

**MINISTRY OF HEALTH AND POPULATION  
NEPAL**

**PREPARATORY SURVEY REPORT  
ON  
THE PROJECT FOR THE IMPROVEMENT OF  
DHULIKHEL HOSPITAL TRAUMA AND  
EMERGENCY CENTER  
IN  
NEPAL**

**JULY 2023**

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

**ORIENTAL CONSULTANTS GLOBAL CO., LTD.**

**INTERNATIONAL TECHNO CENTER CO., LTD.**

**K.ITO ARCHITECTS & ENGINEERS INC.**

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<b>JR</b>
<b>23-029</b>

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## **PREFACE**

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the Joint Venture consist of Oriental Consultants Global Co. Ltd. (OCG), International Techno Center Co., Ltd., and K.ITO Architects & Engineers Inc.

The survey team held a series of discussions with the officials concerned of the Government of Nepal, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Nepal for their close cooperation extended to the survey team.

July, 2023

Haruko KAMEI  
Director General,  
Human Development Department  
Japan International Cooperation Agency

## SUMMARY

### 1. Country Overview

Nepal is a landlocked country located on the southern peak of the Himalayas, bordering India and China. The land area is 147,000 km<sup>2</sup>, and the climate varies according to the altitude from an alpine climate zone with 8,000 meter high mountains to a subtropical climate zone in the lowlands. The rainy season is from June to September and the dry season is from October to May.

Hinduism (81.3%) is the most widely practiced religion, followed by Buddhism (9.0%) and Islam (4.4%). The official language is Nepali, but English is also widely spoken. The Parbate Hindu group accounts for about half of the population, and there are more than 100 other ethnic groups, including the Magar, Tharu, Tamang, and Newar, many of which have their own caste systems.

A new constitution was promulgated in September 2015, establishing the three-tier structure with the federal government, the provincial governments, and the local governments, the separation of powers, the bicameral legislature, and the judicial system.

### 2. Background, History and Outline of the Project

Nepal is one of the poorest countries in the South Asian region, ranking 149th out of 189 countries in the Human Development Index (UNDP, 2018). In *the National Health Policy (2019)*, the Government of Nepal has set a medium to long term policy goal of "providing all citizens with high-quality medical services, from basic health care to advanced medical care." In order to achieve these goals, the government is working on the problems through the implementation of *the Nepal Health Sector Strategy (2015/16-2020/21)* (hereinafter referred to as "NHSS"), which sets forth specific actions. One of the NHSS key strategies is to strengthen preparedness for public health emergencies and disasters, including emergency medical care.

With the number of trauma and emergency patients on the rise, it is hoped that the Dhulikhel Hospital's response capabilities, including an increase in the number of equipment and beds, will be improved. The hospital also functions as a teaching hospital for Kathmandu University and is highly important as a medical educational institution.

The Project for Development of Dhulikhel Hospital Trauma and Emergency Center (hereafter referred to as "the project") aims to develop facilities and related medical equipment that will contribute to strengthening regional medical care through the establishment of a trauma and emergency center. It is positioned as a high-priority project in the field of health care.

This project is consistent with Nepal's development issues and policies, as well as Japan and JICA's cooperation policy analysis. It will contribute to improving the quality of health and medical services in the country through the construction of hospitals and provision of medical equipment, and contribute to SDGs Goal 3 (ensure healthy lives and promote well-being for all at all ages). Therefore, support to the implementation of the project is highly necessary.



### **3. Outline of the Survey Results and Project Description**

#### **(1) Field Survey**

The survey team carried out a total of five field surveys on the following dates.

- 1st Field Survey: 7 April - 30 May of 2021
- 2nd Field Survey: 8 September - 4 October of 2021
- 3rd Field Survey: 11 September - 17 September of 2022
- 4th Field Survey: 18 February - 26 February of 2023
- 5th Field Survey: 17 June - 21 June of 2023

#### **(2) Design Policy**

Since the proposed site for the Trauma and Emergency Center is an 8,460 m<sup>2</sup> sloping land located on the east side of the Dhulikhel Hospital site, bordering the Sindhuli Road, the design will minimize the need for development work and retaining wall construction by considering the topographical characteristics and the shape of the site. The building will be accessible from two different levels to achieve both economic efficiency and functionality. The higher elevation area has access from the Sindhuli roadside, whereas the lower elevation area is accessible to the south road.

The medical equipment to be procured under this plan will be prioritized in order of necessity to provide medical services as a trauma and emergency center, and will be within the budget. The specifications of the equipment shall be in accordance with the medical services required as a top referral hospital in Nepal, performance of the existing equipment, technical level of medical staff, and expansion plan of medical services based on the hospital policy, and shall enable the maintenance and management in Nepal.

### (3) Basic Plan of Facilities

#### Composition of the Facility Components

Components	Facility Details
Penthouse	Stairwells, electrical room
1F	Ward Department 1-bed room (4 rooms) / 4-bed rooms (5 rooms) / 5-bed rooms (2 rooms) / 6-bed rooms (2 rooms) / Staff station / Drug preparation room / Treatment room / Counseling room / Storage / Staff room
GF	Emergency Department, Radiology Department [Emergency Department] Triage area / Contamination shower room / Treatment room (red) (4 beds) / Treatment room (yellow) (6 beds) / Treatment room (green) (10 beds) / Observation room (11 beds) / Staff station / Plaster procedure room, emergency operating room (1 room) / Scrub area / Storage and preparation room / Recovery room / Changing room [Radiology Department] X-ray room / CT room / MRI room / Ultrasonography room / Control room / Report room
B1F	Surgical Department, CSSD, Intensive Care Unit [Surgical Department and CSSD] Operating rooms (2 rooms) / Scrub area / Anesthesia room / Storage / Preparation room / Recovery room / Changing room / Post-operative ward (5 beds), CSSD [Intensive Care Unit] ICU (10 beds) / HDU (High Dependency Unit) (6 beds) / Staff station / Storage angiography room
B2F	Outpatient Department, Rehabilitation Department, Pharmacy Department, Laboratory Department [Outpatient Department] Consultation room (3 rooms) / Treatment room / Recovery room [Rehabilitation Department] Rehabilitation room / Storage [Pharmacy Department] Office / Reception / Storage [Laboratory Department] Sample collection room / urine collection toilet / biochemistry laboratory / hematology laboratory / microbiology laboratory / pathology laboratory / Storage / Blood bank room
B3F	Administration, Education and Supply Department [Administrative Department] Director's Office / Office / IT & Server Room [Education Department] Office / Library / Conference Hall & Workshop Room [Supply Department] Linen storage / Kitchen / Staff cafeteria / Changing room / Waste storage / Mortuary
Utility building, Exterior facilities, etc.	Medical gas building, generator building, guardhouse, wastewater treatment facility, retaining walls, slope measures (greenery work, sprayed concrete), stairs, railings, parking lots, roads and sidewalks on the premises

Source: JICA Survey Team

### (4) Basic Plan of Equipment

The plan is to procure equipment that fall under priority A-1: CT, C-arm, X-ray, Anesthesia machines, Operating lamp, Operating tables, Beds, ICU beds, and Autoclaves, and some equipment under priority A-2.

## Equipment List

No.	Name of the equipment	Total Q'ty	Priority
1	CT	1	A-1
2	C-arm	2	A-1
3	X-ray	1	A-1
4	Anesthesia machine	3	A-1
5	Operating light	3	A-1
6	Operating table	3	A-1
7	Bed	84	A-1
8	ICU bed	16	A-1
9	Autoclave B	1	A-1
10	MRI	1	A-2
11	Angiography	1	A-2
12	Ultrasound machine	2	A-2
13	Hemodialysis machine	2	A-2
14	Blood gas analyzer	1	A-2
15	Biochemistry analyzer	2	A-2
16	Hematology analyzer	1	A-2
17	Blood bank refrigerator	2	A-2
18	Ventilator	5	A-2
19	Portable X-ray	2	A-3
20	Portable ultrasound machine	1	A-3
21	Portable ventilator	2	A-3
22	ECG machine	2	A-3
23	Patient monitor A	39	A-3
24	Defibrillator	4	A-3
25	Suction machine	18	A-3
26	ENT work station	1	A-3
27	Otoscope	1	A-3
28	Ophthalmoscope	2	A-3
29	Stretcher	10	A-3
30	Doppler	3	A-3

No.	Name of the equipment	Total Q'ty	Priority
31	Refrigerator	2	A-3
32	Electro surgical cautery unit	3	A-3
33	Operating light mobile	2	A-3
34	Orthopedic surgical instrument set	2	A-3
35	Neuro surgical instrument set	2	A-3
36	Surgical microscope	1	A-3
37	Patient monitor B	10	A-3
38	Infusion Pump	7	A-3
39	Syringe Pump	10	A-3
40	Radiant warmer	1	A-3
41	Autoclave A	2	A-3
42	Colorimeter	2	A-3
43	Microscope	2	A-3
44	Incubator	2	A-3
45	Hot air oven	2	A-3
46	Blood mixer	3	A-3
47	Blood collection bed	2	A-3
48	Defreeze Refrigerator	1	A-3
49	Oxygen concentrator	2	A-3
50	CPAP/BiPAP machine	6	A-3
51	Bed side cabinet	100	A-3

Source: JICA Survey Team

#### 4. Project Implementation Period and Project Cost Estimation

The implementation period required for this project is 33.5 months in total, including of 6.5 months for detailed design, 4.5 months for bidding, and 22.5 months for facility construction and procurement of equipment, taking into account construction constraints due to the scale of construction and weather conditions, and local construction conditions. The project cost to be borne by the Government of Nepal is estimated at JPY 20 million.

#### 5. Project Evaluation

##### (1) Relevance

According to the reasons presented below, the implementation of the Project through Japanese grant-aid cooperation is relevant:

- Wide Medical Service Area
- Role as a Teaching Hospital
- Consistency with Nepalese Health Policy
- Consistency with Japanese Development Policy

## (2) Effectiveness

The effect indicators related to the direct effects (outputs) of the implementation of the cooperation target projects and the effects (outcomes) expected to be achieved in the future through the implementation of the overall project plan are described below.

### 1) Quantitative Effect Indicators

#### Quantitative Effectiveness Indicators

Quantitative Indicator	Baseline Value (2021)	Target Value (Achieved figures after 3 years)
Out-patients for Trauma and Emergency	21,665	31,000
In-patients for Trauma and Emergency	2,847	4,000
Number of CT Examination	6,987	10,000

Source: JICA Survey Team

### 2) Qualitative Effect Indicators

High-quality trauma and emergency medical services will be provided through the development of specialized trauma and emergency medical facilities and medical equipment.

Human resource development for trauma and emergency medical care will be strengthened through high-quality trauma and emergency medical training for medical students and professionals.

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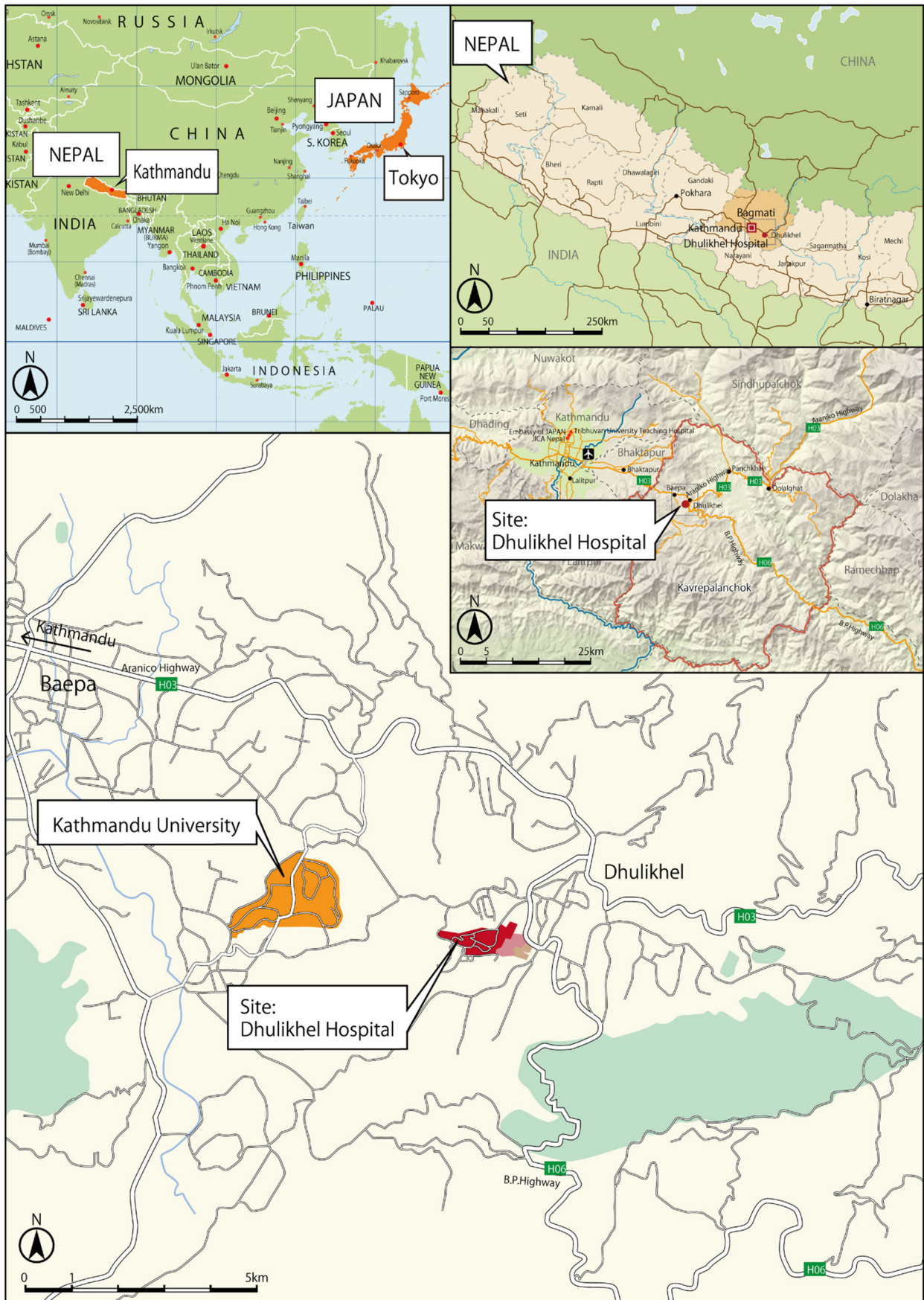
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Source: JICA Survey Team

