of equipment. They will thus contribute to continuous benefit and will enhance the effects of the project.

4. Accomplishment Criteria

The accomplishment of the operation training and maintenance guidance will be measured based on the following criteria.

	Accomplishment	Criteria
Establishment of the consolidated equipment management, and maintenance recording system	1. Equipment management book and spare parts/ consumables inventory book are developed. 2. Equipment operation and maintenance manuals are developed. 3. Maintenance/repair records are developed.	Formulation of equipment management book, manual management book, maintenance/repairs record, etc. Monitoring of these books and manuals.
Clear demarcation of equipment management and maintenance responsibilities	1. Responsibilities for equipment operation and maintenance are regulated and enforced.	1. Express provision of bylaws, etc. and monitoring of activities
Establishment of the preventive maintenance system	1. Routine inspection manuals of the equipment are developed. 2. Routine inspections and maintenance are realized according to the manual. 3. AMC management book is developed. Regular maintenance is done according to AMC. Follow-up actions are taken as to be found necessary through the regular maintenance.	1. Formulation of routine inspections manuals. 2. Monitoring of the activities; whether the routine inspection manuals are developed and properly kept; whether malfunctions are properly reported, and requests for repairs are promptly placed according to the trouble solution system. 3. Formulation of AMC management book Monitoring whether the AMC regular inspection reports are properly kept. Monitoring whether appropriate follow-up actions are taken.
Establishment of the swift trouble solution system	1. Equipment failure report form and repair request form are developed. 2. Equipment is repaired and troubles are cleared without delay, based on these forms.	1. Formulation of the equipment failure report form and the repair request form. 2. Monitoring whether necessary trouble solution and repair actions are taken promptly.

5. Operation Training and Management Activities

Specific activities of the operation training and management services are as mentioned below.

A Japanese expert of equipment operation and maintenance will be assigned to the Institute. The equipment technician or engineer who will be newly employed under the deputy superintendent will cooperate the Japanese expert as a counterpart.

The training will be conducted for about six weeks before and after the delivery of medical equipment.

Support	Activities	Documents
Establishment of the consolidated equipment management, and maintenance recording system	1. The management number is allocated to the equipment. The equipment management book is created in the computer in cooperation with the counterpart. (The book includes maintenance/ repair records) 2. The spare parts / consumable inventory book is created in the computer. Workshops for inventory management are held for the counterpart and equipment users. 3. The equipment manuals and the manual management book are created in cooperation with the counterpart.	1. Equipment management book 2. Accessories/ consumables inventory book 3. Manual management book
Clear demarcation of equipment management and maintenance responsibilities	1. The equipment operation and maintenance system is established in cooperation with the hospital executives.	1. Equipment operation and maintenance bylaw
Establishment of the preventive maintenance system	1. The routine inspection manual and inspection record form are created in cooperation with the counterpart. 2. The AMC management book is created in cooperation with the counterpart. (Follow-up action records are included.)	1. Routine inspection manual and inspection record form 2. AMC management book for each equipment under contract
Establishment of the swift trouble solution system	1. The equipment trouble report form and the repair request form are created in cooperation with the counterpart. 2. Equipment supplier/agency lists are developed in cooperation with the counterpart.	1. Equipment trouble report form, and repair request form 2. Equipment supplier/agency lists for each instrument

6. Implementing Resource

In recognition of current unfavourable management and maintenance conditions of equipment in the medical institutions, the State Government of Orissa analysed the current situations in the Health Policy Management Reinforcement Support Project, financed by DFID, and incorporated improvement and reinforcement programmes in “Orissa Vision-2010” released in February 2003. These programmes consist of the improvement and reinforcement in equipment section and facility/utility section. When the study team surveyed how these programmes were implemented, there was no division in charge in the state government, and no discernible progress has been made. This probably attributes to the shortage of know how and expertise in the management and maintenance of equipment in India.

The study team also researched ELMARC, which was established to be engaged in medical equipment maintenance, worked on the situation analysis in the above DFID support project, and now works as an government agency for procuring medical equipment in the Orissa Health System Development Project, financed by the World Bank. The fact was, however, ELMARC is mainly concerned with maintenance of equipment hardware, and does not have sufficient knowledge, skills or human resources in terms “software” aspect.

In this circumstance, it would be best if the operation training and management guidance for equipment will be implemented under the instructions of an expert from Japan.

7. Implementing Schedule

The operation training and management guidance will be conducted for about six weeks before and after the delivery of medical equipment. Schedules of each activity are as shown below.

Activities \ Week	1	2	3	4	5	6
Establishment of the consolidated equipment management, and maintenance recording system						
i) Formulation of equipment book and accessories/consumables inventory book,						
ii) Formulation of maintenance manuals and manual management book						
Clear demarcation of equipment management and maintenance responsibilities						
Establishment of the preventive maintenance system						
i) Formulation of routine inspection manuals						
ii) Formulation of AMC management book						
Establishment of the swift trouble solution system						
i) Formulation of equipment failure report form and repair request form						
ii) Formulation of equipment supplier/agency lists						
Others						
i) Monitoring the state of implementation						
ii) Analysis of monitoring results, and recommendation						

8. Outputs

Following documents will be created in accomplishment of the operation training and maintenance guidance for equipment. The completion report will be presented to the both governments.

1) Equipment management book, accessories/consumables inventory book
2) Manual management book
3) Routine inspection manual, inspection record form
4) AMC management book for each machine under contract
5) Equipment trouble report form, repair request form
6) Equipment supplier/agency lists
7) Monitoring report

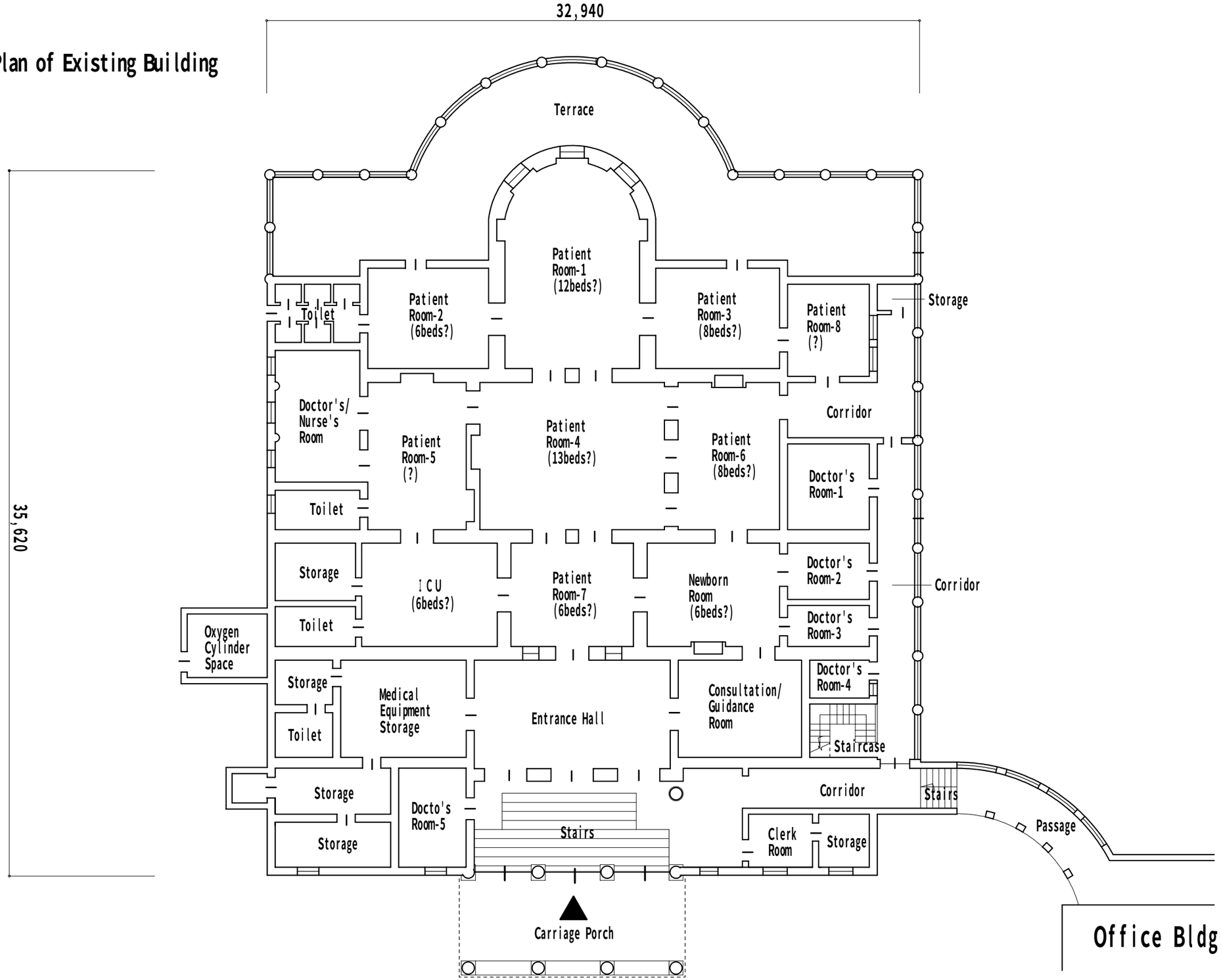
9. Responsibilities of the Recipient Country

The effects of the operation training and management guidance for equipment will not continue unless sufficient financial resources are sustained for the expenses such as the AMC costs, repair costs, purchase costs for accessories, spare parts and consumables, etc. The Institute is expected to secure financial allocation out of the revenues by the User's Charge.

It is also necessary that the Institute will employ a technician or engineer who will be exclusively engaged in equipment maintenance, in prior to the handing over of the equipment to be supplied through the Project.

After the completion of the Project, the Institute shall continuously endeavour to reinforce the equipment operation and maintenance system. Workshops shall be held periodically to enhance the recognition of the equipment users upon the importance of proper operation and maintenance.