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## Abbreviations

Abbreviation	English
A/P	Authorization to Pay
AMC	Annual Maintenance Contract
ARAP	Abbreviated Resettlement Action Plan
AVR	Automatic Voltage Regulator
B/A	Banking Arrangement
BOD	Biochemical Oxygen Demand
CMC	Comprehensive Maintenance Contract
COD	Chemical Oxygen Demand
COPD	Chronic Obstructive Pulmonary Disease
CPAP / BPAP	Continuous Positive Airway Pressure / Bilevel Positive Airway Pressure
CSSD	Central Sterile Supply Department
CT	Computed Tomography
DH	Dhulikhel Hospital
DPT	Diphtheria, Pertussis and Tetanus Vaccine
DSA	Digital Subtraction Angiography
E/N	Exchange of Notes
EIA	Environmental Impact Assessment
ELV	Elevator
EPS	Electrical Pipe Shaft
FIDIC	International Federation of Consulting Engineers
FRP	Fibre-reinforced Plastic
G/A	Grant Agreement
GDP	Gross Domestic Product
GL	Ground Level
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HDU	High Dependency Unit
HEPA	High Efficiency Particle Air Filter
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IEC	International Electrical Code
JASS	Japanese Architectural Standard Specification
JICA	Japan International Cooperation Agency
JIS	Japanese Industrial Standards
JPY	Japanese Yen
KU	Kathmandu University
LARC	Land Acquisition and Resettlement Committee
M/D	Minutes of Discussion
MDF	Main Distributing Frame
MoFE	Ministry of Forest and Environment
MoHP	Ministry of Health and Population
MRI	Magnetic Resonance Imaging
NBC	Nepal National Building Code

<b>Abbreviation</b>	<b>English</b>
NCDs	Noncommunicable Diseases
NDWQS	National Drinking Water Quality Standards
NEA	Nepal Electricity Authority
NHSS	Nepal Health Sector Strategy
NICU	Neonatal Intensive Care Unit
NPR	Nepalese Rupee
ODA	Official Development Assistance
PAPs	Project Affected Persons
PBX	Private Branch Exchange
PCR	Polymerase Chain Reaction
PMU	Project Management Unit
PS	Pipe Shaft
RO	Reverse Osmosis
SDGs	Sustainable Development Goals
TOR	Terms of Reference
TSS	Total Suspended Solids
TU	Tribhuvan University
UNDP	United Nations Development Programme
UPS	Uninterruptible Power-Supply System
VAT	Value Added Tax
WB	World Bank
WHO	World Health Organization

## Chapter 1 Background of the Project

### 1-1 Background and Overview of the Grant Aid

Nepal is one of the poorest countries in the South Asian region, ranking 149th out of 189 countries in the Human Development Index (UNDP, 2018). In *the National Health Policy (2019)*, the Government of Nepal has set a medium to long term policy goal of "providing all citizens with high-quality medical services, from basic health care to advanced medical care." In order to achieve these goals, the government is working on the problems through the implementation of *the Nepal Health Sector Strategy (2015/16-2020/21)* (hereinafter referred to as "NHSS"), which sets forth specific actions. One of the NHSS key strategies is to strengthen preparedness for public health emergencies and disasters, including emergency medical care. Due to heavier vehicle traffic, the number of traffic accidents increased by about 2.4 times to 24,537 cases annually from 2016 to 2021, especially in the central and eastern regions of Nepal (Province 1-3), and trauma accounted for 10% of deaths (global average is about 6%).

Dhulikhel Hospital is also a regional medical center and one of the largest tertiary health facilities in Nepal, receiving patients from the 21 target districts. Immediately after the 2015 Gorkha earthquake, it accepted patients and functioned as a base for disaster medical care. Because it is located at the intersection of Sindhuli Road and Alnico Road, the hospital has many emergency trauma patients including those injured in traffic accidents (16,292 people in 2016/17). The hospital also receives emergency patients with stroke and heart disease which are rapidly increasing due to the change in eating habits accompanying economic development and the spread of noncommunicable diseases (NCDs) affected with urbanization. Therefore, there is a shortage of equipment and beds. With the number of trauma and emergency patients on the rise, it is hoped that the hospital's response capabilities, including an increase in the number of equipment and beds, will be improved.

The hospital also functions as a teaching hospital for Kathmandu University, and trains a wide range of medical students and professionals, including doctors, nurses, and physical therapists. Especially for physical therapists, it is the only bachelor's course in Nepal, and is highly important as a medical educational institution.

In addition, Dhulikhel Hospital is one of the five hospitals designated as the highest level (Level 3) for measures against the new coronavirus, and is expected to strengthen its response to severely ill patients with the new coronavirus.

The Project for Development of Dhulikhel Hospital Trauma and Emergency Center (hereafter referred to as "the project") aims to develop facilities and related medical equipment that will contribute to strengthening regional medical care through the establishment of a trauma and emergency center. It is positioned as a high-priority project in the field of health care.

Japan's Country Development Cooperation Policy for Nepal (September 2021) sets "economic growth and poverty reduction" as a priority area, and "strengthening of health sector" as a development agenda.



In addition, JICA's Country Analysis Paper for Nepal (August 2020) also states that in "Programme for Improvement of Quality of Health", the lack or shortage of medical equipment and the need for advanced diagnosis and treatment in tertiary health facilities will be addressed as support for improving health services and strengthening capacity to respond to NCDs and emerging infectious diseases. The Project consistent with these policies and analyses.

The Project is consistent with Nepal's development issues and policies, as well as Japan and JICA's cooperation policy analysis, and will contribute to improving the quality of health services in the country through the construction of hospitals and provision of medical equipment to deal with the increasing number of patients with stroke and heart disease due to the expansion of NCDs and trauma patients due to the increase in road traffic accidents. In addition, the Project is positioned in the "Strengthening diagnosis and treatment of core hospitals" of the JICA Global Agenda in the health sector, and contribute to SDGs Goal 3 (ensure healthy lives and promote well-being for all at all ages). Therefore, support to the implementation of the Project is highly necessary.

## **1-2 Objective of the Project**

The objective of this Project is to strengthen the medical service for sharply increasing trauma and emergency medical patients by building the Dhulikhel Hospital Trauma and Emergency with medical equipment, thereby contributing to improve quality of health care in Nepal.

## **1-3 Natural Conditions**

In order to implement an appropriate outline design, construction plan and project cost estimate for the Dhulikhel Hospital Trauma and Emergency Center to be developed by the project, five types of natural condition surveys (topographical survey, geological and geotechnical survey, water supply, drainage and water quality conditions, power supply conditions and groundwater survey) were carried out. The objectives, methods and impact of each study on the project are described below.

### **1-3-1 Topographical Survey**

The proposed construction site of the Dhulikhel Hospital Trauma and Emergency Center is located on a slope and has a complex shape. As there are differences in elevation both inside and outside the construction site and the boundaries of the site have not yet been determined, it was necessary to survey the site shape and topographical conditions.

The survey covered an area of approximately 16,000 m<sup>2</sup> centered on the proposed construction site, including the surrounding roads, buildings and structures on the adjacent site and the connection with the existing hospital. Two new concrete benchmarks were established and levelled within the proposed construction area, and existing structures, trees and buried drainage pipes were plotted on the survey map. The site boundaries were also established in the presence of the neighboring landowners, the hospital and the municipality.

The proposed construction site has the highest elevation of approximately 1,541.5 m near the northeast site entrance facing Sindhuli Road, and the lowest elevation of approximately 1,513.5 m near the Visitor Center, which connects to the existing hospital site. The difference in elevation between the highest and lowest areas is approximately 28 m. The site has three levels of flat land on the southeast leading from Sindhuli Road (elevation 1,541 m), near the center (elevation 1,537-1,540 m), and southwest (elevation 1,533 m), with steep slopes toward the northern and southern property boundaries.

### **1-3-2 Geological and Geotechnical Investigations**

A geological and geotechnical investigation was conducted at the planned construction site to determine the scale, structural form, and construction method of the Dhulikhel Hospital Trauma and Emergency Center. Geologically, the site is located in the Lesser Himalayan region and is based on sedimentary rock (sandstone). Boring (20m depth), standard penetration test, sample collection, and laboratory tests were conducted to confirm the geology and ground bearing capacity, and to determine the foundation structure, etc.

The stratigraphy of the ground consists of fine silty sand or fine sandy silt on the highly weathered rock (HWR) deposited 5 to 9 m below the surface, and the weathered rock (WR) and the rock (R.) below 9 m. The distribution of N values showed 12 to 50 in the highly weathered rock and over 50 was observed in the weathered rock. No groundwater was observed in the borehole at 20 m from the surface. Since approximately 200 kN/m<sup>2</sup> can be expected at a depth of 2.1 m from the existing ground surface, a direct foundation structure was judged to be suitable.

### **1-3-3 Water Quality Status Survey**

A water quality and water supply capacity study of various water sources were conducted to determine their availability for the water supply and drainage system planning for the Dhulikhel Hospital Trauma and Emergency Center. The water sources used were city water and well water. The water quality of both sources is within the National Drinking Water Quality Standards (NDWQS) except for e. coli. The water supply for drinking water and sterilization equipment is purified by installing individual RO systems at necessary locations. It was confirmed that the amount of water supplied from the existing water source is not sufficient to supply the Dhulikhel Hospital Trauma and Emergency Center.

It was also confirmed that the treatment capacity of the existing wastewater treatment system has reached its upper limit and that a wastewater treatment system dedicated to the Dhulikhel Hospital Trauma and Emergency Center is needed.

### **1-3-4 Power Supply Status Survey**

The power situation (frequency of power outages, trends in voltage fluctuations, etc.) and supply conditions (power source and available power supply) at Dhulikhel Hospital were confirmed. The results of the survey showed that the longest power outage on the dedicated transmission line for Dhulikhel Hospital in 2020 was approximately 6 hours, for a total of 52 outages per year, or approximately 16 hours. Approximately 9 hours of these outages were due to pre-planned outages,

while the remaining 6 hours and 30 minutes were due to system failures and 30 minutes were due to tripping. The Bhakunde transmission line, which is a public transmission line, had more outages in terms of both duration and frequency than the transmission line dedicated to Dhulikhel Hospital, and the reliability and quality of the transmission line dedicated to Dhulikhel Hospital is higher.

### 1-3-5 Groundwater Investigation

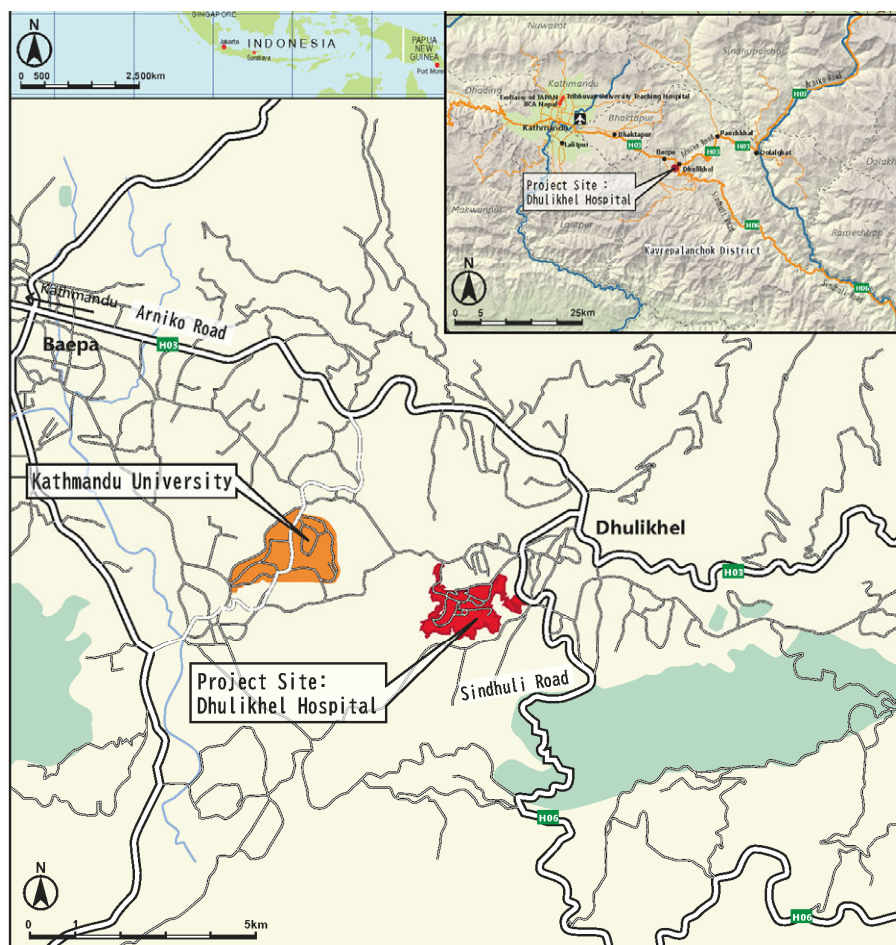
Since it is necessary to utilize well water as a water source for the Dhulikhel Hospital Trauma and Emergency Center, the strata were investigated by electrical prospecting and a test well was drilled. The pumping rate was confirmed to be satisfactory for the water supply used by the Dhulikhel Hospital Trauma and Emergency Center. Water quality was within NDWQS standards with the exception of E. coli. The water supply for drinking water, sterilization equipment, etc. is planned to be purified by installing individual RO systems at necessary locations.

## 1-4 Environmental and Social Considerations

### 1-4-1 Environmental Impact Assessment

#### 1-4-1-1 Project Outline

The project area is located in Dhulikhel, Kavrepalanchok District as shown in Figure 1-1 and Figure 1-2.



Source: JICA Survey Team

**Figure 1-1 Project Location Map (Dhulikhel Hospital Trauma and Emergency Center)**



Source: JICA Survey Team based on the Google Earth Map

**Figure 1-2 Detailed Project Location**

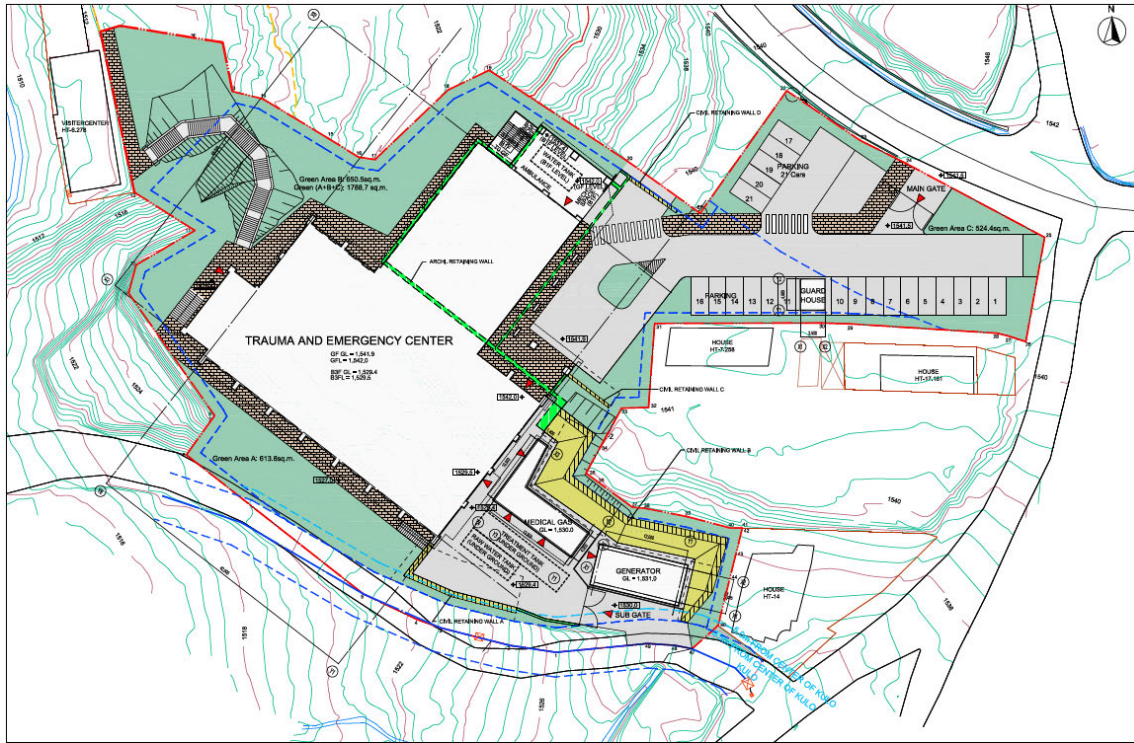
Main project activities are building of the Dhulikhel Hospital Trauma and Emergency Center including provision of medical equipment as shown below.

**Table 1-1 Construction of Facilities in Trauma and Emergency Center**

Name	Specifications	
	Contents	Building Construction Area
Facility	Emergency treatment room, outpatient room, ward, laboratory, radiology department, operation room, ICU	Number of Bed: 100 Beds Compound Area: Approx. 0.62 ha Total Built-Up Area: 0.65 ha Number of Floors: 6 floors * Ground: 3 floors and basement: 3 floors * Landfill and cutting land volume is less than 20,000 m <sup>3</sup>
Equipment	MRI, CT scan, digital X-ray apparatus, defibrillator, ventilator, complete set of surgical equipment, blood testing equipment, autoclave, power generation equipment, emergency power supply	-
Service	Trauma and emergency medical care, Trauma and emergency inpatient and outpatient services, trauma and emergency operation, ICU and HDU services, radiology services, laboratory services, blood transfusion, physiotherapy, pharmacy	Total of 220 technical and nontechnical staff: Physician, Trauma surgeon, General surgeon, Orthopedic, Neurosurgeon, Cardiothoracic and vascular surgeon, Anesthetist/Critical care, Medical officer, Staff nurse, Health assistant, Laboratory staff, Radiographer, Pharmacist, Maintenance/Biomedical, Ambulance paramedics, Ambulance driver, Administrative officer/Manager, Account section officer, Security, Secretarial/Receptionist, Hygiene, Ward boys/girls, Social worker/Public relation officer, Medical recording and statistics

Source: JICA Survey Team





Source: JICA Survey Team

**Figure 1-3 Facilities Layout and Project Affected Area (as of November 2022)**

#### 1-4-1-2 Environmental and Social Features of the Project Area

The environmental features showing natural and social information are shown below.

**Table 1-2 Environmental Features of the Project Area**

Area	Item	Literature Survey (Secondary Data)																																																	
Natural/Physical Environment	Land Use	The land use of the project area is grass land without any cultivation as of 26 <sup>th</sup> of April, 2021. Surrounding land use areas are residential / developed area, grass land and secondary forest on the unused slope. The land use map is shown in Figure 1-4.																																																	
	Climate	The project area is located at an altitude of 1,500 m above sea level, with mild and refreshing climate throughout the year; while warm in winter. Snowing is rare even in winter. The average temperature in the warmest month is 24 °C, and the average temperature in the coldest month is 10 °C. About three-quarters of the annual rainfall occurs in the rainy season. In the Köppen category, the project area belongs to the temperate summer rain climate (Cwa). The average yearly rainfall is approximately 1,600 mm in the project area in the Kavrepalanchowk District.																																																	
	Air Quality	<p>The air quality secondary data at the nearest point measured in 2017 is shown below. Some data on particulate matter, such as TSP and PM, show values beyond the standard even the location is far from Kathmandu area. The measurement points are shown in Figure 1-5.</p> <p>[Air Quality Measurement Location (Secondary Data in 2017)]</p> <table border="1"> <thead> <tr> <th></th> <th>Air-1</th> <th>Air-2</th> </tr> </thead> <tbody> <tr> <td>Monitoring Date</td> <td>15/16 Dec. 2017</td> <td>17/18 Dec. 2017</td> </tr> <tr> <td>Elevation</td> <td>1,432m</td> <td>1,497m</td> </tr> <tr> <td>Coordinates</td> <td>27° 38' 37.38" N 85° 28' 4.66" E</td> <td>27° 38' 22.24" N 85° 28' 52.00" E</td> </tr> <tr> <td>Location</td> <td>Palanse-9, Suryabinayak Municipality</td> <td>Sanga-14, Banepa Municipality</td> </tr> </tbody> </table> <p>[Air Quality Data (Secondary Data in 2017)]</p> <table border="1"> <thead> <tr> <th rowspan="2">SN</th> <th colspan="3">Ambient Air Quality</th> <th colspan="2">Gaseous Pollutant</th> </tr> <tr> <th>TSP</th> <th>PM<sub>10</sub></th> <th>PM<sub>2.5</sub></th> <th>SO<sub>2</sub></th> <th>NO<sub>2</sub></th> </tr> </thead> <tbody> <tr> <td>Air-1</td> <td>169.82</td> <td>150.64*</td> <td>67.74*</td> <td>13.96</td> <td>0.15</td> </tr> <tr> <td>Air-2</td> <td>89.3</td> <td>84.04</td> <td>60.43*</td> <td>&lt;2.7</td> <td>0.26</td> </tr> <tr> <td>Nepal</td> <td>230</td> <td>120</td> <td>40</td> <td>70</td> <td>80</td> </tr> <tr> <td>WHO</td> <td>150</td> <td>50</td> <td>25</td> <td>500</td> <td>150</td> </tr> </tbody> </table> <p>* The value is exceeding the national standard. Nepal: National Air Standard, 2012 Source: Environmental Impact Assessment of Suryabinayak - Dhulikhel Road Improvement Project (2018)</p>		Air-1	Air-2	Monitoring Date	15/16 Dec. 2017	17/18 Dec. 2017	Elevation	1,432m	1,497m	Coordinates	27° 38' 37.38" N 85° 28' 4.66" E	27° 38' 22.24" N 85° 28' 52.00" E	Location	Palanse-9, Suryabinayak Municipality	Sanga-14, Banepa Municipality	SN	Ambient Air Quality			Gaseous Pollutant		TSP	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>	Air-1	169.82	150.64*	67.74*	13.96	0.15	Air-2	89.3	84.04	60.43*	<2.7	0.26	Nepal	230	120	40	70	80	WHO	150	50	25	500
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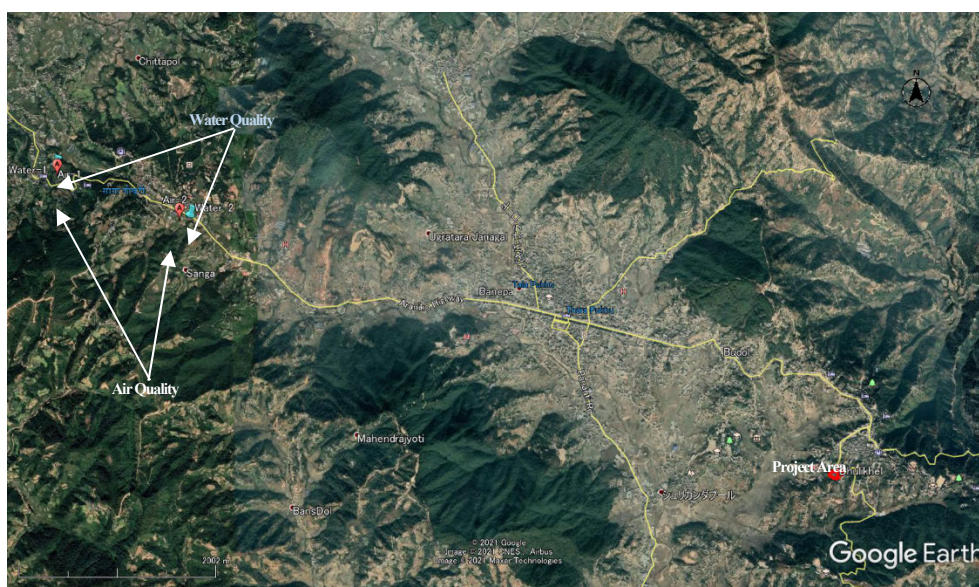
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Natural Protected Area		No law-based protected area is observed in the project area nor surrounding area. A key biodiversity area (KBA) named Phulchoki Mountain forests is located approx. 8 km southwest as shown in Figure 1-6.																																											
Fauna, Flora and Ecosystem		<p>According to the site and literature surveys for the project, the presence of species listed below have been recorded.</p> <p>Based on the literature survey, 1 species, i.e., Common Leopold (VU), may be using the project site as part of its territory, but it is expected that its nest and breeding area is out of the project area since it is developed without forest and green areas.</p> <p>[Table Recorded Species]</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Observed Sp.Number</th> <th>IUCN Species</th> <th>Observed Species</th> </tr> </thead> <tbody> <tr> <td>Mammal</td> <td>9</td> <td>0</td> <td>Golden Jackal, Jungle Cat, Small Indian Civet, Small Asian Mongoose, Common Leopard, Large Indian Civet, Indian Grey Mongoose, Yellow-Throated Marten, Masked Palm Civet * Common Leopard is listed as VU in the IUCN Red-list</td> </tr> <tr> <td>Birds</td> <td>34</td> <td>0</td> <td>Ashy Drongo, Barn Swallow, Black Drongo, Black Kite, Blue Whistling Thrush, Cattle Egret, Chestnut-Tailed Starling, Common Pigeon, Common Myna, Common Tailorbird, Eurasian Collared Dove, Eurasian Golden Oriole, Eurasian Tree Sparrow, Fulvous-Breasted Woodpecker, Great Tit, Grey-Headed Canary-Flycatcher, Grey-Hooded Warbler, Himalayan Bulbul, House Sparrow, Indian White-Eye, Indian Pond Heron, Jungle Myna, Long-Tailed Shrike, Oriental Magpie-Robin, Oriental Turtle-Dove, Pied Bushchat, Red-Rumped Swallow, Red-Vented Bulbul, Red Turtle-Dove, Rose-Ringed Parakeet, Rusty-Cheeked Scimitar-Babbler, Western Spotted Dove, White-Throated Kingfisher, Zitting Cisticola</td> </tr> <tr> <td>Herpetofauna</td> <td>4</td> <td>0</td> <td>Skittering Frog, Indian Bull frog, Common Garden Lizard, Common Rat snake</td> </tr> <tr> <td>Butterfly</td> <td>12</td> <td>0</td> <td>Indian Common Crow, Common Four-Ring, Oriental Common Grass Yellow, Common Jester, Indian Common Mormon, Common Sailer, Fulvous Pied Flat, Dark Clouded Yellow, Indian Tortoiseshell, Metallic Cerulean, Newar Three-Ring, Pea Blue</td> </tr> </tbody> </table> <p>IUCN (International Union for Conservation of Nature and Natural Resources) list of species: NT (Near Threatened), VU (Vulnerable), EN (Endangered), CR (Critically Endangered)</p>	Category	Observed Sp.Number	IUCN Species	Observed Species	Mammal	9	0	Golden Jackal, Jungle Cat, Small Indian Civet, Small Asian Mongoose, Common Leopard, Large Indian Civet, Indian Grey Mongoose, Yellow-Throated Marten, Masked Palm Civet * Common Leopard is listed as VU in the IUCN Red-list	Birds	34	0	Ashy Drongo, Barn Swallow, Black Drongo, Black Kite, Blue Whistling Thrush, Cattle Egret, Chestnut-Tailed Starling, Common Pigeon, Common Myna, Common Tailorbird, Eurasian Collared Dove, Eurasian Golden Oriole, Eurasian Tree Sparrow, Fulvous-Breasted Woodpecker, Great Tit, Grey-Headed Canary-Flycatcher, Grey-Hooded Warbler, Himalayan Bulbul, House Sparrow, Indian White-Eye, Indian Pond Heron, Jungle Myna, Long-Tailed Shrike, Oriental Magpie-Robin, Oriental Turtle-Dove, Pied Bushchat, Red-Rumped Swallow, Red-Vented Bulbul, Red Turtle-Dove, Rose-Ringed Parakeet, Rusty-Cheeked Scimitar-Babbler, Western Spotted Dove, White-Throated Kingfisher, Zitting Cisticola	Herpetofauna	4	0	Skittering Frog, Indian Bull frog, Common Garden Lizard, Common Rat snake	Butterfly	12	0	Indian Common Crow, Common Four-Ring, Oriental Common Grass Yellow, Common Jester, Indian Common Mormon, Common Sailer, Fulvous Pied Flat, Dark Clouded Yellow, Indian Tortoiseshell, Metallic Cerulean, Newar Three-Ring, Pea Blue																							
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Cultural Heritage		No law-based protected cultural heritage and religious structures are observed in the project-affected areas.																																											
Social-Economy	Population	<p>The project area is located in Ward 6, Dhulikhel Municipality, Kavrepalanchowk District of Bagmati Province.</p> <p>Based on the Population Census 2011, the total population of Kavrepalanchowk District was 381,937, while that of Dhulikhel Municipality was 32,162. On the other hand, the population distribution between males and females of Dhulikhel Municipality was 50.05%: 49.95%.</p> <p>[Population in the Project Area]</p> <table border="1"> <thead> <tr> <th rowspan="2">Area</th> <th colspan="2">Total Population</th> <th rowspan="2">Change (%)</th> </tr> <tr> <th>2001</th> <th>2011</th> </tr> </thead> <tbody> <tr> <td>Nepal</td> <td>23,151,423</td> <td>26,494,504</td> <td>12.6%</td> </tr> <tr> <td>Bagmati Province</td> <td>3,008,487</td> <td>5,529,452</td> <td>45.6%</td> </tr> <tr> <td>Kavrepalanchowk District</td> <td>385,672</td> <td>381,937</td> <td>-1.0%</td> </tr> <tr> <td>Dhulikhel Municipality</td> <td>-</td> <td>32,162</td> <td>5.6%</td> </tr> <tr> <td>Ward 6</td> <td>-</td> <td>2,002</td> <td>-</td> </tr> </tbody> </table> <p>Source: Central Bureau Statistics</p>	Area	Total Population		Change (%)	2001	2011	Nepal	23,151,423	26,494,504	12.6%	Bagmati Province	3,008,487	5,529,452	45.6%	Kavrepalanchowk District	385,672	381,937	-1.0%	Dhulikhel Municipality	-	32,162	5.6%	Ward 6	-	2,002	-																	
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Area	Item	Literature Survey (Secondary Data)
	Education and Literacy	Dhulikhel Municipality has plenty of educational institutions, including Kathmandu University. There are basic education schools: 24 run by the government, and 6 are private institutions. While there are 11 secondary schools run by the government and 8 are private institutions. There is also a school run by a monastery in the municipality. Altogether, there are 50 schools in the area. The national statistics show a literacy rate in favor of men, i. e., Dhulikhel Municipality has 85.63% literate male population while that of females is 65.77%, or a total literacy rate of 75.26%. The school enrollment rate is 99%, which is slightly higher than the national average of 96%.
	Health and Sanitation	Major reasons of mortality in Nepal are ischemic heart disease, chronic obstructive pulmonary disease, diarrheal diseases, lower respiratory infections, and intracerebral hemorrhage. Meanwhile, in 2020-2021, more than 780,000 persons had been infected by COVID-19 and more than 11,000 persons due to this disease had died as of October 2021.
	Income and Poverty	According to the Government of Nepal, 18.7 percent of Nepali population are currently living under the poverty line. Per capita annual income was 191.121 USD based on data from the Central Bureau of Statistics in 2020.