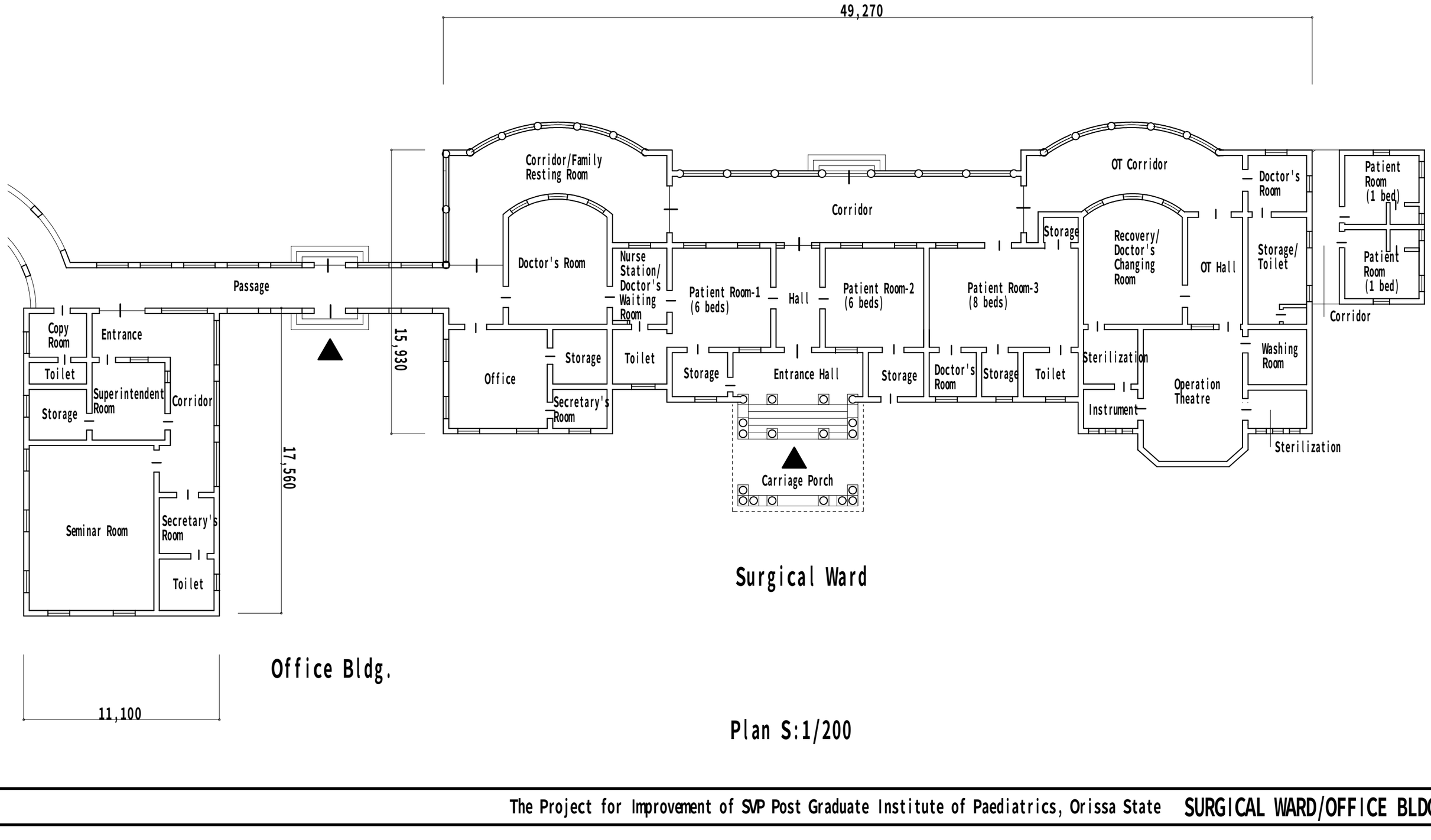
5-6 Floor Plan of Existing Building

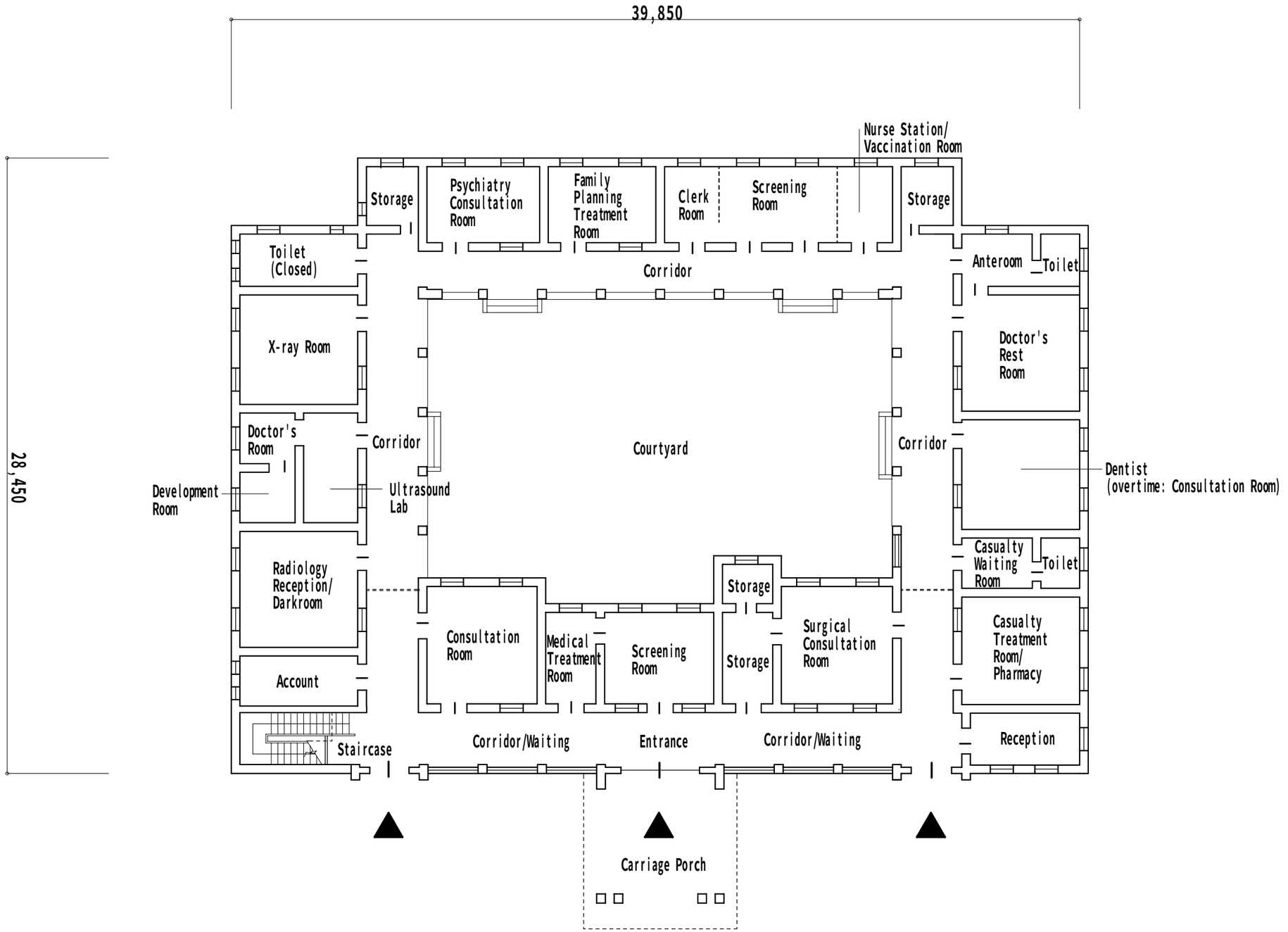


Plan S:1/200

Remarks : Numbers of beds in the Patient Rooms are unknown because they were under construction during the basic design study.

Numbers of beds in the Patient Rooms in this drawing are tha same as those in the preliminary study report.

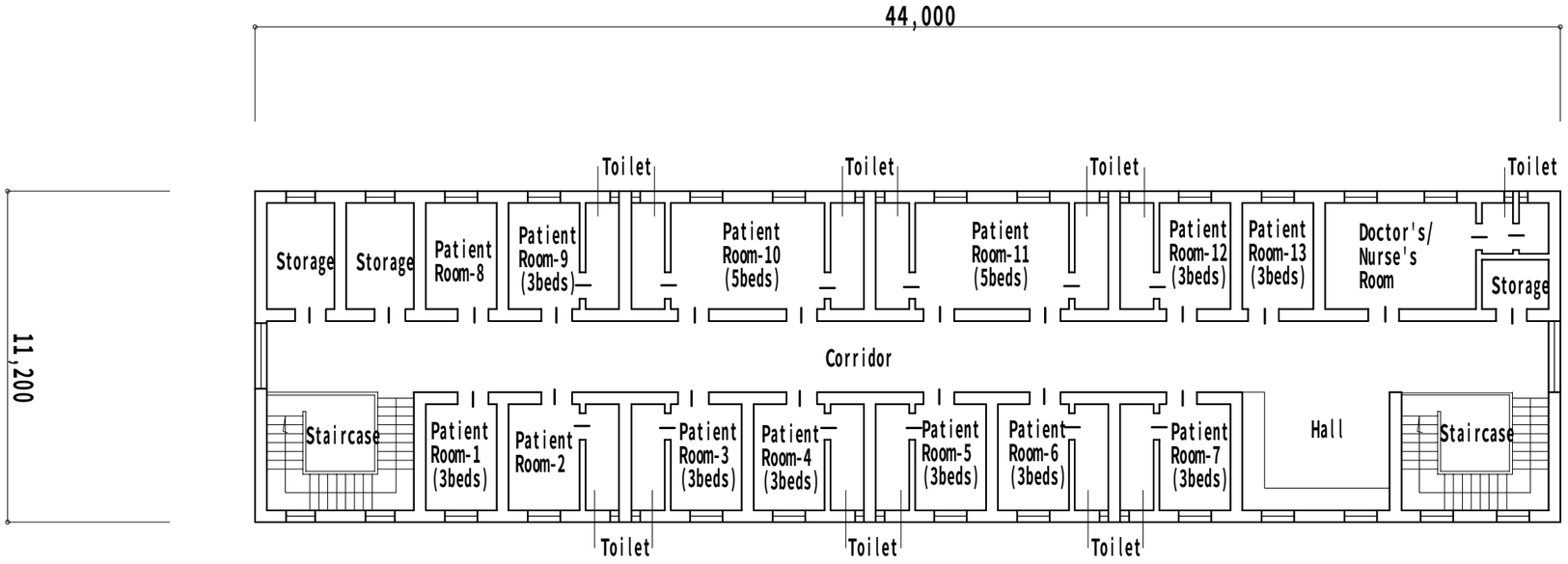

49,270
Corridor/Family Resting Room
Corridor
OT Corridor
Doctor's Room
Patient Room (1 bed)
Passage
Doctor's Room
Nurse Station/ Doctor's Waiting Room
Patient Room-1 (6 beds)
Hall
Patient Room-2 (6 beds)
Patient Room-3 (8 beds)
Storage
Recovery/ Doctor's Changing Room
OT Hall
Storage/ Toilet
Patient Room (1 bed)
Corridor
Copy Room
Entrance
Toilet
Superintendent Room
Corridor
Storage
15,930
Office
Storage
Toilet
Secretary's Room
Storage
Entrance Hall
Storage
Doctor's Room
Storage
Toilet
Sterilization
Operation Theatre
Instrument
Washing Room
Sterilization
Carriage Porch
17,560
Seminar Room
Secretary's Room
Toilet
Surgical Ward
Office Bldg.
11,100
Plan S:1/200


39,850
28,450
Nurse Station/
Vaccination Room
Storage
Psychiatry
Consultation
Room
Family
Planning
Treatment
Room
Clerk
Room
Screening
Room
Storage
Toilet
(Closed)
Corridor
Anteroom
Toilet
X-ray Room
Doctor's
Rest
Room
Doctor's
Room
Corridor
Courtyard
Corridor
Development
Room
Ultrasound
Lab
Dentist
(overtime: Consultation Room)
Radiology
Reception/
Darkroom
Casualty
Waiting
Room
Toilet
Storage
Consultation
Room
Medical
Treatment
Room
Screening
Room
Storage
Surgical
Consultation
Room
Casualty
Treatment
Room/
Pharmacy
Account
Staircase
Corridor/Waiting
Entrance
Corridor/Waiting
Reception
Carriage Porch