Source: JICA Survey Team, based on Google Earth

**Figure 1-4 Land Use in the Project and Surrounding Areas**



Source: JICA Survey Team, based on Google Earth

**Figure 1-5 Measurement Location of Secondary Data on Air and Water Quality**





Source: IBAT (<https://www.ibat-alliance.org/visual-data-map>)

**Figure 1-6 Location of Law-Based Natural Protected Area**

### 1-4-1-3 Regulations and Organizations related to Environmental and Social Consideration

#### (1) Environmental Screening and Related Environmental Laws and Regulations

The result of environmental screening in accordance with the Environmental Protection Rules (2020) in Nepal and JICA Guidelines for Environmental and Social Considerations (2010) are presented in this section.

#### (2) Result of the Environmental Screening Based on Relevant Laws in Nepal

The conditions for Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for development of the hospital in accordance with Environmental Protection Rules (2020) are shown below.

All conditions for an IEE, except volume of water consumption, are satisfied. The expected water consumption is 50,000 L/day in case of 100 beds in accordance with National Building Code in Nepal which is beyond 20,000 L/day, thus implementation of EIA is necessary.

**Table 1-3 Result of Environmental Screening for IEE and EIA**

No	Conditions for IEE (Health and Building Sector)	Project Condition	Applicable Condition	
			IEE	EIA
1	To run a hospital, nursing home, or medical business with 26 to 100 beds	100 or less than 100 beds	Applicable	
2	To run a teaching hospital with more than 51 to 100 beds	Not a teaching hospital		
3	To construct a joint building of built-up area or floor area with more than 5,000 to 10,000 square meters, both residential, commercial, or residential and commercial in nature.	Building area or floor area is less than 10,000 m <sup>2</sup>	Applicable	
4	Construction of cinema halls, theaters, community buildings, stadiums, concert halls, and sports complexes with a simultaneous arrival and departure of 1,000 to 2,000 people	The hospital is not a facility with the conditions shown on the left.		
5	To bury and excavate more than 20,000 cubic meters of soil and develop a site	The estimated volume is more than 20,000 m <sup>3</sup> .	Applicable	



No	Conditions for IEE (Health and Building Sector)	Project Condition	Applicable Condition	
			IEE	EIA
6	To construct buildings of 11 stories or more than 25 meters with a height of 16 stories or up to 50 meters.	The height and number of floors is less than the figure shown on the left.	Applicable	
7	To construct and operate a building using 10,000 to 20,000 liters of water daily.	The estimated water consumption is more than 20,000 L/day		<b>Applicable</b>

Source: Environmental Protection Rules 2020

### (3) Result of the Environmental Screening Based on JICA's Guidelines

Since the project is not located in a sensitive area, has no sensitive characteristics, does not fall into sensitive sectors under the JICA Guidelines for Environmental and Social Considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant, the Project has been classified as Category B in accordance with the aforementioned JICA Guidelines. Thus, an environmental and social assessment report of IEE level is required in the preparatory survey report.

### (4) Related Laws Regarding EIA and Screening Process

#### 1) Environmental Protection Act (2019)

Environmental Protection Act, 2053 (1997) (EPA1997) was replaced by the Environmental Protection Act (EPA), 2076 (2019) (EPA 2019), which requires a proponent to undertake (i) Brief Environmental Study, (ii) IEE, or (iii) EIA for a proposed project and have the report approved by the concerned sector agency prior to its implementation.

#### 2) Environmental Protection Rules (2020)

After the enforcement of the EPA2019, the environmental protection rules (EPR 2020) accordingly repealed previous EPR 1997 as per the EPA1997. EPR 2020 became effective on 15th June 2020 and obliges project proponents to perform environmental assessments as per Schedules 1, 2, and 3. It defines thresholds for environmental assessment under 3 categories: Brief Environmental Study, IEE, and EIA.

EPR 2020 has defined the roles of the provincial government and the local government as well in the process of environmental assessment of development projects. The legal regime on the environment makes every effort to integrate environmental aspects in the projects and programs.

The process of EIA is shown in Figure 1-7.

### (5) Gaps in EIA-Related Laws in Nepal and JICA Guidelines

The result of gap analysis between EIA-related laws and JICA Guidelines for Environmental and Social Considerations (2010) is shown below. There are no significant gaps, however, the names of some analyzed items are not same.

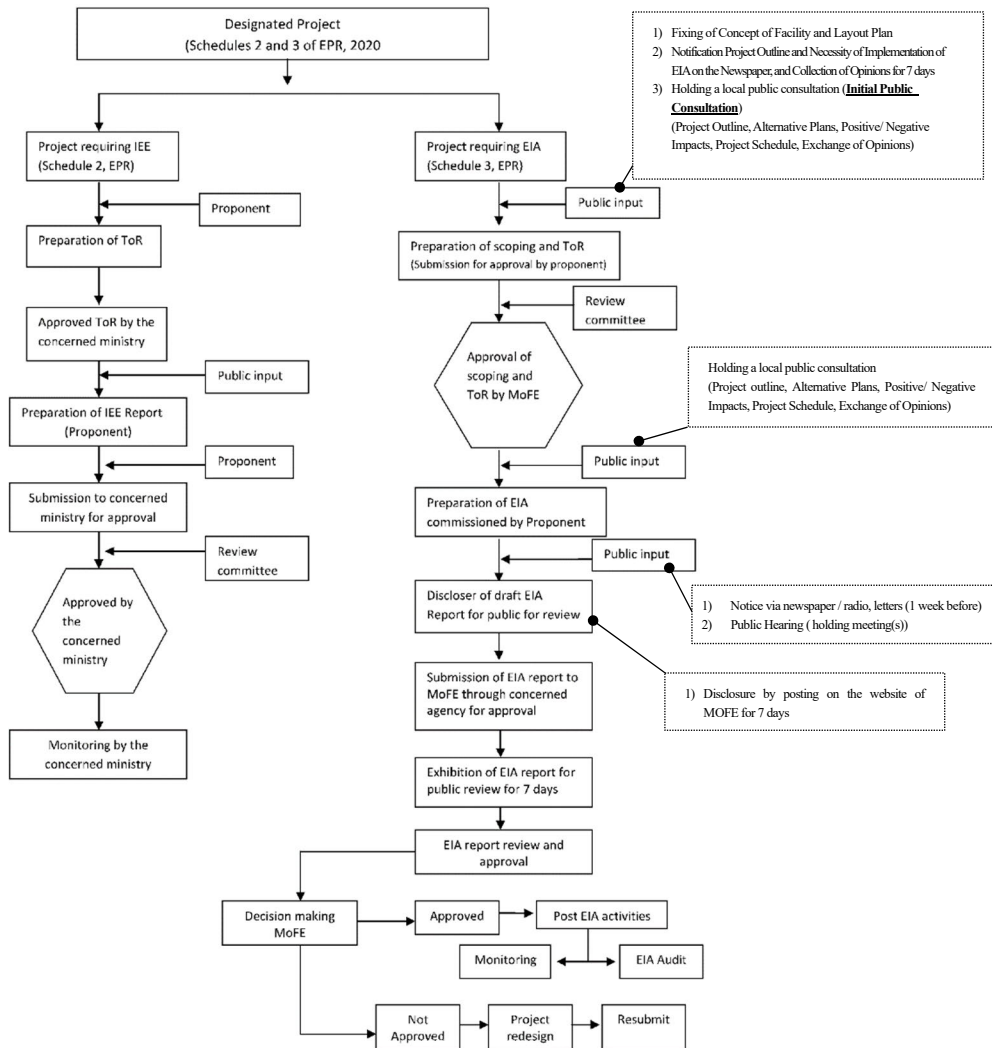
**Table 1-4 Gap Analysis between EIA Related Laws in Nepal and JICA Guidelines**

JICA Guideline (2010)	Environmental Protection Act (2019) /Environmental Protection Rules (2020)	Gaps / Policy to fill up gaps in this Study
<p><u>[I. Underlying Principles]</u></p> <p>1. Environmental impacts that may be caused by projects must be assessed and examined in the earliest possible planning stage. Alternatives or mitigation measures to avoid or minimize adverse impacts must be examined and incorporated into the project plan. (Appendix 1)</p>	<p>The proponent shall make detailed analysis of possible adverse effects on the environment from the implementation of such a proposal and various alternatives that can be adopted for mitigation such effects, and recommend the alternative that is appropriate for the implementation of the proposal and the grounds and reasons why that alternative is implementable. (Act/Chap.1/Article 4)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p><u>[II. Information Disclosure]</u></p> <p>1. EIA reports (which may be referred to differently in different systems) must be written in the official language or in a language widely used in the country in which the project is to be implemented. When explaining projects to local residents, written materials must be provided in a language and form understandable to them. (Appendix 2)</p> <p>2. EIA reports are required to be made available to the local residents of the country in which the project is to be implemented. The EIA reports are required to be available at all times for perusal by project stakeholders such as local residents and copying must be permitted. (Appendix 2)</p>	<p>The proponent shall prepare EIA report in Nepal language, but if the project is funded by international grant, there is provision to prepare report in English language also (Rule 7 (8), page 27 of EPR, 2020) but brief report with executive summary will be written in Nepali language also (Rule 7 (9), page 27 of EPR, 2020).</p> <p>After approval of EIA report from the Ministry of Forests and Environment, the approved EIA report will be submitted to concerned municipality from where local residents will see and copy approved EIA report. Before approval of the EIA report, the Ministry of Forests and Environment will post it on the website and send EIA report to the concerned Municipality and other organizations to get their feedbacks on the draft EIA report (Rule 9 (6) of EPR, 2020)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p> <p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p><u>[III. Local Stakeholder Meeting / Consultation]</u></p> <p>1. Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which they are planned. For projects with a potentially large environmental impact, sufficient consultations with local stakeholders, such as local residents, must be conducted via disclosure of information at an early stage, at which time alternatives for project plans may be examined. The outcome of such consultations must be incorporated into the contents of project plans. (Appendix 1)</p> <p>2. In preparing EIA reports, consultations with stakeholders, such as local residents, must take place after sufficient information has been disclosed. Records of such consultations must be prepared. (Appendix 2)</p> <p>3. If necessary, consultations with relevant stakeholders, such as local residents, should take place throughout the preparation and implementation stages of a project. Holding consultations is highly desirable, especially when the items to be considered in the EIA are being selected and when the draft report is being prepared. (Appendix 2)</p>	<p>The proponent shall examine detailed alternative plan during EIA study by consultation with stakeholders during the meeting. During EIA study, sufficient consultation will be conducted with local stakeholders such as residents. Public hearing will be conducted at local level in the presence of local government representative (Rule 6 of EPR, 2020).</p> <p>Before public hearing, public notice will be published in local newspaper by mentioned date, time and venue and broadcasting from local FM. Copy of public hearing notice will be pasted in local government office and public places such as school, health post, etc.</p> <p>After public hearing, public notice according to Schedule 9 of EPR, 2020 will be published in national newspaper again and should be uploaded in project website to provide opportunity to local resident for providing their comments and suggestion about implementation of project ( Rule 7 (2, 3) of EPR, 2020).</p> <p>The proponent shall conduct consultation with stakeholders such as local resident after sufficient information has been disclosed. Record of such consultation minutes will be attached in Annex part of EIA report. (page 141 of EPR, 2020)</p> <p>The proponent shall consult with relevant stakeholders, such as local residents throughout the preparation and implementation stages of a project. Holding consultations is highly desirable, especially when the items to be considered in the EIA are being selected and when the draft report is being prepared. (page 141 of EPR, 2020)</p>	<p>No Gaps (follow Nepal Laws and JICA Guidelines 2010)</p> <p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p> <p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>

JICA Guideline (2010)	Environmental Protection Act (2019) /Environmental Protection Rules (2020)	Gaps / Policy to fill up gaps in this Study
<p><u>[IV. Scope of Impacts to Be Assessed]</u></p> <p>1. The impacts to be assessed with regard to environmental and social considerations include impacts on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts. These also include social impacts, including migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children's rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety. (Appendix 1)</p>	<p>The proponent shall make detailed analysis of environmental and social considerations which include impact on human health and safety, as well as on the natural environment, that are transmitted through air, water, soil, waste, flora and fauna. (pages 150-152 of EPR, 2020)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p>2. In addition to the direct and immediate impacts of projects, their derivative, secondary, and cumulative impacts as well as the impacts of projects that are indivisible from the project are also to be examined and assessed to a reasonable extent. It is also desirable that the impacts that can occur at any time throughout the project cycle should be considered throughout the life cycle of the project. (Appendix 1)</p>	<p>The proponent shall examine direct and immediate impacts of project but cumulative impact shall not be examined during EIA study. However, it is not expected that the cumulative impacts are not caused from other projects and activities, thus gaps have not been found in the project.</p>	<p>No Gap in the project (as described on the left)</p>
<p><u>[V. Monitoring and Grievance Redress]</u></p> <p>1. Project proponents etc. should make efforts to make the results of the monitoring process available to local project stakeholders. (Appendix 1)</p>	<p>Proponent shall conduct self-monitoring and submit report to concerned agency every six month during construction and operation phase of project.(Rule 45 of EPR, 2020)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p>2. When third parties point out, in concrete terms, that environmental and social considerations are not being fully undertaken, forums for discussion and examination of countermeasures are established based on sufficient information disclosure, including stakeholders' participation in relevant projects. Project proponents, etc. should make efforts to reach an agreement on procedures to be adopted with a view to resolving problems. (Appendix 1)</p>	<p>The proponent shall establish grievance redressal unit to resolve problems, and when third parties point out that environmental and social consideration are not being fully undertaken, the grievance redressal unit shall coordinate with concerned stakeholders, and forums for discussion and examination of countermeasures are established to resolve the problems. There is provision to complain to concerned agency by third party if proponent have not fully undertaken environmental and social considerations. (Clause 36 of EPA, 2019)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p><u>[VI. Ecosystem and Biota]</u></p> <p>1. Projects must not involve significant conversion or significant degradation of critical natural habitats and critical forests. (Appendix 1)</p>	<p>The proponent shall not involve significant conversion and significant degradation of critical natural habitats and critical forests. (Rule 33 of EPR, 2020)</p>	<p>No Gap (The Project follows Nepal Laws and JICA Guidelines 2010)</p>
<p><u>[VII. Indigenous Peoples]</u></p> <p>1. Any adverse impacts that a project may have on indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When, after such an examination, avoidance is proved unfeasible, effective measures must be taken to minimize impacts and to compensate indigenous peoples for their losses. (Appendix 1)</p>	<p>There is no clear provision to avoid a project if it may have adverse impacts on indigenous people according to EPR, 2020. But if the proposed project will have impact on indigenous people, compensation shall be provided for their losses. However, it has been confirmed that no indigenous people have been identified among the project affected persons, thus there are no gaps in the prepared EIA.</p>	<p>No Gap in the project (as described on the left)</p>

Notes) Appendix 1: Environmental and Social Considerations Required for Intended Projects, Appendix 2: EIA Reports for Category A Projects

Source: JICA Guidelines for Environmental and Social Considerations (2010)



Source: JICA Survey Team based on Environmental Protection Rules 2020

**Figure 1-7 EIA Process**

#### 1-4-1-4 Environmental Alternative Analysis of the Project Location

In the environmental alternative analysis of the facility location, cooperation with Dhulikhel Hospital was indispensable, thus the nearest two locations (A and B) have been selected as candidates. The results of the environmental alternative analysis are shown in the table below. Although “Location A” requires land acquisition, there are other considerations like safety (prevention/minimization of accidents), convenience of public infrastructure, and less impact on land stability and flooding. Therefore, Location A is recommended than Location B.



Source: JICA Survey Team, based on Google Earth

**Figure 1-8 Alternative Locations of Project Area**

**Table 1-5 Result of Environmental Alternative Analysis for the Project Location**

Major Evaluated Item		Location A	Location B
Natural Env.	Ecosystem	Few impacts due absence of natural vegetation (abandoned farmland)	Few impacts due to absence of natural vegetation (Helicopter landing area)
	Hydrological Situation	No flooding in the area because it is located on top of the hill.	Area is flooded in the rainy season because it is located in low land.
	Topography and Geography	Since this area is located at the edge of a slope, appropriate slope protection is necessary.	The land is not stabilized because the surrounding buildings have been damaged by land upheaval.
Social Env.	Land Acquisition and Resettlement	Land acquisition will be required and 2 households will be resettled caused by physical displacement.	There are no land acquisition needed nor resettlement.
	Public Infrastructure and Services	Possible to access from Sindhuli directly	Impossible to access from Sindhuli Road. Approx. 500 m connected road from Sindhuli Road is very narrow and tightly curved.
	Traffic Accident and Safety	No traffic accidents are caused on the connected road due to direct link from the trunk road (Sindhuli Road).	It is expected that traffic accidents happen because of 500 m narrow and tightly curved connected road from Sindhuli Road.
Comprehensive Evaluation		Although some land acquisition are necessary, "Location-A" is recommended because the location is directly accessible from the trunk road and the convenience of public infrastructure is high.	Although acquisition of some lands is necessary, "Location-A" is recommended because it is directly accessible from the trunk road, and the convenience level of public infrastructure is high.

Source: JICA Survey Team

If this project is not implemented, it is expected that the capacity to respond to emergency patients will be limited, or that it will take time to transfer patients to other hospitals, reducing the survival rate.

### 1-4-1-5 Environmental Scoping (Degree of Project Impact)

The degree of impact on each item based on environmental reconnaissance is shown in the Leopold scoping matrix below.

**Table 1-6 Expected Degree of Impact on Each Item (Scoping Matrix)**

	No	Affected Activities Impact Items Based on the JICA Guidelines (Nepal Side)	Pre/ During Construction Phase								Operation Phase											
			Rating During Pre/Const.	Land acquisition and clearance	Change of land use plan, control of various activities by regulations for the construction	Reclamation of wetland, etc.	Deforestation	Alteration of the ground by cut, land, filling, drilling, etc.	Operation of construction equipment, machines and vehicles	Construction of roads, building, parking areas, and other related facilities	Traffic restriction in the construction area	Influx of construction workers, construction of base camp	Rating after Construction	Operation of service and gathering patients and employees of the hospital	Appearance/Occupancy of building and other structure	Pumping Up of Underground Water	Discharge of Waste Water and Wastes					
Pollution	1	Air pollution (Air Pollution)	B-						B-													
	2	Water pollution (Water Pollution, waste water generation)	B-						B-			B-	B-								B	
	3	Waste (Construction Waste, hospital waste generation)	B-	B-								B-	B-									B
	4	Soil contamination (Soil Contamination)	C						C				C									C
	5	Noise and vibration (Noise Pollution, Land Vibration)	B-								B-		B-	B-								
	6	Ground subsidence																				
	7	Odor																				
	8	Sediment quality	C						C													
Natural Environment	9	Protected area																				
	10	Ecosystem (urban biodiversity/ ecosystem)	C		C								C									C
	11	Hydrology																				
	12	Topography and geology (landslide/corruption of project area and embankment)	B-							B-												
Social Environment	13	Involuntary resettlement	B-	B-																		
	14	The poor	C	C																		
	15	Indigenous and ethnic people																				
	16	Local economy such as employment and livelihood																				
	17	Land use and utilization of local resources																				
	18	Water Usage (Groundwater extraction)	C						C				C									C
	19	Existing social infrastructures and services																				
	20	Social institutions such as local decision making institutions																				
	21	Misdistribution of benefits and damage																				
Social Environment	22	Local conflict of interests (conflict between workers and local people)	B-									B-										
	23	Cultural Heritage																				
	24	Landscape																				
	25	Gender (Child labor and discrimination towards women labor)	C									C										
	26	Right of Children (same as No25)	C									C										
	27	Infectious diseases such as HIV/AIDS(infectious diseases such as COVID-19 and HIV/AIDS)	B-							B-			B-	B-								
	28	Labor environment including work safety (occupational health and safety)	B-										B-	B-	B-							
Others	29	Accidents (caused by traffic congestion)	B-									B-	B-	B-								
	30	Cross boundary impacts and climate change																				

Notes) Rating:

A: Serious adverse impacts are expected. B: Some adverse impacts are expected. C: Extent of impact(s) is unknown (serious impact is not expected, but survey and analysis shall be done) No mark: Light or few adverse impacts are expected. Detailed quantitative survey is not necessary.

Source: JICA Study Team



**Table 1-7 Evaluation of Reasons for Building the Trauma and Emergency Center**

Area	Nb	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/During Construction	Operation Phase	
Pollution	1	Air pollution	B-		<b>Construction phase:</b> Temporary negative impacts are expected from dust due to operation of construction machines and equipment. However, this impact is not significant and can be controlled by mitigation measures. <b>Operation phase:</b> Serious negative impacts are not expected because there are no activities which will cause these on this item. However, general air quality monitoring during operation stage is necessary by request from MoFE.
	2	Water pollution	B-	B-	<b>Construction phase:</b> Turbid water may be generated by earthworks especially during rainy season. However, organic polluted water will not be discharged since a base campsite will not be set up; no need for it due to small-scale construction activities that will be carried out. <b>Operation phase:</b> General domestic effluent and medical wastewater are discharged from the hospital.
	3	Waste	B-	B-	<b>Construction phase:</b> Construction waste, such as waste soil, are expected. <b>Operation phase:</b> General domestic waste, e. g., night soil and medical waste, will be generated from the hospital.
	4	Soil contamination	C	C	<b>Construction phase:</b> Excavated soil in the compound may be polluted. If the polluted waste soil is transported out of the project area, the project may cause adverse impacts. <b>Operation phase:</b> Activities related to the operation of the hospital and generation of medical waste may cause soil contamination.
	5	Noise and vibration	B-	B-	<b>Construction phase:</b> Generation of noise and vibration is expected due to operation of construction machines and equipment. <b>Operation phase:</b> Operation of generator may cause noise impacts to the surrounding area
	6	Ground subsidence			<b>Construction and operation phase:</b> No impacts are expected since activities which cause ground subsidence are not expected.
	7	Odor			<b>Construction and operation phase:</b> No impacts are expected since activities which cause odor are not expected.
	8	Sediment quality	C		Refer to No.4, Soil Contamination.
Natural environment	9	Protected area			<b>Construction and Operation phase:</b> The project area is not located in any natural and cultural protected areas. The nearest natural protected area is Phulchoki Mountain forests (Key Biodiversity Area), which is more than 8 km away from the project area.
	10	Ecosystem	C	C	<b>Construction:</b> Leaking of hazardous material and wastes may give negative impacts to surrounding fauna and flora species. <b>Operation phase:</b> Inappropriate waste (e. g., medical waste) management may give adverse impacts on fauna and flora species near the project site.
	11	Hydrology			<b>Construction and Operation phase:</b> There are no activities which will give adverse impacts to rivers and streams nearby.
	12	Topography and geology	B-	B-	<b>Construction phase and Operation phase:</b> Considerable topography and geological sites are not located in the Project area, thus no impact is expected. However, earthwork may cause slope to collapse and slide.
Social environment	13	Involuntary resettlement	B-		<b>Pre-Construction phase:</b> A couple of houses may be affected by land acquisition and clearance works. <b>Operation phase:</b> Any adverse impacts are not expected on this item.
	14	The poor	C		<b>Pre-Construction and Operation phase:</b> Land acquisition and resettlement may give adverse impacts to project-affected persons living under the poverty line. <b>Operation phase:</b> Any adverse impacts are not expected due to absence of activities which will give such impact on this item.
	15	Indigenous and ethnic people			<b>Pre-Construction phase:</b> Land acquisition and resettlement may give adverse impacts to indigenous and ethnic people living in the project area. However, no indigenous and ethnic people have been identified among the project-affected persons. <b>Operation phase:</b> Any adverse impacts are not expected due to absence of activities which will give such impacts on this item.
	16	Local economy such as employment and livelihood			<b>Construction and Operation phase:</b> The project activities will be conducted in a limited project area, thus the project will not give any adverse impact to the local economy.
	17	Land use and utilization of local resources			<b>Pre-construction and Operation phase:</b> Most of project land belongs to Dhulikhel Hospital and only approx. 800 m <sup>2</sup> of private land will be purchased. Since the land use of both lands is open grassland, the project will not give any adverse impacts on local resources.
	18	Water usage	C	C	<b>Construction and Operation phase:</b> A well will be used for construction activities and operation of the center. Boring of well and pumping up of water may give adverse impacts such as dropping of water level within the vicinity.