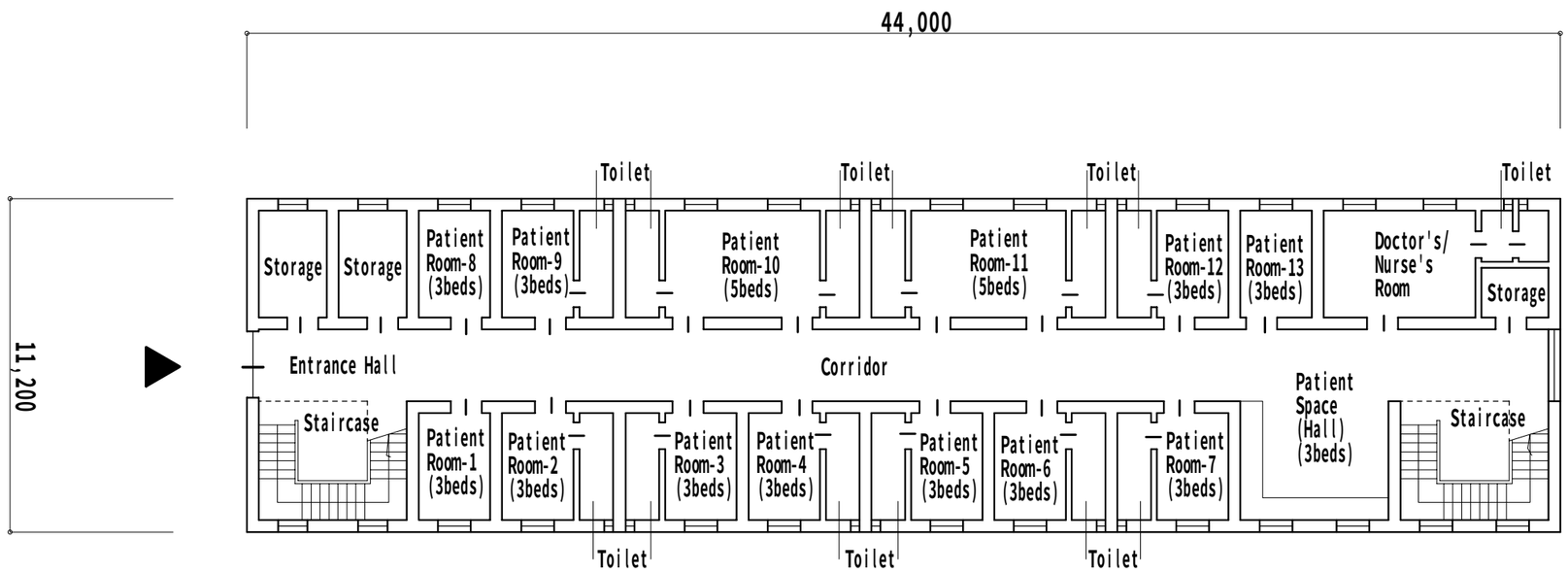
Plan S:1/200


60,950
45,550
Patient Room-1 (8beds)
Toilet
Patient Room-3 (4beds)
Storage
Patient Room-4 (11beds)
Staircase
Nurse Station
Corridor
Patient Room-2 (10beds)
Newborn Room-1 (11beds)
Patient Room-5 (12beds)
Nurse Station
Anteroom
Anteroom
Treatment Room
Newborn Room-2 (8beds)
Nurse Station
Toilet
Toilet
Staircase
Library
Seminar Room
Entrance
Toilet
Lab-1
Anteroom
Corridor
Doctor's Room-1
Doctor's Room-4
Corridor
Toilet
Anteroom
Lab-2
Lab-3
Lecturer Waiting Room
Lab-4
Lab-5
Doctor's Room-2
Doctor's Room-5
Doctor's Room-3
Doctor's Room-6

Plan S:1/200



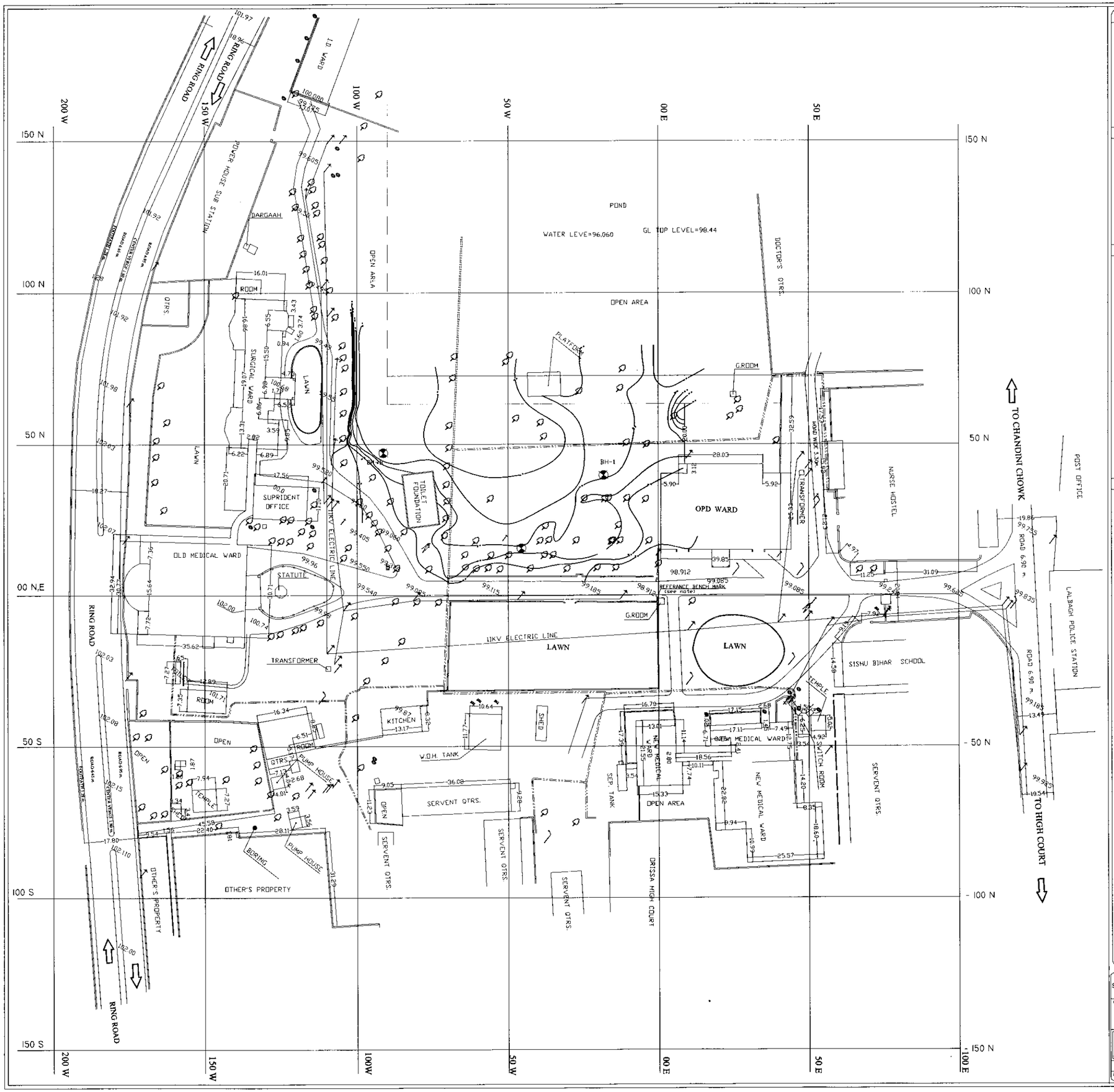
First Floor Plan S:1/200 (only Firsy Floor used for ID Ward)



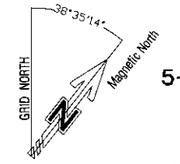
Ground Floor Plan S:1/200 (temporary used for Medical Ward)

5-7 Geotechnical Investigation Report

5-7-1 Topographical Survey Plan



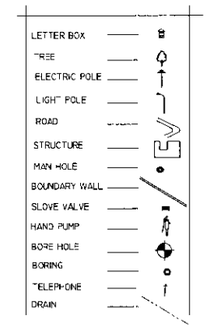
Magnetic North :



Notes :

01. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED
02. DO NOT SCALE THE DRAWING IF IN DOUBT PLEASE ASK
03. GRIDS ARE DRAWN AT 10.0 x 10.0m INTERVALS
04. CONTOUR INTERVAL IS 0.20M.
05. REF. BM. MARKED TAKEN ON GATE PILLER (N 00.000/E 00.000) AS 100.00 m. WHICHIS 0.90 m. ABOVE GROUND LEVEL AS SHOWN IN PLAN.

Legends :



Area Details :

S.NO.	LEVEL
BH-1.	98.527
BH-2.	98.585
BH-3.	98.337

Project : Topographical Survey Plan of
S.V.P POST GRADUATE INSTITUTE OF PAEDIARICS
CUTTACK , ORISSA

Client : THE CONSORTIUM OF YOKOGAWA ARCHITECTS & ENGINEERS INC. AND DAICHI HEALTH CARE FACILITY CONSULANTS INC. TOKYO, JAPAN.

Surveyed By : CENGRS GEOTECHNICA Pvt. Ltd.
Civil & Geotechnical Engineers, B-3/87 Safdarjung Enclave, New Delhi 29
TEL. 01- (2610 3774 , 26 0 5251.) Fax : 011 - 2619 3985

Scale	1 : 500	Surv.	Pradeep	Drn.	Amit	Chkd.	... jain
Date	MAY, 2004	Job. No.	204086-A	Rev. No.	00		

100.000 W

50.000 W

00.000 W

100.000 N

50.000 N

00.000 N

OPEN AREA

PLATFORM

TOILET FOUNDATION

11KV ELECTRIC LINE

OPD WARD

GUARD ROOM

99.100
REFERANCE BENCH MARK
(see note)

BH-1

BH-2

BH-3

8.75

3.12

5.90

12.75

20.00

Magnetic North :

38°35'14"

GRID NORTH

Magnetic North

Notes :

01. ALL DIMENSIONS ARE IN METERS UNLESS OYHERWISE SPECIFIED
02. DO NOT SCALE THE DRAWING, IF IN DOUBT PLEASE ASK
03. GRIDS ARE DRAWN AT 10.0 x 10.0m INTERVALL
04. REF. BM. MARKED TAKEN ON GATE PILLER (N 00.000,E 00.000)
AS 100.00 m WHICHES 0.90 m. ABOVE GROUND LEVEL
AS SHOWN IN PLAN.