Area	Nb	Impacted Item on JICA Guidelines	Rating		Reasons of the Rating
			Pre/During Construction	Operation Phase	
	19	Existing social infrastructures and services			<b>Construction and Operation phase:</b> There are no social infrastructures such as hospitals, schools and meeting places in the project area. Additionally, any access routes for nearest social infrastructures are not existing in the project-affected area.
	20	Social institutions such as local decision making institutions			<b>Construction and operation phase:</b> In the project-affected area, any developed residential areas and society groups are not observed. Thus, the project will not give any adverse impacts on this item.
	21	Misdistribution of benefit and damage			<b>Construction and operation phase:</b> Since the project's positive impacts are given to the inhabitants and patients fairly, misdistribution of benefits and damages caused by the project is not expected.
	22	Local conflict of interests	C		<b>Construction phase:</b> Construction labors and local people may have conflicts on local manners and religions <b>Operation phase:</b> Dhulikhel Hospital is existing already and many patients are visiting this area. Building of new hospital will give beneficial impacts fairly to all inhabitants in the project area. Thus, local conflicts are not expected.
	23	Cultural heritage			<b>Construction and operation phase:</b> Any cultural heritage and religious facilities are not observed in the project affected area, thus the project will not give any impacts on this item
	24	Landscape			<b>Construction and operation phase:</b> There are no law-based designated landscape areas around the project Area. Thus, existence of a hospital building will not give any serious impacts on the landscape.
	25	Gender	C		<b>Construction and operation phase:</b> Unequal labor employment and the possibility of wage payments between men and women <b>Operation phase:</b> Negative impacts specified for women are not expected. However, facilities should be considered for women from the view of gender equality.
	26	Right of children	C		<b>Construction phase:</b> Child labor may occur during construction. <b>Operation phase:</b> Negative impacts specified for children are not expected.
	27	Infectious diseases such as HIV/AIDS	B-	B-	<b>Construction phase:</b> Since construction laborers gather in the construction area and, it is expected that infectious diseases, such as COVID-19, may be spread. Additionally, alteration to ground by cut land and filling may provide habitats for mosquitoes that possibly transmit dengue fever. <b>Operation phase:</b> Since patients and employees enter the hospital, infectious diseases such as COVID-19 may spread in the vicinity.
Others	28	Labor environment	B-		<b>Construction phase:</b> Construction work environment needs to be considered in accordance with relevant laws and regulations. <b>Operation phase:</b> No impact is expected since the work environment will be secured in accordance with concerned regulations in Nepal.
	29	Accidents	B-	B-	<b>Construction phase:</b> Construction vehicles may use existing local roads near residential areas, thus the number of traffic accidents may increase. <b>Operation phase:</b> Concentration of traffic may cause congestion near the hospital.
	30	Cross boundary impacts and climate change			<b>Construction phase:</b> Operation of construction machines and construction of structures will generate GHGs; however, total volume will be at negligible level. <b>Operation phase:</b> Operation of the training center may generate GHGs; however, expected volume is limited and at negligible level.

Notes) Rating:

A: Serious impact is expected. B: Some impacts are expected. C: Extent of impact is unknown (serious impact is not expected, but survey and analysis shall be done) No mark: Light impact is expected. Detailed quantitative survey is not necessary.

Source: JICA Study Team

#### 1-4-1-6 Methodologies for EIA (TOR)

The survey items and methodologies for implementation of EIA are shown below.



**Table 1-8 Survey Items and Methodologies for EIA (TOR)**

Category	No.	Items on the JICA Guidelines	Survey Item and Methodology	Methodology of Forecast
Pollution	1	Air Pollution	(1) Site Survey : 3 Points (Dhulikhel Hospital, 2 points in the project site) (2) Item: CO, NO <sub>2</sub> , SO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> (3) Frequency: once (dry season)	Qualitative
	2	Water Quality	(1) Site Survey : 3 Points (surface water, underground water and discharged water from sewerage facility of Dhulikhel Hospital) (2) Item: BOD, pH, SS, Temperature, Coliform (3) Frequency: Once (Rainy Season)	Qualitative
	3	Waste	(1) Site Survey: Waste management system of the Dulikhel Hospital (2) Item: Process of waste management (3) Frequency: Once	Qualitative/ Quantitative
	4	Soil Contamination and Sediment	(1) Site Survey: 1 Point (project site) (2) Item: Cadmium, Hexavalent Chromium, Mercury, Lead, Arsenic, Cyanide, Selenium, Fluorine, Boron (3) Frequency: Once	Qualitative
	5	Noise and Vibration	(1) Site Survey : 3 Points (2 points in the project site, Dulikhel Hospital) (2) Item: Ambient Noise and Ambient Vibration (24 hrs) (3) Frequency: Once (not rainy day)	Qualitative/Quantitative
Natural Env.	10	Ecosystem	(1) Site Survey: Project site and surrounding area (2) Item: Fauna (Mammals, Reptiles, Amphibians, Birds and Butterflies), Flora (3) Frequency: Once	Qualitative
	12	Topography and Geography	Refer to results of JICA Survey (Geographic survey such as boring)	Qualitative
Social Env.	13	Resettlement	(1) Site Survey : Interview with directly project-affected persons (PAPs) (2) Item: PAPs Census, Inventory of Loss Assets, Socioeconomic Survey, Replacement Cost Survey (3) Frequency: Once	Qualitative
	14	Poverty	Refer to results of surveys in No.13	Qualitative
	18	Water Use	(1) Site Survey: Sample wells (2) Item: Pumping water volume from underground (3) Frequency: Continuous monitoring during the preparatory survey	Quantitative
	25	Gender	Refer to results of surveys in No.13	Qualitative
	26	Right of Children	(1) Site Survey: Monitoring and sample survey nearest construction sites (2) Item: Confirmation of child labor (3) Frequency: Once	Qualitative
	27	Infectious Diseases including STD such as HIV/AIDS	(1) Site Survey: Interview with Dhulikhel Hospital/ Collection of secondary data (2) Item: Present Condition of Infectious Diseases (3) Frequency: Once	Qualitative
	28	Labor Environment and Safety	(1) Site Survey: Visual survey at the nearest construction sites (2) Item: Confirmation of safety instruments (3) Frequency: Once	Qualitative
Others	29	Accident	(1) Site Survey: Collection of secondary data (2) Item: Case of accidents (3) Frequency: Once	Qualitative

Source: JICA Survey Team

#### 1-4-1-7 Summary Results of Baseline Survey and Impact Analysis

The summary of baseline survey, forecast, and evaluation is shown below.

**Table 1-9 Summary of Baseline Survey, Forecasts, and Evaluation**

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
Pollution (Physical and Chemical Environment)	1	Air pollution  (Air Pollution)	B- (B-)	( )	<p>1. Survey Point Air-1 : Project Site North Air-2: Project Site South Air-3: Dhulikhel Hospital Quadrangle 2. Survey Date: 21<sup>st</sup> of July, 2021 3. Result <b>All air quality data meet Nepal and IFC standards</b> (Standard Value in Nepal/IFC) <b>[Air-1: Project Site North]</b> PM<sub>10</sub>: 60.80 µg/m<sup>3</sup> (120/150) PM<sub>2.5</sub>: 21.87 µg/m<sup>3</sup> (40/75) SO<sub>2</sub>: 2.14 µg/m<sup>3</sup> (80/125) NO<sub>2</sub>: 6.13 µg/m<sup>3</sup> (70/40) CO: &lt;1,000µg/m<sup>3</sup> (10,000/-) <b>[Air-2: Project Site South]</b> PM<sub>10</sub>: 85.98 µg/m<sup>3</sup> (120/150) PM<sub>2.5</sub>: 28.07 µg/m<sup>3</sup> (40/75) SO<sub>2</sub>: 2.67 µg/m<sup>3</sup> (80/125) NO<sub>2</sub>: 3.65 µg/m<sup>3</sup> (70/40) CO: &lt;1,000µg/m<sup>3</sup> (10,000/-) <b>[Air-3: Dhulikhel Hospital Quadrangle]</b> PM<sub>10</sub>: 53.92 µg/m<sup>3</sup> (120/150) PM<sub>2.5</sub>: 15.49 µg/m<sup>3</sup> (40/75) SO<sub>2</sub>: 1.54 µg/m<sup>3</sup> (80/125) NO<sub>2</sub>: 1.64 µg/m<sup>3</sup> (70/40) CO: &lt;1,000µg/m<sup>3</sup> (10,000/-) *Nepal Standard: National Ambient Air Quality Standard, 2069</p>	<p>[During Construction] Exhaust gases including CO, NO<sub>2</sub>, SO<sub>2</sub> and PMs will be discharged from construction machines and may cause impact on the nearby residential area. However, this adverse impact will be at negligible level and not serious due to the following reasons: · Operation time is only during daytime · Number of construction machines that will be operating at the same time will be less than 10, thus negative impacts that they will cause will be at negligible level and, generally, air quality is dependent on background density. · In general, such negative impacts from construction machines are less than 10% of the background density of each item.</p> <p>[After Construction] Serious negative impacts are not expected because there are no activities which will give such impacts on air quality.</p>	<p>[During Const.] Exhaust gases and dusts are generated during construction, thus some adverse impacts may be caused and impacted the nearest hotel and house(s). However, the adverse impact is not serious because the number of construction machines will be less than 10 units at the same time, and the residential area is far from the construction area. Furthermore, general mitigation measures, such as sprinkling water for dust control, will be implemented when the dust creates impact on the nearest residential area.</p> <p>[After Const.] Serious negative impacts are not expected because there are no activities which will give such impacts on this item.</p>
	2	Water quality  (Water pollution)	B- (B-)	(-)	<p>1. Survey Point · Surface Water: Out of project site · Underground Water: Inside of Dhulikhel Hospital · Discharged Water from the hospital's treatment facility 2. Survey Date: 16<sup>th</sup> of July, 2021 3. Result <b>Surface Water</b> [Standard Value: Land Surface Water Quality (Nepal Gazette, 23 June 2003)] Measured water quality is not exceeding any standard. [Temperature] 25.67 °C (40) [pH] 7.52 (5.5-9.0) [BOD] 33.0 mg/L (50) [TSS] 21 mg/L (200) [E-coli form] TNTC* (no standard) [Total-coli form] TNTC* (no standard) *TNTC: Too Numerous to Count</p>	<p>[During Const.] Turbid water may run off from the construction area during construction stage. With regard to organic water pollution, most of construction workers will go home after work or stay in an existing hotel, thus significant adverse impacts for this item are not expected.</p> <p>[After Construction] Approximately 34,000 L/day wastewater is generated from the Trauma and Emergency Center. All effluents are sent to water treatment facility in the project site and discharged to the natural river after treatment. The water quality is less than standard value.</p>	<p>[During Const.] During construction, turbid water will flow into the existing streams and rivers not only within the project area, but also in the surrounding area. Thus, it supposed that such negligible impacts do not give significant effects on mudflats in the downstream. However, some general mitigation measures, such as appropriate management of earthwork area, will be implemented for minimization of adverse impacts.</p> <p>[After Construction] Necessary wastewater treatment facility will be installed for the Trauma and Emergency Center, thus it is not likely to significantly impact the water quality of the existing rivers and streams.</p>

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
					<p><b>Underground Water</b> [Nepal Drinking Water Standard (Nepal Gazette, 26 June 2006)] Measured water quality data are not exceeding the standard except E-coli form level.</p> <p><b>[Underground Water-1: Inside of Dhulikhel Hospital]</b> [Temperature] 24.78 °C (no standard) [pH] 7.66 (6.5-8.5) [BOD] 3.2 mg/l (no standard) [SS(TDS)] 2 mg/L (1,000) [E-coli form] *Exceeding <b>8 MPN/100 mL (0)</b></p> <p><b>Wastewater (Influent)</b> [Standard Value: Land Surface Water Quality (Nepal Gazette, 23 June 2003)] Measured water quality on BOD is exceeding any standard.</p> <p><b>[Discharged water from Treatment Facility at the Dhulikhel Hospital in 2020]</b> [pH] 7.86 (5.0-9.0) [BOD] <b>68 mg/L (50)</b> [TSS] 32.0 mg/L (200)</p>		
	3	Waste (Waste)	B- (B-)	B- (B-)	<p>According to interview with Dhulikhel Hospital, following waste materials are generated and managed appropriately.</p> <p>(1) General waste 360 kg/day Collected by the Dhulikhel Municipality and disposed at designated landfill site.</p> <p>(2) Medical waste 6.5 kg/day : Unsegregated waste 3.2 kg/day : Infected waste including needles and sharps, gloves, gauze pieces, and intravenous lines Medical wastes are separated in the hospital and collected at the waste management center in the hospital, and then separated again. Infected wastes are treated using the autoclave and handed over to the designated company.</p>	<p>[During Const.] Forecast of Construction's major Waste Generation 1. Waste soil: 20,000 m<sup>3</sup> (Max)</p> <p>[After Construction] Following general domestic waste and medical waste are generated from the Trauma and Emergency Center. Expected volume of waste based on the Dhulikhel Hospital's capacity (475 beds) (1) General waste 80 kg/day (2) Medical waste 1.5 kg/day : Unsegregated waste 0.7 kg/day : Infected waste, however, these wastes will be managed and disposed in currently the same manner.</p>	<p>[During Const.] Surface soil in the project area is not polluted and the soil quality during construction will be tested again. Waste soil is transported from the project area and reused for other purposes outside of the project area. Thus, the project does not give any adverse impact on this item.</p> <p>[After Construction] All wastes from the Trauma and Emergency Center will be managed, segregated, and disposed in currently the same manner at Dhulikhel Hospital. Thus, the project is not likely to give any adverse impacts on this item.</p>

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
	4	Soil contamination and sedimentation quality  (Soil Pollution)	C (-)	C (-)	<p>1. Sampling site Soil-1: Project site</p> <p>2. Survey Date: 16<sup>th</sup> of July* and 26<sup>th</sup> of October, 2021</p> <p>3. Result of Analysis All soil samples are not exceeding referred standards. (In particular items, Japanese Standard is referred due to no similar standard in Nepal.)</p> <p><b>[Soil-1: Project area]</b></p> <p>[Cadmium] &lt;0.1 mg/kg (45)</p> <p>[Hexavalent Chromium] 4.53 mg/kg (250)</p> <p>[Mercury]* &lt;0.05 mg/kg (15)</p> <p>[Lead] &lt;0.5 mg/kg (150)</p> <p>[Arsenic] 10.16 mg/kg (150)</p> <p>[Cyanide] &lt;2.5 mg/kg (50)</p> <p>[Selenium] &lt;0.5 mg/kg (150)</p> <p>[Fluorine]* 18.66 mg/kg (4,000)</p> <p>[Boron]* 0.82 mg/kg (4000)</p>	<p>[During const.] Estimated volume of waste soil from the project area will be around 10,000 to 20,000 m<sup>3</sup>. This soil will be reused for other purposes, such as for construction of houses outside of project area. Also, waste soil will be transported and disposed at the designated landfill site. It is expected that the excavated soil does not cause pollution since the current surface soil is not polluted as shown in the baseline data.</p> <p>[After Construction] If the wastewater and medical wastes are not managed properly, effluent may give impacts on surrounding soil and on sediment quality.</p>	<p>[During const.] It is expected that the generated soil in the project area is not polluted based on soil analysis, thus soil contamination is not caused by the construction soil. Appropriate management and implementation of mitigation measures minimize such risks.</p> <p>[After const.] Wastewater treatment will be conducted using the sewerage system, and medical wastes will be managed the same manner as Dhulikhel Hospital. Thus, such appropriate management and implementation of mitigation measures minimize such risks. The project is not likely to have significant impacts.</p>

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
Pollution	5	Noise and Vibration	B- (B-)	B- (-)	<p>1. Survey Point  NV-1: Project Site North (noise only)  NV-2: Project Site South (noise and vibration)  NV-3: Dhulikhel Hospital Quadrangle (noise only)</p> <p>2. Result (Standard Value)  Current land use of the project site: Roadside and mixed residential and commercial area  All measured noise levels on-site are exceeding standards in Nepal. However, the vibration level satisfies the referred standard level.</p> <p>NV-1: Project Site North  <b>[Noise]</b> (Mixed Residential)  (Ministry of Environment, Science and Technology, Nepal Gazette 2069-07-13/IFC)  Daytime 6:00-18:00  <b>67 dB(A) (63/70)</b>  Nighttime 18:00-6:00  <b>61 dB(A) (55/70)</b></p> <p>NV-2: Project Site South  <b>[Noise]</b> (Mixed Residential)  Daytime 6:00-18:00  <b>65 dB(A) (63/70)</b>  Nighttime 18:00-6:00  <b>62 dB(A) (55/70)</b></p> <p><b>[Vibration]</b>  (Referred to Japanese Standard for Construction Vibration)  Daytime 7:00-20:00  &lt;25 dB (65)  Nighttime 20:00-7:00  &lt;25 dB (60)</p> <p>NV-3: Dhulikhel Hospital Quadrangle  <b>[Noise]</b> (Peace area)  Daytime 6:00-18:00  <b>48 dB(A) (50/55)</b>  Nighttime 18:00-6:00  <b>43 dB(A) (40/45)</b></p>	<p>[During const.]  Impacts: Construction noise &amp; vibration  Forecast Point: At Sensitive Receptor (OYO Hotel)  The forecast point is adjacent to the project site.  Expected noise and vibration levels during construction do not exceed referred standard of construction noise and vibration.</p> <p>[Construction Noise]  Less than 85 dB(A) (85)  [Construction Vibration]  Less than 75 dB (75)  *Construction noise and vibration standards are referred to Japanese Standards because these standards are not available in Nepal.</p> <p>[After Construction]  Operation of generator when there is power interruption may cause noise and gives impact to surrounding houses.</p>	<p>[During const.]  No standard values for construction noise and vibration have been established in Nepal at the moment. Thus, it is recommended that other standard such as Japanese should be referred in this ESIA.  The forecasted construction noise and vibration at sensitive receptor is within Japanese standards, thus any special mitigation measures such as setting up noise barriers are not necessary. However, noise and vibration level will be higher than baseline data, thus general mitigation measures such as limitation of working time and appropriate machine maintenance for minimizing of noise and vibration are planned.</p> <p>[After const.]  Noise generation is expected when power generator is operated. Although power level of the generator is around 90 dB(A), the generator will be installed inside the building, thus the noise level is mitigated and decreased to negligible level.</p>

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result										
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation								
Natural Environment	10	Ecosystem	C (-)	C (-)	Recorded Species (IUCN considerable species) 1. Mammals: 9 Species (Common Leopard (VU)) 2. Birds: 34 Species 3. Reptiles and Amphibians: 4 4. Butterflies: 12 With regard to the Common Leopard, it is expected that the species may use the project site as part of its moving area, not nesting and breeding area.	[During Construction] Since the project and surrounding area is developed as farm land and residential area, recorded species are common species. However leaking of hazardous material and wastes may give adverse impacts on such urbanized fauna and flora species. Additionally some secondly trees might be cut in the west side of project area.  [After Construction] Insufficient of waste management such as medical waste may give adverse impacts on fauna and flora species near project site.	[During and After Const] Appropriate waste water treatment and waste management will be conducted based on the planned mitigation measures during and after construction. Thus the project activities do not give any significant impacts to ecosystem. With regard to the Common Leopard categorized “VU” under IUCN Red-List, it is expected the project site is a part of moving area, not nesting nor breeding area. Because there are not any natural vegetation in the project site. Thus implementation of project does not give any serious impacts their habitat. With regard to cutting tree in the west side of project site, a endorsement letter shall be obtain from MOFE after detailed design in accordance with the Forest Rules 2022.								
	12	Topography and Geology	B- (B-)	B- (B-)	(1) Topography The project area is located around 1,500 m elevation, and it is formed on stepped terrain and located on the edge of the slope.  (2) Geology The survey was conducted at 15 points in the project area. According to the survey, soft ground has not been observed from survey points. Original target depth was confirmed at -20.0 m and N-values are between 39-45.	[During and After Const] Considerable topography and geological sites are not located in the project area, thus no impact is expected. However, embankment of the project site may have risks of slope failure, land slide and soil erosion. Thus, some mitigation measures are necessary.	[During and After Const] Implementation of appropriate designing and mitigation measures, such as slope protection and periodical monitoring and maintenance, will mitigate the expected impacts. Thus, it is not likely to give significant impacts on stability of earthwork section.								
Social Environment	13	Involuntary resettlement	B- (B-)	- (-)	A total of 5 project-affected households (PAHs) with 11 resettlers will be displaced by the project. Also, 2 private landowners of 950 m <sup>2</sup> are recorded in the affected area.	[Before and During const.] Affected households, number of resettlers, the area of private lands to be purchased and other affected properties are shown below.  <b>Table Summary of PAHs</b> <table border="1"> <thead> <tr> <th>Item</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>Affected Residence (Resettlers)</td> <td>2 HHs (11 Persons)</td> </tr> <tr> <td>Affected Landowners</td> <td>2 HHs (950 m<sup>2</sup>)</td> </tr> <tr> <td>Affected Structure (restaurant)</td> <td>1 HH</td> </tr> </tbody> </table>	Item	Quantity	Affected Residence (Resettlers)	2 HHs (11 Persons)	Affected Landowners	2 HHs (950 m <sup>2</sup> )	Affected Structure (restaurant)	1 HH	[Before During const.] Although 2 residences with 11 resettlers, and land acquisition of 950 m <sup>2</sup> are caused by the project, implementation of appropriate compensation, and livelihood restoration program will mitigate expected adverse impacts, thus the project is not likely to give serious impacts on land acquisition and involuntary resettlement.
	Item	Quantity													
Affected Residence (Resettlers)	2 HHs (11 Persons)														
Affected Landowners	2 HHs (950 m <sup>2</sup> )														
Affected Structure (restaurant)	1 HH														
	14	The Poor (-)	C (B-)	- (-)	According to the Government of Nepal, 18.7 percent of Nepali population is currently living under the poverty line. Per capita annual income is 191.121 USD based on data from the Central Bureau of Statistics in 2020.	[During Const.] According to socioeconomic surveys on ARAP, 1 household is living under the poverty line. Thus, the project’s compensation policy considers such vulnerability. Livelihood restoration program has been prepared and will be applied.	[During Const.] 1 household living under the poverty line has been identified. Appropriate compensation rate is under discussion with the affected household. The project will also prepare special additional allowance for the livelihood restoration program. Thus, the project is not likely to give serious impact on the household. However, social monitoring shall be done based on the monitoring plan.								



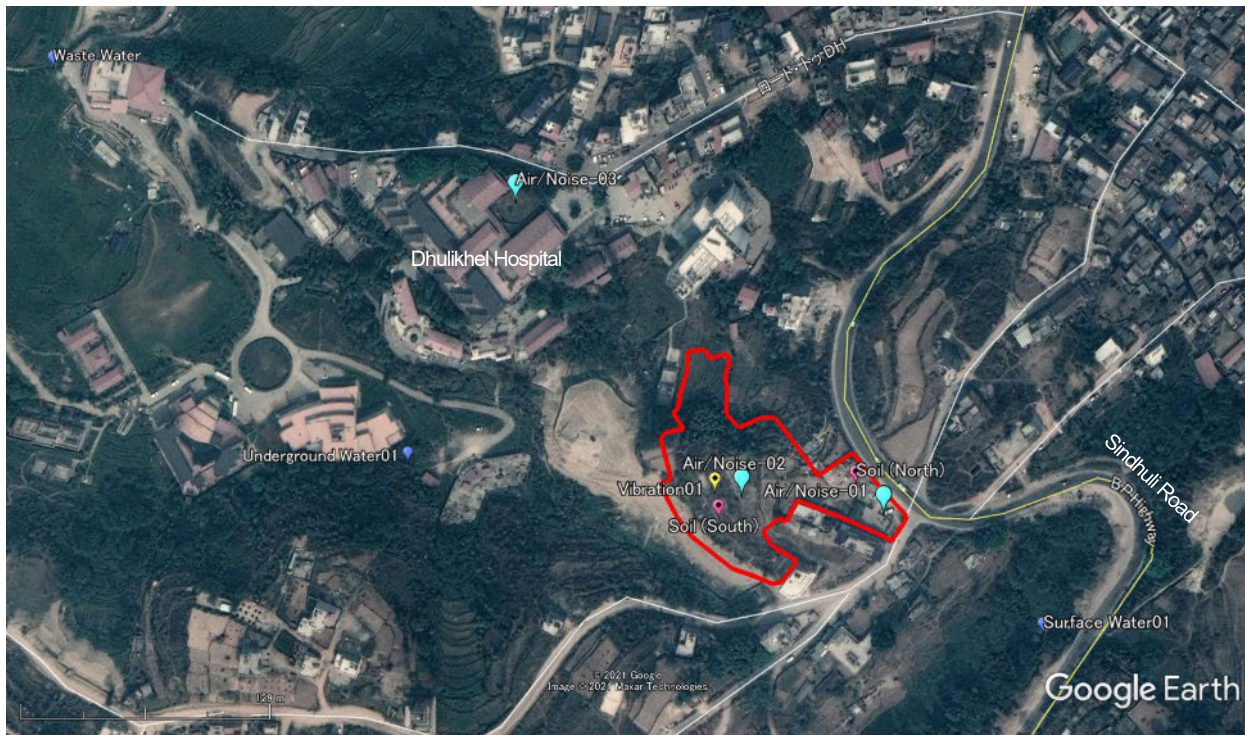
Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
	18	Water usage  (Lowering water table)	C (-)	C (-)	According to the test well during the study, the water source specifications are shown below: (1) Capacity: 50,000 L/day (2) Depth of water source: GL-10 m from the surface.	[During and After Const.] The aquifer of the well's water source is assumed to be a weathered zone in this study area. This is different from the horizontally spreading sedimentary layer, which often forms an aquifer with a shape close to vertical. Therefore, the project is not likely to give adverse impacts on the surrounding wells and underground water.	[During and After Const.] It is predicted that the construction and operation of a well for the project will not give adverse impacts on the surrounding wells. However, periodical monitoring and mitigation measures shall be prepared when it is necessary.
	25	Gender	C (C)	- (-)	The Labor Act (2017) prescribed that "No employer shall discriminate any labor on the ground of religion, color, sex, caste, tribe, origin, language, ideological conviction, or other similar ground." However, according to site observation and interviews with women, job opportunities and wages of women are lower than those of men workers.	[During Const.] According to the general culture and custom of Nepal, most of the workers involved in heavy labor and high-risk construction work are men, and the same situation is expected for this project. Thus, the project is not likely to give serious negative impacts on the provision of fair salary for male and female workers.	[During Const.] It is expected that the impact on women will not be serious. However, it is necessary to monitor that the contractor follows the provisions of the Labor Act 2017.
	26	Rights of Children	C (C)	- (-)	According to information from the Child Labor Report 2021 of the International Labour Organization (ILO), the following are the features of child labor in Nepal. 2.07 (29.3%) million child laborers (5-17 years old) out of 7.07 million total number of children are recognized in Nepal. However, the ratio in Bgmati province is only 8.9% (mainly agriculture and retail).	[During Const.] Child laborers may be hired as simple workers in the construction site and/or as laborers at the quarry site.	In the project area, child laborers have not been observed during surveys. Additionally, the Labour Act (2017) in Nepal prescribes the prohibition of employment of children. Thus, prevention measures shall be implemented strictly during construction. Implementation of such measures eases risks of the hiring of child laborers.
	27	Infectious diseases such as HIV/AIDS	B- (B-)	B- (B-)	According to literature survey, major infectious diseases in Nepal are malaria, dengue fever, scrub typhus, influenza and HIV. Additionally, COVID-19 pandemic in Nepal had more than 11,000 deaths in 2021.	[During and After Const.] Hired construction workers and skilled equipment operators who are coming from other areas and foreign countries may establish contact with inhabitants and spread infectious diseases. Additionally, puddles in the construction area and insufficient drainage will provide a habitat for dengue carrier mosquitoes.	Inflow of workers during construction may provide opportunity for spreading infection diseases. Additionally, insufficient and inappropriate drainage and maintenance during construction may also provide habitats for mosquito larvae. However, implementation of mitigation measures must prevent and minimize these adverse impacts. Thus, the project is not likely to give serious impacts on them.
	28	Labor environment including work safety	B- (B-)	- (-)	The rights of employees and obligations of employers in Nepal are prescribed in the Labor Act (2017). Employers are obliged to supply safety equipment, such as helmets and safety shoes, at construction sites; however, there are some cases where employees work without safety devices.	[During const.] Working without considering labor laws and regulations in the construction area may cause accident. For instance, working without using helmet and working boots increase the risks of head and foot injuries.  [After Const] No impacts are expected because there will be no related labor work in the project area.	[During const.] Relevant laws such as Labor Act 2017 in Nepal, IFC Standards, and related guidelines of FIDIC (International Federation of Consulting Engineers) shall be applied to maintain employees/workers' safety during construction. The labor environment and safety will be secured in accordance with the above laws and international standards.