Legends :

- LETTER BOX
- TREE
- ELECTRIC POLE
- LIGHT POLE
- ROAD
- STRUCTURE
- MAN HOLE
- BOUNDARY WALL
- SLOVE VALVE
- HAND PUMP
- BORE HOLE
- BORING
- TELEPHONE
- DRAIN

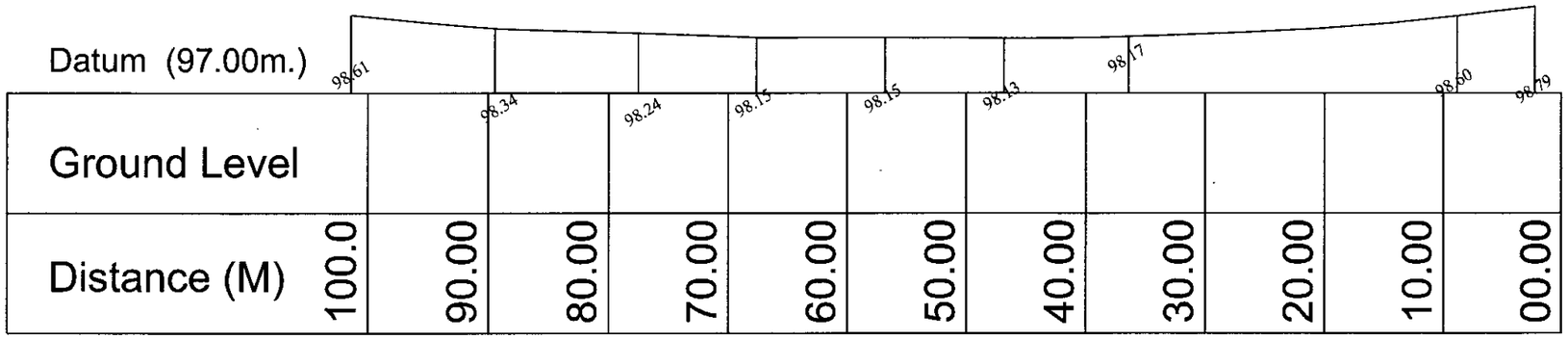
S.NO:	LEVEL
BH-1.	98.527
BH-2.	98.585
BH-3.	98.337

Project : Topographical Survey Plan of
S.V.P POST GRADUATE INSTITUTE OF PAEDIARICS
CUTTACK , ORISSA

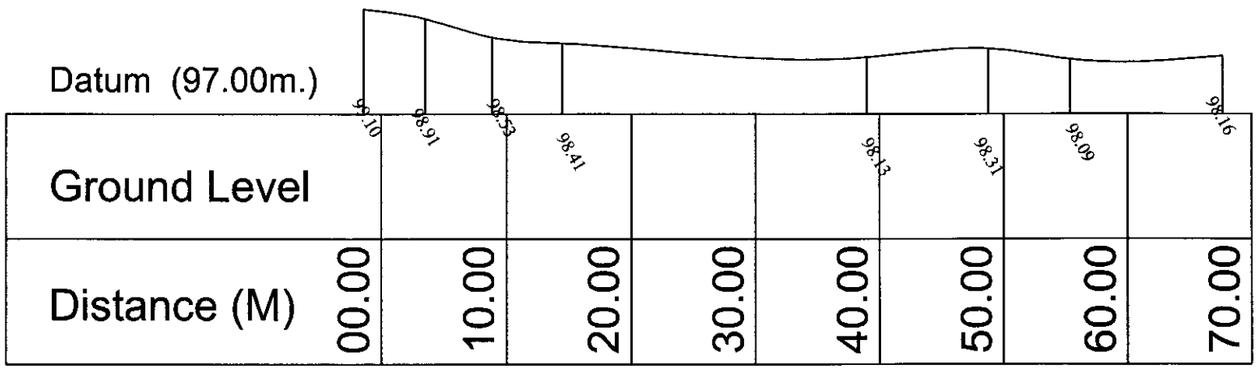
Client : THE CONSORTIUM OF
YOKOGAWA ARCHITECTS & ENGINEERS INC. AND
DAIICHI HEALTH CARE FACILITY CONSULANTS INC
TOKYO, JAPAN

Surveyed By : CENGRS GEOTECHNICA Pvt. Ltd.
Civil & Geotechnical Engineers, B 3/87 Safdarjung Enclave, New Delhi - 29
Tel.. 011 (2610 3774 , 2610 525 .) Fax : 011 2619 3985

Scale	1 : 200	Sys'	Pradeep	Dsn	Amit	Chkr.	
Date	MAY 2004	Job. No.	204050-A	Rev. No	00		



L - Section 50-N, 50-N



L - Section 50-W, 50-W

Prj.Id
Topographical Survey Plan of
S.V.P POST GRADUATE INSTITUTE OF PAEDIARICS
CUTTACK , ORISSA

Client
THE CONSORTIUM OF
YOKOGAWA ARCHITECTS & ENGINEERS,INC. AND
DAICHI HEALTH CARE FACILITY CONSULANTS INC.
TOKYO, JAPAN

Surveyed By CENGRS GEOTECHNICA Pvt. Ltd.
Civil & Geotechnical Engineers, B 3/87 Safdarjung Enclave, New Delhi - 29.
TEL. 011 (2610 3774 , 2610 525..) FAX : 011 - 2619 3985

Scale 1 : 200	Sryd Prradeep	Drn. Amit	Chkd. r. jain
Date MAY, 2004	Job .No. 204050-A	Rev. No. 00	

	CENGRS GEOTECHNICA PVT. LTD.	Job No. 204050-B	Sheet No. i

REPORT ON :

GEOTECHNICAL INVESTIGATION AT S.V.P. POST GRADUATE INSTITUTE OF PEDIATRICS AT CUTTACK (ORISSA)

Submitted to:

The Consortium of
Yokogawa Architects Engineers, Inc. and
Daiichi Health Care Facility Consultants Inc.
2-20-28, Shimomeguro, Meguro-Ku
Tokyo, Japan

TABLE OF CONTENTS

TABLES

ILLUSTRATIONS

1.0 INTRODUCTION

1.1 Project Description

Sardar Vallavbhai Patel Post Graduate Institute of Pediatrics at Cuttack, Orissa is planning to expand its facilities. A two storey building is planned with covering an area to about 5000 m^2. The average ground level is taken as 98.5 m.

M/s. Yokogawa Architects & Engineers, Inc. and Daiichi Health Care Facility Consultants Inc., Tokyo, Japan is the project consultant for this project. A layout plan showing the locations of our field investigation is illustrated in Fig.1.

1.2 Purposes of Study

The overall purposes of this study are to investigate the stratigraphy at the site and to develop geotechnical recommendations for foundation design and construction. To accomplish these purposes, the study was conducted in the following phases:

(a) drilling three boreholes to 30 m depth or refusal, whichever is earlier in order to determine site stratigraphy and to collect soil samples for laboratory testing;

(b) testing selected soil samples in the laboratory to determine pertinent index and engineering properties of the soils ; and

(c) analyzing all field and laboratory data in order to develop engineering recommendations for foundation design and construction.

2.0 FIELD INVESTIGATIONS

2.1 Soil Borings

The borings were progressed using a shell and auger to the specified depth or refusal, whichever is encountered earlier. The diameter of borehole was 150 mm. Where caving of the borehole occurred, casing was used to keep the borehole stable. The work was in general accordance with IS:1892-1979.

Standard Penetration Tests (SPT) were conducted in the boreholes at 1.5 m depth intervals by connecting a split spoon sampler to 'A' rods and driving it by 45 cm using a 63.5 kg hammer falling freely from a height of 75 cm. The tests were conducted in accordance with IS:2131-1981.

The number of blows for each 15 cm of penetration of the split spoon sampler was recorded. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm sampling interval is termed the SPT value or the 'N' value.

The 'N' values are presented on the soil profile for each borehole. Refusal to further boring penetration was considered when the 'N' values exceed 100 or when practical refusal to further penetration by shell and auger was encountered.

Disturbed samples were collected from the split spoon after conducting SPT. The samples were preserved in transparent polythene bags. Undisturbed samples were collected by attaching 100 mm diameter thin walled 'Shelby' tubes and driving the sampler using a 63.5 kg hammer in accordance with IS: 2132-1986. The tubes were sealed with wax at both ends. All samples were transported to our Delhi laboratory for further examination and testing.

2.2 Groundwater

Groundwater level was measured in the boreholes 24 hours after drilling and sampling was completed. The measured water levels are recorded on the individual soil profiles.

3.0 LABORATORY TESTS

The laboratory testing programme was aimed at verifying the field classifications and developing parameters for engineering analysis. All tests were performed in accordance with the current applicable IS specifications. The following tests were conducted on selected soil and water samples recovered from the borehole:

Laboratory Test	Applicable IS: Code
Natural moisture content	IS: 2720 (Part-2)-1973
Grain size analysis	IS: 2720 (Part-4)-1985
Liquid, Plastic limit and shrinkage limit	IS: 2720 (Part-5& 6)-1985
Specific Gravity	IS: 2720 (Part-3)-1980
Free Swell Index	IS:2720 (Part-40)-1977
Unconsolidated Undrained Triaxial shear test	IS: 2720 (Part-11)-1971
Consolidated Drained Direct Shear Test	IS: 2720 (Part-13)-1986
Unconfined Compression Test	IS: 2720 (Part-10)-1991
Consolidation test	IS: 2720 (Part-15)-1986
Chemical analysis of soil and groundwater to determine pH value, sulphates and chlorides	IS: 2720 (Part-27)-1977 IS: 2720 (Part-28)-1973 IS: 3025 -1964

All test results are presented on the Tables 1 to 3 and in the illustrations section of this report.

4.0 GENERAL SITE CONDITIONS

4.1 Site Stratigraphy

The area of the site is low lying. During rainy season, about 15-25 cm of standing water collects at the site.

At the site, a fill of 0.60-0.75 m is met. Below this, clayey silt / sandy silt is met to about 8.5 to 11.0 m depth (RL 90.0-87.5 m). This is underlain by silty sand / fine to medium sand to about 18.5 m depth (RL 80.0 m). Below this, clayey silt is met to about 20.0-22.0 m depth (RL 78.5-76.5 m). Below 20.0-22.0 m, fine to medium sand is met to the final explored depth of 30.0 m (RL 68.5 m).

Field SPT vales range from 5 to 9 to about 7.0 m depth (RL 91.5m). However at Borehole 3, a SPT value of 3 is met at 2.0 m depth (RL 96.5m). Below 7.0 m, SPT values range from 9 to 18 to

about 10.0 m depth (RL 88.5 m) and from 18 to 31 to about 22.0 m depth (RL 76.5 m). In underlying soils, SPT values increase and range from 42 to 61 (with some values exceeding 100) to the final explored dept of 30.0 (RL 68.5 m).

Detailed description of the materials encountered at the borehole locations is presented on the individual soil profiles on Tables 1 to 3. Engineering terms used for describing soils are explained on Table 4. Table 5 presents chemical test results of soil and groundwater. A pictorial summary of the borehole profiles is presented on Fig. 2. Corrected SPT values are plotted on Fig.3.

4.2 Groundwater

Based on our measurement in the completed boreholes, groundwater was encountered between 4.30 to 4.65 m depth (RL 94.2m to 93.85 m) below the existing ground level at the time of our field investigation (May, 2004). Fluctuations of upto 2 to 3 m may occur in measured water level due to seasonal variations in rainfall and surface evaporation rates. The area is prone to cyclones and heavy rains due to which substantial standing water may collect at the site.

5.0 CONCEPTS FOR ANALYSIS

5.1 Bearing Capacity for Shallow Foundations

Bearing capacity analysis for shallow foundations has been done in accordance with IS:6403-1981. The following equation has been used for the analysis:

$$q_{net\ safe} = \frac{1}{F}\left[cN_c\zeta_c d_c + p(N_q - 1)\,\zeta_q d_q + 0.5\,B\,\gamma N_\gamma \zeta_\gamma d_\gamma R_w\right]$$

where :

$q_{net\ safe}$ = safe net bearing capacity of soil based on the shear failure criterion

c = cohesion intercept

ϕ = angle of internal friction

γ = total unit weight of soil

p = overburden pressure
B = width of foundation
R_w = water table correction factor
F = Factor of safety, taken as equal to 2.5 in accordance with IS:1904
N_c, N_q, N_γ = Bearing capacity factors which are a function of ϕ.
$\zeta_c, \zeta_q, \zeta_\gamma$ = Shape factors. For Strip footings, $\zeta_c = \zeta_q = \zeta_\gamma = 1$
For Square footing, $\zeta_c = 1.3$, $\zeta_q = 1.2$, $\zeta_\gamma = 0.6$
d_c, d_q, d_γ = Depth factors
For $\phi \leq 10$, $d_c = 1 + 0.2 \tan(45 + \phi/2)\, D/B$, $d_q = d_\gamma = 1$
For $\phi > 10$, $d_q = d_\gamma = 1 + 0.1 \tan(45 + \phi/2)\, D/B$

Depending upon the soil conditions, either general shear failure condition or average of local and general shear failure conditions or local shear failure conditions has been used for the analysis.

5.2 Settlement Analysis for Shallow Foundations

Settlement analysis has been performed based on immediate settlement computations by elastic theory as per procedure given by Bowles[1] and consolidation settlement [Clauses 9.2.2 and 9.2.3 of IS 8009 (Part 1) 1976]. As per IS 1904, the tolerable total settlement is taken as 50 mm.

The total settlement is computed as the sum of the elastic settlement and the consolidation settlement. The elastic settlement has been computed using the following equation [Clause 9.2.3 of IS 8009 Part 1-1976].

$$S_i = \frac{qB'(1-\mu^2)}{E} I_d\, d_c$$

where :

S_i = immediate (elastic) settlement
B = foundation width, $B' = B/2$

[1] Bowles, J.E. (1996), "***Foundation Analysis and Design***", International Edition, pp. 303-317.

μ = Poisson's ratio
q = applied bearing pressure
E = modulus of elasticity
d_f = depth factor
d_r = rigidity factor
I = influence factor at corner of rectangular loaded area (B' x L')

The consolidation settlement of the cohesive soils has been computed using the following equation [Clause 9.2.2. of IS 8009 (Part-1)-1976].

$$S_c = \frac{c_c H}{1+e_o}[\log(\frac{p+\Delta p}{p})]\lambda_{oed}\, d_f\, d_r$$

where :

S_c = consolidation settlement
c_c = compression index
e_o = initial void ratio
p = overburden pressure
λ_{oed} = oedometer correction factor, taken as equal to 0.7

5.3 Axial Capacity of Bored Piles

The axial compressive capacity for bored piles has been computed based on static analysis using c-ϕ values as interpreted from the site stratigraphy and laboratory test results.

The ultimate pile compressive capacity has been computed using the following equation as given in IS 2911 Part-I Section 2.

$$Q_{ult} = \left[\sum_{i=1}^{n} f_i A_s L_i\right] + q_u A_p$$

$$= \left[\sum_{i=1}^{n} (\alpha c_i + p_i k \tan\delta_i) A_s L_i\right] + \left[c_p N_c + q_p N_q + 0.5 Dr\, N_\gamma\right] A_p$$

where :

Q_{ult}	=	ultimate pile capacity
f_s	=	unit skin friction
α	=	adhesion factor, taken as 0.5 under compressive loading
c_i	=	cohesion intercept in i^{th} layer
p_i	=	overburden pressure at centre of i^{th} layer
k	=	coefficient of lateral earth pressure, taken as 1.5 under compressive loading
δ_i	=	angle of friction between soil and pile (taken as equal to ϕ_i) for the i^{th} layer
A_s	=	surface area of pile per m length
L_i	=	length of pile section in i^{th} layer
c_p	=	cohesion intercept in bearing strata
q_u	=	unit end bearing
q_p	=	overburden pressure in bearing strata
N_c, N_q	=	bearing capacity factors, which are a function of ϕ in the bearing strata
A_p	=	pile cross sectional area

The overburden pressure is assumed to become constant below depth of about 20 pile diameters.

6.0 FOUNDATION ANALYSIS AND RECOMMENDATIONS

6.1 General

A suitable foundation for any structure should have an adequate factor against exceeding the bearing capacity of the supporting soils. Also the vertical movements due to compression of the soils should be within tolerable limits for the structure. We consider that foundation designed in accordance with the recommendations herein will satisfy these criteria.

6.2 Foundation Type and Depth

A SPT value of 3.0 is met to about 2.0 m depth in Borehole 3. Below this, SPT values increase with depth and range from 5 to 9 to 7.0 m depth.

Open spread foundations and strip footings (including brickwall type spread footings) may be used to support the structural loads. We recommend a minimum foundation depth of 2.0 m (RL 96.5 m) below existing ground level. A plinth beam interconnecting the foundations should be provided in order to give rigidity to the structure, to restrict differential settlement within tolerable limits for the structure.

Alternatively, pile foundations may be used to support the structural loads. Recommendations are presented herewith for 400 mm and 500 mm diameter RCC bored cast-in-situ piles.

6.3 Shallow Foundations

Open foundations bearing at or below about 2.0 m depth (RL 96.5 m) is a suitable foundation scheme.

Soil parameters used for foundation analysis are as follows:

For 2.0 m depth (RL 96.5 m) :

$c = 5.80\ T/m^2$ $\phi = 0$ degrees $\gamma = 1.80\ T/m^3$
$c' = 3.87\ T/m^2$ $\phi' = 0$ degrees
$N_c' = 5.14$ $N_q' = 1.00$ $N_\gamma' = 1.80$ Local Shear Failure

For 3.0 m depth (RL 95.5 m) :

$c = 6.70\ T/m^2$ $\phi = 0$ degrees $\gamma = 1.80\ T/m^3$
$c' = 4.47\ T/m^2$ $\phi' = 0$ degrees
$N_c' = 5.14$ $N_q' = 1.00$ $N_\gamma' = 0$ Local Shear Failure

The bearing capacity equation as given in Section 5.1 has been used for the analysis. For the soil conditions encountered at the site, local shear failure has been used for analysis.

Settlement analysis has been performed in accordance with IS 8009 Part I. The computation has been done by computing the settlement using the elastic and consolidation theory. The detailed procedure is given in section 5.2 of this report. As per IS:1904, the tolerable settlement is taken as 50 mm. The groundwater is considered to rise to ground level for design purpose.

Soil parameters used for the settlement analysis for the proposed structure are as follows:

RL, m		Soil Classification	γ T/m^3	E T/m^2	μ	P_c	e_a	C_{c1}	C_{c2}
From	To								
98.5	97.7	FILL	1.60						
97.7	93.5	Clayey Silt/ Sandy silt	1.75	350		14	0.70	0.022	0.200
93.5	88.5	Clayey Silt/ Sandy silt	1.85	600		23	0.67	0.019	0.190
88.5	80.0	Fine to medium sand	1.90	1000	0.4				
80.0	76.5	Clayey silt	1.95	1000		30	0.66	0.017	0.160
76.5	68.5	Fine to medium sand	2.00	1200					

Based on a detailed analysis for foundations of different sizes, we recommend the following values of net bearing pressure at or below RL 96.5 m (2.0 m below EGL).

RL of Foundation Embedment, m	Foundation Embedment Depth, m	Foundation Width, m	Recommended Net Allowable Bearing Pressure, T/m^2
96.5	2.0	1	10.0
		2	8.5
		≥3	7.0
95.5	3.0	1	14.0
		2	12.0
		≥3	10.0

The above values include a bearing capacity factor of 2.5. Total settlement of foundations designed for the above recommended values of net bearing pressure is estimated to be about 50 mm. A plinth beam interconnecting the foundations should be provided in order to give rigidity to the structure and to restrict differential settlement. Net bearing pressures for foundations at intermediate levels may be interpolated linearly between the values given above. Typical calculations are enclosed at the end of the report.

6.4 Pile Foundations

RCC bored cast-in-situ piles may be provided to support the structural loads. Recommendations are presented herewith for 400 mm and 500 mm diameter piles. The cut-off-level has been taken at RL 97.5 m (1.0 m below ground level).

Parameters used for pile capacity analysis are as follows :

RL, m		Soil Classification	c, T/m^2	ϕ^o	Υ, T/m^3	k	α	N_c	N_q	N_γ
From	To									
98.5	97.7	Fill	-	-	1.60					
97.7	95.5	Clayey silt/ sandy silt	5.8	0	1.75	1.5	0.5			
95.5	92.5	Clayey silt/ sandy silt	6.7	0	1.80	1.5	0.5			
92.5	88.5	Clayey silt/ sandy silt	7.6	0	1.85	1.5	0.5			
88.5	80.0	Fine to coarse sand	0.0	31	1.90	1.5			23.93	25.99
80.0	76.5	Clayey silt/ sandy silt	11.0	5	1.95	1.5	0.5	9.0	1.57	0.45
76.5	68.5	Fine to medium sand	0.0	33	2.00	1.5			34.86	35.19

The following table represents our recommended values of safe axial compressive load for 400 and 500mm diameters bored cast-in-situ piles.

Reduced level of pile Tip, m	Pile Length below COL, m	Recommended Safe Compressive Capacities, Tonnes	
		Dia = 400 mm	Dia = 500 mm
85.5	12.0	32	49
83.5	14.0	38	58
81.5	16.0	42	61
79.5	18.0	48	70
77.5	20.0	54	78

The above pile capacities include a safety factor of 2.5. The pile capacities at intermediate depths may be interpolated linearly between the values given above. These capacities may be used as a guideline for preliminary design. Final capacities should be confirmed in site by initial pile load test as per IS specifications. Typical calculations are given at the end of this report.

6.5 Definition of Gross and Net Bearing Pressure

For the purposes of this report, the net allowable bearing pressure should be calculated as the difference between total load on the foundation and the weight of the soil overlying the foundation divided by the effective area of the foundation. The gross bearing pressure is the total pressure at the foundation level including overburden pressure and surcharge load. The following equations may be used -

$$q_{net} = [(P_s + W_f + W_s) / A_f] - S_v$$
$$q_{gross} = q_{net} + S_v = (P_s + W_f + W_s) / A_f$$

where:

q_{net} = net allowable bearing pressure

q_{gross} = gross bearing pressure

P_s = superimposed static load on foundation

W_f = weight of foundation

W_s = weight of soil overlying foundation

A_f = effective area of foundation

S_v = overburden pressure at foundation level prior to excavation for foundation.

It may please be noted that safe bearing pressures recommended in this report refer to *"**net values**"*.

6.6 Liquefaction Potential

Liquefaction is likely in soil deposits consisting of loose sands (SP) below water table with SPT N-values less than 15. At shallow depths, the soil deposits consist of clayey silt / sandy silt with N-values less than 15. The sands below water table classify as SP and SP-SM with N-values more than 15. Groundwater is met at 4.30~4.65 m depth.

Reviewing the soil conditions, SPT values, soil gradation and depth of water table, we are of the opinion that the liquefaction potential for the soils at the site during earthquake is low. No specific measures are considered warranted.

In our opinion, provision of plinth beam interconnecting the column / footings as well as earthquake bands at lintel level are sufficient to ensure stability of the proposed building during earthquakes.

7.0 FOUNDATION CONSTRUCTION CONSIDERATIONS

7.1 Excavation

Temporary open cut excavation through soil to about 2.0 to 3.0m depth may be cut using side slopes of 1 - vertical on 0.3 to 0.4 - horizontal. The excavation slopes should be monitored by the engineer. If excessive sloughing or caving occurs, the slopes may be flattened to ensure stability.

7.2 Foundation Level Preparation

The exposed foundation bearing surface should be watered and compacted properly using light manual rammers/rollers. The surface should then be protected from disturbances due to construction activities so that the foundations may bear on the natural undisturbed ground. For all shallow foundations and pile caps, we recommend the placement of a 75 to 100 mm thick "blinding layer" of lean concrete to facilitate placement of reinforcing steel and to protect the soils from disturbance.

7.3 Pile Construction

In case piles are planned, a properly mixed drilling mud should be used to control the caving of the borehole during drilling and concreting. Use of tremie concreting is recommended in order that the groundwater does not mix with the fresh concrete. The concrete should be coherent, with a minimum cement content of 400 kg/cu.m. for M25 grade of concrete and should have a slump of about 150 to 180 mm.

7.4 Pile Load Tests

In case pile foundations are planned, we recommend that load tests be conducted on piles in order to confirm the static capacities and to ensure proper performance of the piles. A programme of initial load tests and routine load tests should be drawn up and sufficient number of piles should be tested in accordance with IS : 2911 Part-IV in order to ensure that the safe load on the pile is either equal to or greater than the working load on the piles.

7.5 Chemical Attack

Chemical test results on soil and groundwater are presented on Table 5. The results indicate that the soils contain sulphate in the range of 0.10 to 0.12 percent and chlorides in the range of 0.02 to 0.04 percent. The groundwater contains 361 to 412 mg / litre of sulphates and 170 to 210 mg / litre of chlorides. The pH value of soil is between 8.3 to 8.6 and that of groundwater is between 7.6 to 8.0 indicating somewhat alkaline condition.

IS:456-2000 recommends that precautions should be taken against chemical degradation of concrete if the sulphates content of the soils exceeds 0.2 percent or if the groundwater contains more than 300 mg per litre of sulphates (SO_3).

Comparing the test results with these specified limits, the sulphate content of the soils is less than the specified limit; however the sulphate content of the groundwater is above the specified limit. The strata falls in Class 2 classification as described on IS 456 – 2000 which indicates a medium potential for corrosion.

In our opinion, the groundwater is marginally aggressive to concrete. We recommend the following measures as a good practice to limit the potential for chemical attack :

(1) For shallow foundations and pile caps, the concrete should contain a minimum cement content of 330 kg/m^3. Concrete for pile foundations should contain at least 400 kg/m^3 of cement. Ordinary Portland cement may be used for concrete.

(2) Water cement ratio in foundation concrete should not exceed 0.55.

(3) A clear concrete cover over the reinforcement steel of at least 40 mm should be provided for all foundations.

(4) The concrete for shallow foundations and pile caps should be densified adequately using a vibrator so as to form a dense impervious mass.

7.6 Variability in Subsurface Conditions

Subsurface conditions encountered during construction may vary somewhat from the conditions encountered during the site investigation. In case significant variations are encountered during construction, we request to be notified so that our engineers may review the recommendations in this report in light of these variations.

8.0 SUMMARY OF PRINCIPAL FINDINGS AND RECOMMENDATIONS

Cengrs Geotechnica Private Limited conducted a geotechnical investigation for the expansion of hospital building at Sardar Vallavhbhai Patel Post Graduate Institute of Pediatrics, Cuttack, Orissa. The scope of work included three boreholes upto 30.0 m depth.

A loose heterogeneous fill of soil is met at the surface, which extends to 0.6-0.8 m depth. The natural soils below fill consist of clayey silt / sandy silt to 8.5-11.0 m depth (RL 90.0-87.5 m) underlain by fine to medium sand to about 18.5 m (RL 80.0 m). Below this, clayey silt is met to about 20.0-22.0 m depth (RL 78.5-76.5 m). Below this, fine to medium sand is met to the final explored depth of 30.0 m (RL 68.5 m).

Groundwater was encountered between 4.30 to 4.65 m depth (RL 94.2 to 93.85 m) below the existing ground level at the time of our field investigation (May, 2004).

We recommend the following alternative schemes.

Open Foundations: At 2.0 m embedment depth (RL 96.5m), we recommend a net allowable bearing pressure of 8.5 T/m^2 for 2 m wide foundation and 7.0 T/m^2 for (≥ 3.0m) wide foundation.

At 3.0 m embedment depth (RL 95.5m), we recommend a net allowable bearing pressure of 12.0 T/m^2 for 2 m wide foundation and 10 T/m^2 for (≥ 3.0m) wide foundation.

A plinth beam interconnecting the columns / foundation should be provided in order to give rigidity to the structure and to restrict differential settlement.

Pile Foundations: For a12 m long pile (pile tip at RL 85.5 m), safe compressive capacity for 400 mm diameter pile may be adopted as 32 tonnes and for 500mm diameter pile as 49 tonnes. For 18 m long pile (pile tip at RL 79.5 m), safe compressive capacity for 400 mm diameter pile is 48 tonnes and for 500 mm diameter pile is 70 Tonnes.

9.0 CLOSURE

We appreciate the opportunity to perform this investigation for you and have pleasure in submitting this report. Please contact us when we can be of further service to you.

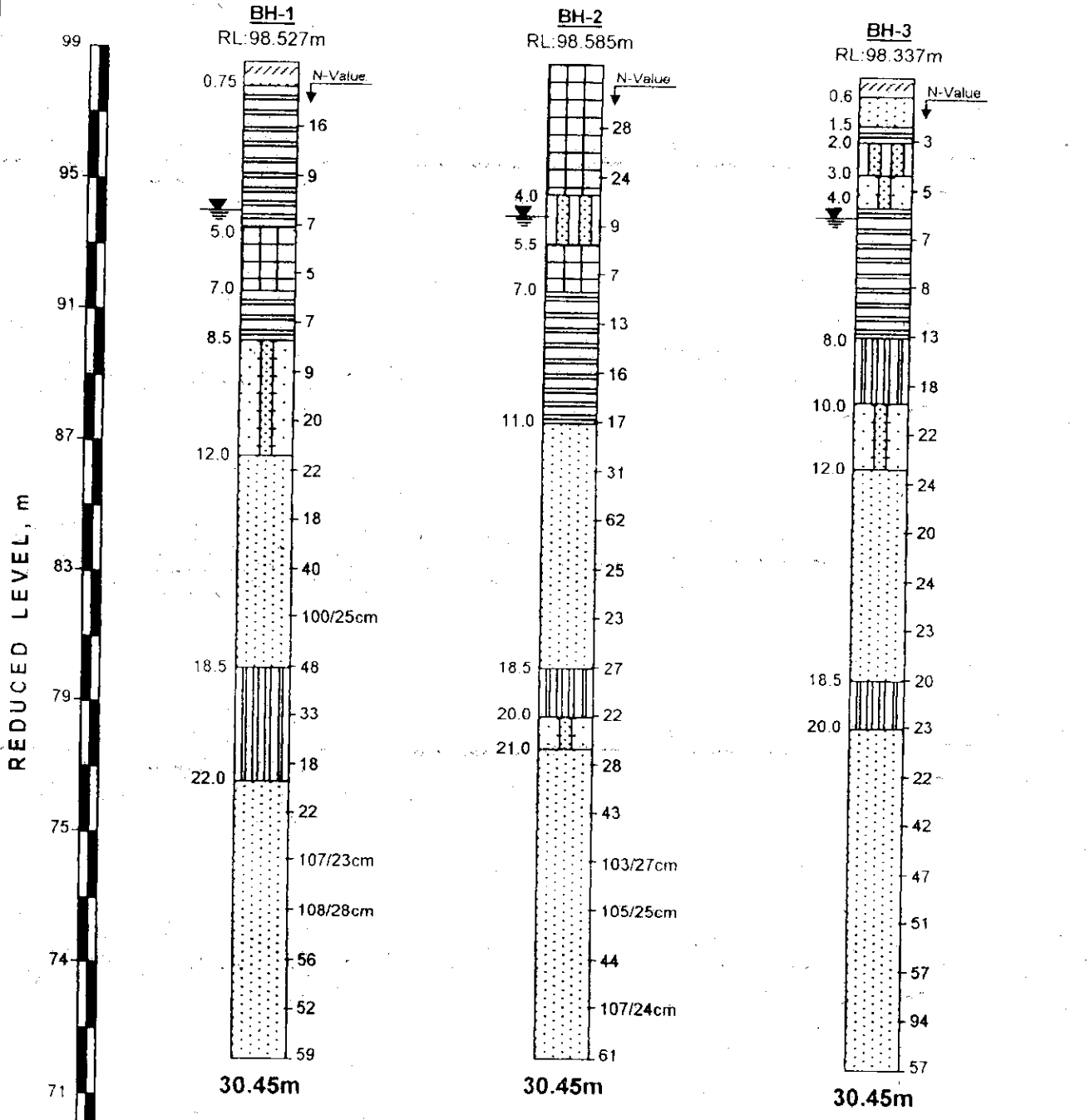
for **CENGRS GEOTECHNICA PRIVATE LIMITED**

Ravi Sundaram Sanjay Gupta

(RAVI SUNDARAM)
DIRECTOR

(SANJAY GUPTA)
MANAGING DIRECTOR

CENGRS GEOTECHNICA PVT. LTD.	Job No. 204050-B	Fig No. 2



LEGEND	
SYMBOL	DESCRIPTION
	FILL
	Sandy silt (CL)
	Clayey silt (MI)
	Fine sand (SP-SM)
	Silty fine sand (SM)
	Fine sand (SP)
	Silty clay (MH)
	Water Table

SUMMARY OF BOREHOLE PROFILE

Sardar Vallavbhai Patel Post Graduate Institute of Pediatrics at Cuttack, Orissa

FINAL REPORT ON :

ADDITIONAL GEOTECHNICAL INVESTIGATION AT S.V.P. POST GRADUATE INSTITUTE OF PAEDIATRICS AT CUTTACK (ORISSA)

Submitted to:

The Consortium of
Yokogawa Architects & Engineers, Inc. and
Daiichi Health Care Facility Consultants Inc.
2-20-28, Shimomeguro, Meguro-Ku
Tokyo, Japan

TABLE OF CONTENTS

TABLES

ILLUSTRATIONS

1.0 INTRODUCTION

1.1 Project Description

Sardar Vallavbhai Patel Post Graduate Institute of Paediatrics at Cuttack, Orissa is planning to expand its facilities. A two storey building is planned with covering an area to about 5000 m^2. M/s. Yokogawa Architects & Engineers, Inc. and Daiichi Health Care Facility Consultants Inc., Tokyo, Japan is the project consultant for this project.

Previously three boreholes were drilled at the site. Our report on these three boreholes has been submitted to M/s. Yokogawa Architects & Engineers, Inc. vide our Report No. 204050-B.

To reconfirm the site stratigraphy and the extent of loose soils at the site, Yokogawa requested to Cengrs to do one more borehole, designated as BH-4. This report presents the results together with our recommendations. A layout plan showing the locations of our current and previous field investigation is illustrated in Fig.1.

1.2 Purposes of Study

The overall purposes of this study are to reconfirm the stratigraphy at the site and to develop geotechnical recommendations for foundation design and construction. To accomplish these purposes, the current study was conducted in the following phases:

(a) drilling one boreholes to 30 m depth or refusal, whichever is earlier in order to determine site stratigraphy and to collect soil samples for laboratory testing;
(b) testing selected soil samples in the laboratory to determine pertinent index and engineering properties of the soils ; and
(c) analyzing all field and laboratory data in order to develop engineering recommendations for foundation design and construction.

2.0 FIELD INVESTIGATIONS

2.1 Soil Borings

The borings were progressed using a shell and auger to the specified depth or refusal, whichever is encountered earlier. The diameter of borehole was 150 mm. Where caving of the borehole occurred, casing was used to keep the borehole stable. The work was in general accordance with IS:1892-1979.

Standard Penetration Tests (SPT) were conducted in the boreholes at 1.5 m depth intervals by connecting a split spoon sampler to 'A' rods and driving it by 45 cm using a 63.5 kg hammer falling freely from a height of 75 cm. The tests were conducted in accordance with IS:2131-1981.

The number of blows for each 15 cm of penetration of the split spoon sampler was recorded. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm sampling interval is termed the SPT value or the 'N' value.

The 'N' values are presented on the soil profile for each borehole. Refusal to further boring penetration was considered when the 'N' values exceed 100 or when practical refusal to further penetration by shell and auger was encountered.

Disturbed samples were collected from the split spoon after conducting SPT. The samples were preserved in transparent polythene bags. Undisturbed samples were collected by attaching 100 mm diameter thin walled 'Shelby' tubes and driving the sampler using a 63.5 kg hammer in accordance with IS: 2132-1986. The tubes were sealed with wax at both ends. All samples were transported to our Delhi laboratory for further examination and testing.

2.2 Groundwater

Groundwater level was measured in the boreholes 24 hours after drilling and sampling was completed. The measured water levels are recorded on the individual soil profiles.

3.0 LABORATORY TESTS

The laboratory testing programme was aimed at verifying the field classifications and developing parameters for engineering analysis. All tests were performed in accordance with the current applicable IS specifications. The following tests were conducted on selected soil and water samples recovered from the borehole:

Laboratory Test	Applicable IS: Code
Natural moisture content	IS: 2720 (Part-2)-1973
Grain size analysis	IS: 2720 (Part-4)-1985
Liquid and Plastic limit	IS: 2720 (Part-5& 6)-1985
Specific Gravity	IS: 2720 (Part-3)-1980
Free Swell Index	IS:2720 (Part-40)-1977
Unconsolidated Undrained Triaxial shear test	IS: 2720 (Part-11)-1971
Consolidated Drained Direct Shear Test	IS: 2720 (Part-13)-1986
Chemical analysis of soil and groundwater to determine pH value, sulphates and chlorides	IS: 2720 (Part-27)-1977 IS: 2720 (Part-26)-1973 IS: 3025 (Part-24)-1986 IS: 3025 (Part-32)-1988

All test results are presented on the Table 1 and in the illustrations section of this report.

4.0 GENERAL SITE CONDITIONS

4.1 Site Stratigraphy

The soil conditions and SPT N - values of BH-4 of current investigation are compare well with the previously drilled BH-3. At location, silty fine sand is met to 4.0 m depth (RL 94.5 m). Below this, clayey silt is met to 7.5 m depth (RL 91.0 m). This is underlain by silty clay of high plasticity and medium expansive in nature to about 10.0 m depth (RL 88.5 m). Below this, fine to medium sand is met to the final explored depth of 30.0 m (RL 68.5 m).

At Borehole 1 & 2, SPT values range from 7 to 13 to about 9.0 m depth (RL 89.5 m). However, at Boreholes 3 & 4, SPT values range from 3 to 13 to 9.0 m depth (RL 89.5 m). At Boreholes 3 & 4, SPT values are as low as 3 to 5 to about 3.0~4.0 m depth.

Below 9.0 m depth, SPT values range from 18 to 22 to 11.0 m depth (RL 87.5m) and from 20 to 37 to 22.0 m depth (RL 76.5 m). In the underlying soils, SPT values increase and range from 46 to 61 to the final explored depth of 30.0 m (RL 68.5 m).

Laboratory Test	Applicable IS: Code
Natural moisture content	IS: 2720 (Part-2)-1973
Grain size analysis	IS: 2720 (Part-4)-1985
Liquid and Plastic limit	IS: 2720 (Part-5& 6)-1985
Specific Gravity	IS: 2720 (Part-3)-1980
Free Swell Index	IS:2720 (Part-40)-1977
Unconsolidated Undrained Triaxial shear test	IS: 2720 (Part-11)-1971
Consolidated Drained Direct Shear Test	IS: 2720 (Part-13)-1986
Chemical analysis of soil and groundwater to determine pH value, sulphates and chlorides	IS: 2720 (Part-27)-1977 IS: 2720 (Part-26)-1973 IS: 3025 (Part-24)-1986 IS: 3025 (Part-32)-1988

All test results are presented on the Table 1 and in the illustrations section of this report.

4.0 GENERAL SITE CONDITIONS

4.1 Site Stratigraphy

The soil conditions and SPT N - values of BH-4 of current investigation are compare well with the previously drilled BH-3. At location, silty fine sand is met to 4.0 m depth (RL 94.5 m). Below this, clayey silt is met to 7.5 m depth (RL 91.0 m). This is underlain by silty clay of high plasticity and medium expansive in nature to about 10.0 m depth (RL 88.5 m). Below this, fine to medium sand is met to the final explored depth of 30.0 m (RL 68.5 m).

At Borehole 1 & 2, SPT values range from 7 to 13 to about 9.0 m depth (RL 89.5 m). However, at Boreholes 3 & 4, SPT values range from 3 to 13 to 9.0 m depth (RL 89.5 m). At Boreholes 3 & 4, SPT values are as low as 3 to 5 to about 3.0~4.0 m depth.

Below 9.0 m depth, SPT values range from 18 to 22 to 11.0 m depth (RL 87.5m) and from 20 to 37 to 22.0 m depth (RL 76.5 m). In the underlying soils, SPT values increase and range from 46 to 61 to the final explored depth of 30.0 m (RL 68.5 m).

The SPT values at shallow depth indicate weak soil conditions in the western half of the site (BH 3 & 4). In the eastern half of the site (BH 1 & 2), the soil conditions are relatively better.

Detailed description of the materials encountered at the borehole location is presented on the individual soil profile on Table 1. Engineering terms used for describing soils are explained on Table 2. Table 3 presents chemical test results of soil and groundwater. A pictorial summary of the borehole profiles is presented on Fig. 2. Corrected SPT values are plotted on Fig.3.

4.2 Groundwater

Based on our measurement in the completed boreholes, groundwater was encountered between 4.30 to 4.65 m depth (RL 94.2 m to 93.85 m) below the existing ground level at the time of our previous field investigation (May, 2004). During current investigation (BH-4), groundwater was encountered at 3.75 m depth (RL 94.75 m) at the time of our field investigation (October, 2004). Fluctuations of upto 2 to 3 m may occur in measured water level due to seasonal variations in rainfall and surface evaporation rates. The area is prove to cyclones and heavy rains due to which substantial standing water may collect at the site.

5.0 FOUNDATION ANALYSIS AND RECOMMENDATIONS

5.1 General

A suitable foundation for any structure should have an adequate factor against exceeding the bearing capacity of the supporting soils. Also the vertical movements due to compression of the soils should be within tolerable limits for the structure. We consider that foundation designed in accordance with the recommendations herein will satisfy these criteria.

5.2 Area Distribution of Soil Conditions

Reviewing the soil conditions and SPT N values, we have divided the site in two parts designated as Area-1 and Area-2.

These areas are illustrated on Figure-1. The demarcating line between the areas is marked along the grid axis 50 W. This line is an imaginary hypothetical line separating the two areas. The actual condition on site may vary from that shown on Figure 1 and may be a gradual transition instead of a clearly defined line.

Area-1 has been investigated by Borehole 1 & 2. In this area, SPT values range from 16 to 26 to about 2.0~3.0m depth. Below this, SPT values decrease somewhat and range from 7 to 9 to about 9.0 m depth. In this area, it is feasible to place open foundation at 2.0 m depth.

Area-2 has been investigated by Borehole 3 & 4. In this area, SPT values are as low as 3 to 5 to about 3.0~3.5 m depth. Below this, SPT values range from 7 to 13 to about 8.0 ~ 9.0 m depth. For open foundations, in this area, we recommend a minimum foundation depth of 3.0 m.

5.3 Foundation Type and Depth

Open spread foundations and strip footings (including brickwall type spread footings) may be used to support the structural loads. We recommend as follows:

a) In Area-1, the minimum foundation depth for open foundation should be at least 2.0 m.

b) In Area-2, the minimum foundation depth for open foundation should be at or below 3.0 m depth.

In case open foundations are planned, we suggest that a construction joint be provided along the 50 W line so as to isolate the foundations in two different areas. Alternatively, open foundations for whole building may be designed conservatively using the recommended values for Area-2. A plinth beam inter connecting the foundations should be provided in order to give rigidity to the structure and to restrict differential settlement.

Alternatively, pile foundation may be used to support the structural loads. Recommendations are presented herewith for 400 mm and 500 mm diameter RCC bored cast-in-situ piles.

5.4 Shallow Foundations

Based on a detailed analysis for foundations of different sizes (As covered in our Report No. 204050-B), we recommend the following values of net bearing pressure for Area-1 and Area-2.

Area	RL of Foundation Embedment, m	Foundation Embedment depth, m	Foundation Width, m	Recommended Net Allowable Bearing Pressure, T/m^2
Area-1	96.5	2.0	1	10.0
			2	8.5
			3	7.0
	95.5	3.0	1	14.0
			2	12.0
			3	10.0
Area-2	95.5	3.0	1	10.0
			2	8.5
			3	7.0
	94.5	4.0	1	14.0
			2	12.0
			3	10.0

The above values include a bearing capacity factor of 2.5. Total settlement of foundations designed for the above recommended values of net bearing pressure is estimated to be about 50 mm. A plinth beam interconnecting the foundations should be provided in order to give rigidity to the structure and to restrict differential settlement. Net bearing pressures for foundations at intermediate levels may be interpolated linearly between the values given above.

5.5 Pile Foundations

Based on detailed analysis for piles of different lengths (as given in our report no. 204050-B), we recommend the following values of safe axial compressive load capacities for 400 and 500mm diameters bored cast-in-situ piles. These pile capacities are applicable for both Area-1 and Area-2.

Reduced level of pile Tip, m	Pile Length below COL, m	Recommended Safe Compressive Capacities, Tonnes	
		Dia = 400 mm	Dia = 500 mm
85.5	12.0	32	49
83.5	14.0	38	58
81.5	16.0	42	61
79.5	18.0	48	70
77.5	20.0	54	78

The above pile capacities include a safety factor of 2.5. The pile capacities at intermediate depths may be interpolated linearly between the values given above. These capacities may be used as a guideline for preliminary design. Final capacities should be confirmed in site by initial pile load test as per IS specifications.

5.6 Definition of Gross and Net Bearing Pressure

For the purposes of this report, the net allowable bearing pressure should be calculated as the difference between total load on the foundation and the weight of the soil overlying the foundation divided by the effective area of the foundation. The gross bearing pressure is the total pressure at the foundation level including overburden pressure and surcharge load. The following equations may be used -

$$q_{net} = [(P_s + W_f + W_s) / A_f] - S_v$$

$$q_{gross} = q_{net} + S_v = (P_s + W_f + W_s) / A_f$$

where:

q_{net} = net allowable bearing pressure

q_{gross} = gross bearing pressure

P_s = superimposed static load on foundation

W_f = weight of foundation

W_s = weight of soil overlying foundation

A_f = effective area of foundation

S_v = overburden pressure at foundation level prior to excavation for foundation.

It may please be noted that safe bearing pressures recommended in this report refer to ***"net values"***.

6.0 CLOSURE

We appreciate the opportunity to perform this investigation for you and have pleasure in submitting this report. Please contact us when we can be of further service to you.

for **CENGRS GEOTECHNICA PRIVATE LIMITED**

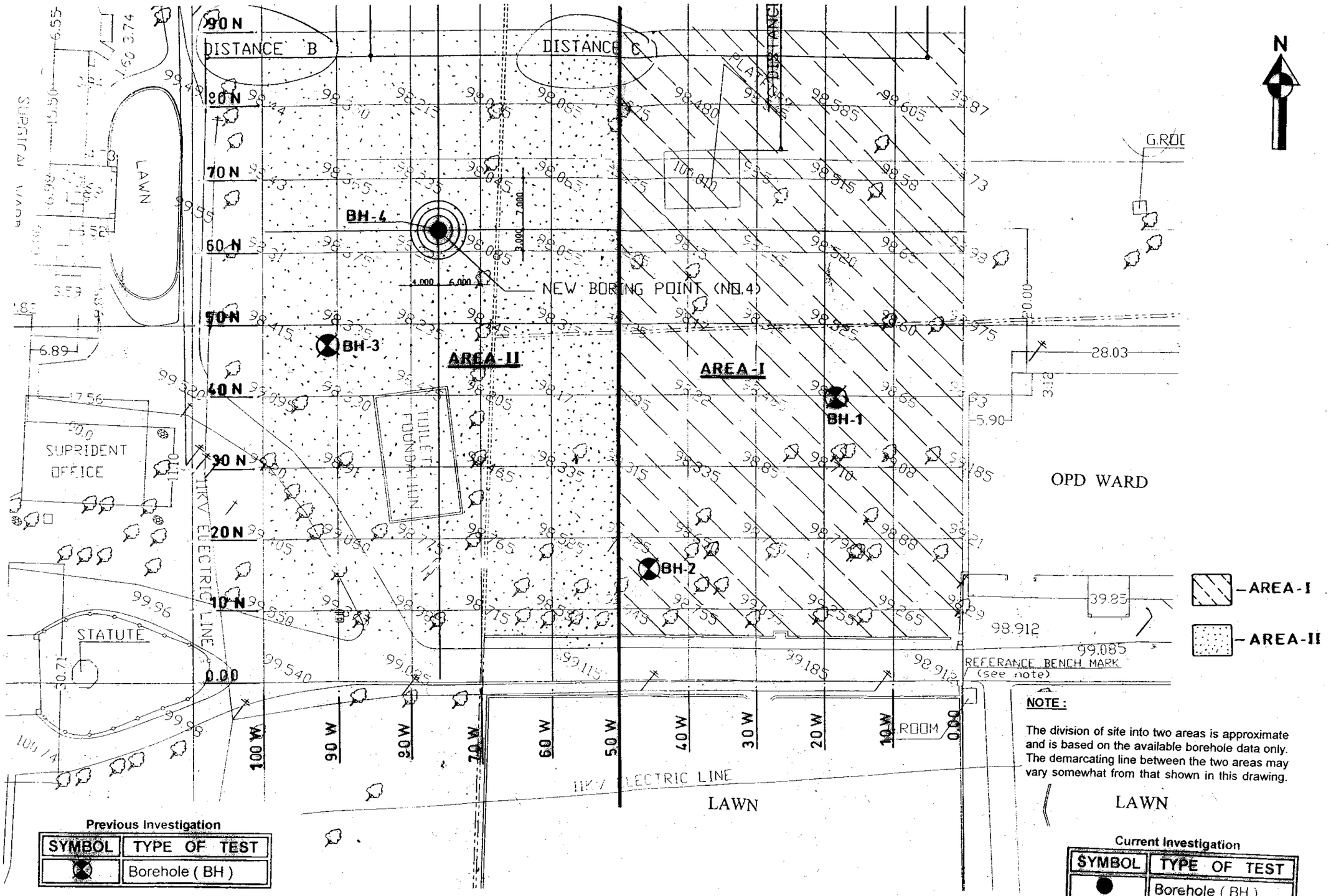
Ravi Sundaram

(RAVI SUNDARAM)
DIRECTOR

Sanjay Gupta

(SANJAY GUPTA)
MANAGING DIRECTOR

JOB NO. : 204120 | FIG. NO. : 1



Previous Investigation

SYMBOL	TYPE OF TEST
⊗	Borehole (BH)

Current Investigation

SYMBOL	TYPE OF TEST
●	Borehole (BH)

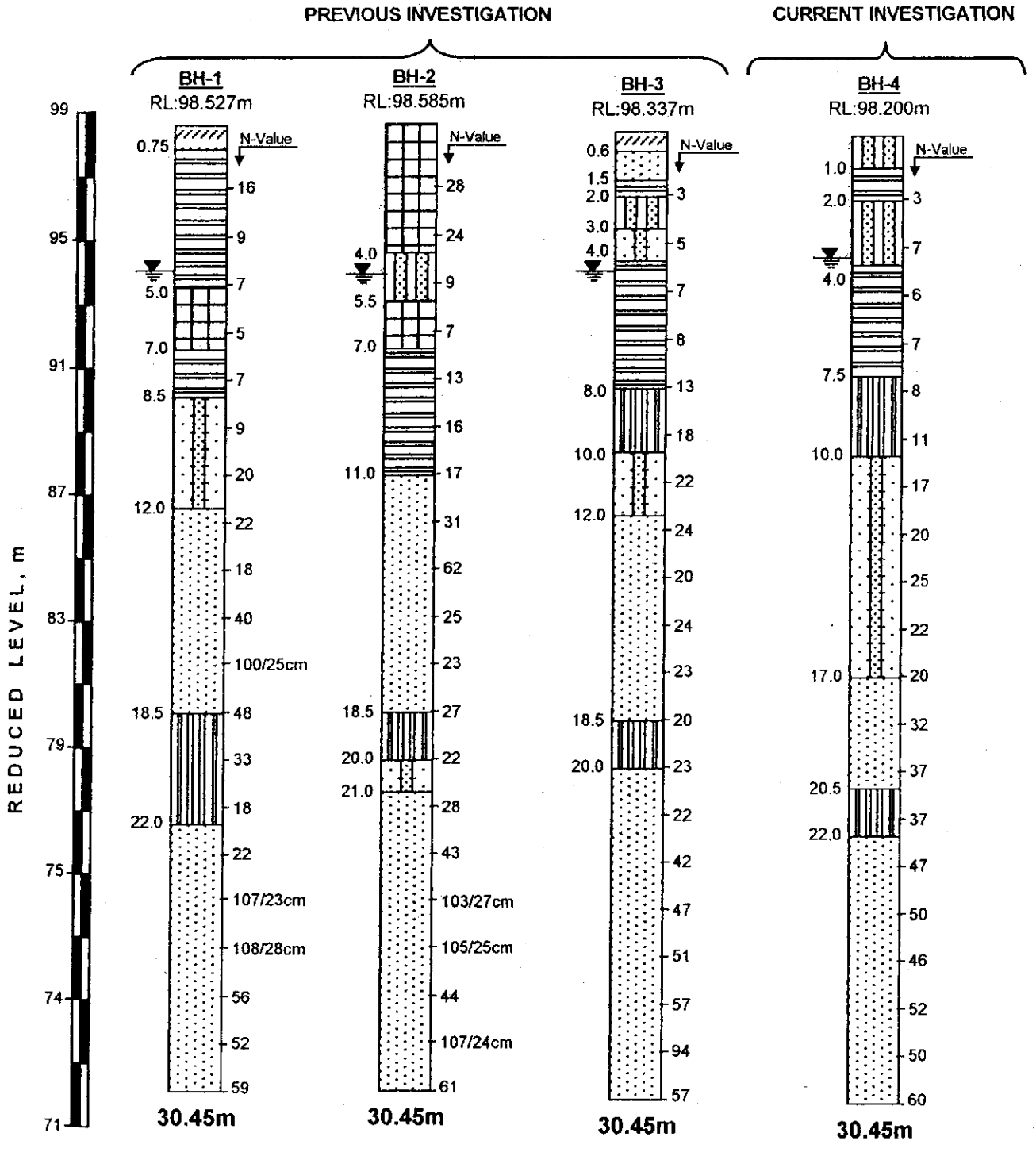
NOTE :

The division of site into two areas is approximate and is based on the available borehole data only. The demarcating line between the two areas may vary somewhat from that shown in this drawing.

PLAN OF FIELD INVESTIGATION

Sardar Vallavbhai Patel Post Graduate Institute of Pediatrics at Cuttack, Orissa

CENGRS GEOTECHNICA PVT. LTD.	Job No. 204120	Fig No. 2



LEGEND	
SYMBOL	DESCRIPTION
	FILL
	Sandy silt (CL)
	Clayey silt (MI)
	Fine sand (SP-SM)
	Silty fine sand (SM)
	Fine sand (SP)
	Silty clay (MH)
	Water Table

SUMMARY OF BOREHOLE PROFILE

Sardar Vallavbhai Patel Post Graduate Institute of Pediatrics at Cuttack, Orissa

6. Itemized Costs to be Borne by the Indian Side

1. Site Preparation

(1) Removal of Obstacles		
1) Toilet foundation (11m x 17m)		63,000 Rs.
2) Borehole		171,000 Rs.
3) Part of campus road	126 m2 x 450 Rs./m2 =	56,700 Rs.
	Subtotal	290,700 Rs.
	→	291,000 Rs.
(2) Trees and bushes (26 nos.)		141,750 Rs.
	→	142,000 Rs.
(3) Rerouting of open sewage ditches		
1) Excavation of new ditch	176m x 4,500Rs./m =	792,000 Rs.
2) Burying the existing ditches	177m x 4,500Rs./m =	796,500 Rs.
	Subtotal	1,588,500 Rs.
	→	1,589,000 Rs.
	Total	2,022,000 Rs.

2. Remodelling of the Existing Buildings

(1) Old Medical Ward		
1) Interior wall repainting	1,048m2 x 107.1Rs./m2 =	112,240.8 Rs.
2) Equipment maintenance shop repairs	50m2 x 1,000Rs./m2 =	50,000.0 Rs.
	Subtotal	162,240.8 Rs.
	→	162,000.0 Rs.
(2) Existing Surgical Ward		
1) Interior wall repainting	1,280m2 x 107.1Rs./m2 =	137,088 Rs.
2) OT room renewal	170m2 x 1,000Rs./m2 =	170,000 Rs.
	Subtotal	307,088 Rs.
	→	307,000 Rs.
(3) OPD Ward: connection corridor (unused toilet) renewal		
1) Concrete	4 m3 x 3,110.3Rs./m3 =	12,441.72 Rs.
2) Mortar finish: floor	12m2 x 186.84Rs./m2 =	2,242.08 Rs.
3) Mortar finish: wall	48m2 x 202.5Rs./m2 =	9,720.00 Rs.
4) Painting: wall	48m2 x 107.1Rs./m2 =	5,140.80 Rs.
5) Painting: ceiling	12m2 x 107.1Rs./m2 =	1,285.20 Rs.
6) Wall demolishing	2 nos. x 10,000Rs./nos =	20,000.00 Rs.
	Subtotal	50,829.80 Rs.
	→	51,000.00 Rs.
(4) New Medical Ward		
Interior painting	1,640m2 x 107.1Rs./m2 =	175,644 Rs.
	→	176,000 Rs.
	Total	696,000 Rs.

3. Planting

(1) Turf	1,500m2 x 200Rs./m2 =	300,000 Rs.
(2) Bush (Height: 1.0m)	70 nos. x 500Rs./nos =	35,000 Rs.
	Total	335,000 Rs.