Area	No.	Item (Nepal Item)	Rating Scoping Stage (After Analysis)		Summary of Result		
			Pre and During Const.	Operation	Baseline (On-Site Measurement)	Forecast	Evaluation
Other	29	Accident  (-)	B- (B-)	B- (B-)	<p>According to statistical data of the Metropolitan Police Report, a total of 166 people died with 229 seriously injured out of a total 9,545 traffic accident cases in 2020. Majority of the reasons for such traffic accidents were speeding, reckless driving, defective vehicles, and flat tires.</p> <p>The number of traffic accidents in 2020 is 187% of 2011 data.</p>	<p>[During Const.] According to the construction plan, construction machines and trucks will be operated for approximately 2 years. Risks of traffic accidents may increase in the project area and surrounding connected roads; thus, mitigation measures shall be prepared.</p> <p>In addition, construction workers and skilled equipment operators who will not be using safety gears, such as helmet, have risks of accidents during construction.</p> <p>[After Construction] During the operation of Trauma and Emergency Center, traffic volume will increase and may cause traffic congestion. Furthermore, number of traffic accident cases may also increase.</p>	<p>[During Const.] Operation of construction machines and vehicles may increase the accident rate in the construction area and on the road where construction machines are used. Also, construction vehicles may use existing local road near residential and commercial areas, thus the number of traffic accidents may increase during construction.</p> <p>Furthermore, construction workers have risks of accidents during construction. Thus, general mitigation measures are necessary for minimizing accidents.</p> <p>[After Construction] Traffic volume will increase on the connected Sindhuli Road, thus proper traffic management will be conducted by the hospital so that the project will not cause traffic congestion and traffic accidents. Such mitigation measures will minimize adverse impacts.</p>

Notes) Rating:

A: Serious impact is expected. B: Some impacts are expected. C: Degree and area of impacts are unknown (further surveys and analysis shall be done) —: Light impact is expected. Thus, baseline surveys and analysis are not necessary. +/-: Positive and Negative Impacts

Source: JICA Study Team



Source: JICA Survey Team based on Google Earth

**Figure 1-9 Site Measurement Points (Air, Noise, Vibration, Underground Water, Surface Water, and Soil)**

### 1-4-1-8 Mitigation Measures and its Cost

Tentative mitigation measures on feasibility study stage are shown below. These mitigation measures shall be updated based on final design and construction plan during detailed design.

In general, costs for these general mitigation measures during construction are included as construction cost.

**Table 1-10 Environmental and Social Mitigation Measures**

Area	No.	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
Pollution	1	Air Pollution	<input type="checkbox"/> Water sprinkling shall be carried out in construction area and connected road, if required. <input type="checkbox"/> Periodic cleaning shall be done for connected public roads	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MoHP
	2	Water pollution	<input type="checkbox"/> Turbid water from unpaved construction area shall be treated in sedimentation pond and discharged to the river, if required <input type="checkbox"/> Waste oil of construction machines shall be stored and disposed to designated site or by the licensed agent. <input type="checkbox"/> Construction machines shall be maintained so as not to leak oil in the basecamp site. <input type="checkbox"/> Provision of sanitation facilities, if required <input type="checkbox"/> Domestic wastewater and night soil from construction area shall be treated and discharged to designated site and facilities.	<input type="checkbox"/> Effluent from the Trauma and Emergency Center shall be treated by appropriate sewerage facilities and discharged to the river	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	3	Waste	<input type="checkbox"/> Waste soil from construction area shall be reused or disposed to designated landfill site <input type="checkbox"/> Waste oil of the construction machines is collected and disposed at licensed agent. <input type="checkbox"/> Waste chemicals and hazardous materials are stored at contractor's facility and disposed by licensed agent <input type="checkbox"/> Domestic solid wastes shall be collected and disposed by the Municipality. <input type="checkbox"/> Domestic wastewater and night soil shall be treated and/or collected by licensed agent.	<input type="checkbox"/> Domestic waste from the Trauma and Emergency Center shall be collected and disposed to designated landfill site by the Municipality <input type="checkbox"/> Medical waste shall be treated in the Trauma and Emergency Center, and then collected by the licensed agent and disposed at the designated landfill site.	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	4	Soil Contamination and Sediment	<input type="checkbox"/> Excavated soil shall be analyzed and confirmed if its quality is under standard values. Polluted soil shall be treated and used as construction material, if excavated soil is not polluted. <input type="checkbox"/> Construction machines shall be maintained so as not to leak oil in the construction site. <input type="checkbox"/> Waste oil of the construction machines is collected and disposed at licensed agent <input type="checkbox"/> Waste chemicals and hazardous materials are stored at contractor's facility and disposed at licensed agent	<input type="checkbox"/> Implementation of wastewater treatment by the sewerage facilities <input type="checkbox"/> Appropriate waste management including medical waste (use the same collection and management process of Dhulikhel Hospital)	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP

Area	No.	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
	5	Noise and Vibration	<input type="checkbox"/> Construction activities and operation of construction machines shall be limited during daytime and weekdays <input type="checkbox"/> Construction machines shall be well maintained and checked every day <input type="checkbox"/> Information disclosure, such as construction schedule and activities, in advance to surrounding communities	<input type="checkbox"/> Installation of power generator inside of the building so as not to cause noise pollution	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
Natural Environment	10	Ecosystem	<input type="checkbox"/> Appropriate management of hazardous materials such as oil and waste. Domestic garbage shall be stored properly so that these will not be eaten by animals especially birds.	<input type="checkbox"/> Appropriate management of domestic and medical wastes. Domestic garbage shall be stored so that these will not be eaten by animals especially birds.	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	12	Topography and Geology	<input type="checkbox"/> Installation of slope protection and retaining wall with appropriate measures	<input type="checkbox"/> Appropriate maintenance of the installed slope protection	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
Social Environment	13	Involuntary Resettlement	<input type="checkbox"/> Holding consultation meetings for understanding of compensation policy. <input type="checkbox"/> Implementation of adequate compensation in accordance with ARAP based on the JICA Guidelines.	<input type="checkbox"/> Monitoring based on ARAP	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	14	The Poverty				
	18	Water Usage	<input type="checkbox"/> Alternative measures for water provision shall be prepared if water level and water quality at the nearest well change during construction.	<input type="checkbox"/> Alternative measures for water provision shall be prepared if water level and water quality at the nearest well change	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	25	Gender	<input type="checkbox"/> Provision of job opportunities and fair salary for any gender. <input type="checkbox"/> At least 10% of female workers should be hired as simple workers.	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MOHP
	26	Rights of Children	<input type="checkbox"/> No employment under the age of 18 shall be followed. [Article 6.21 "Child Labor" of Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) and General Conditions/International Federation of Consulting Engineers (FIDIC)]	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MOHP

Area	No.	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
	27	Infectious Diseases such as HIV/AIDS	<input type="checkbox"/> Installation of sufficient drainage facilities so as not to provide habitat for vector mosquito <input type="checkbox"/> Provision of adequate temporary sanitation facilities <input type="checkbox"/> Enforcement of medical screening and periodic medical check-up for workers <input type="checkbox"/> In order to prevent spread of infectious diseases such as COVID-19, awareness of the workers on this is promoted during construction <input type="checkbox"/> The following shall be followed: Article 6.7, “Health and Safety” of Conditions of Contract for Construction for Buildings and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) General Conditions/ International Federation of Consulting Engineers (FIDIC).	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MOHP
	28	Labor Environment and Safety	<input type="checkbox"/> Relevant laws in Nepal such as Labour Act 2017 shall be followed. <input type="checkbox"/> Additionally, Article 23 of Occupational Health and Safety, Labor and Working Conditions in IFC Performance Standards 2 shall be applied. <input type="checkbox"/> Chapter 6, Staff and Labor, including 6.6 “Facilities for Staff” of Conditions Of Contract For Construction for Building and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) General Conditions/ International Federation of Consulting Engineers (FIDIC) shall be followed	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MOHP
Others	29	Accident	<input type="checkbox"/> Deploying flagman at the gate of construction area and intersections for traffic management <input type="checkbox"/> Installation of safety sign board such as speed limit and residential area in the project area <input type="checkbox"/> Installing fence around the construction site to keep out local people such as children <input type="checkbox"/> Installation of lighting facility in the night time in the construction area <input type="checkbox"/> Restricting mobilization speed to less than 20 km/h in the construction site <input type="checkbox"/> Implementation of safety training for the workers	<input type="checkbox"/> Appropriate traffic management control for users of the Trauma and Emergency Center	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP

Source: JICA Study Team

#### 1-4-1-9 Preparation of Environmental Management Plan (EMP)

In general, EMP consists of i) mitigation measures and ii) monitoring plan. Tentative EMP is shown below.

##### (1) Mitigation Measures

Mitigation measures in EMP is shown in Table 1-10.

## (2) Environmental Monitoring Plan

### 1) Monitoring Items, Frequency, and Estimated Cost

Tentative monitoring items, method, location and frequency is shown below.

**Table 1-11 Environmental Monitoring Plan for Preconstruction and Construction Phases (2 years)**

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target
Pollution	1	Air pollution	TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, Ozone	Base on the indicated methodology in the National Ambient Air Quality Standards for Nepal, 2012	<b>2 Locations</b> Where baseline monitoring was carried out. (Dhulikhel Hospital and project site)	<b>1 time / year x 2 years</b> (Dry season)	<b>2.0</b> (1 time /year x 500 USD / point x 2 points x 2 years)	<b>National Ambient Air Quality Standards for Nepal, 2012</b> 1. <b>Total Suspended Solid (TSP)</b> · 24 hours: 230 µg/m <sup>3</sup> 2. <b>PM<sub>10</sub> (Ø&lt;10µm)</b> · 24 hours: 120 µg/m <sup>3</sup> 3. <b>PM<sub>2.5</sub> (Ø&lt;2.5µm)</b> · 24 hours: 40 µg/m <sup>3</sup> 4. <b>Sulphur Dioxide (SO<sub>2</sub>)</b> · 24 hours: 70 µg/m <sup>3</sup> · Annual: 50 µg/m <sup>3</sup> 5. <b>Nitrogen Dioxide (NO<sub>2</sub>)</b> · 24 hours: 80 µg/m <sup>3</sup> · Annual: 40 µg/m <sup>3</sup> 6. <b>Carbon Monoxide (CO)</b> · 8 hours : 10,000 µg/m <sup>3</sup> · 24 hours: 50 µg/m <sup>3</sup> 7. <b>Ozone</b> · 8 hours: 157 µg/m <sup>3</sup>
	2	Water Quality	TSP, pH, temperature, TDS, BOD, Total Coliform	Based on the Nepal Gazette, 30 April 2001 and 23 June 2003 editions And/Or same methodology used in baseline surveys	<b>2 Locations</b> Upstream of construction area and downstream of construction area	<b>2 times / year x 2 years</b> (1 time / Dry and Rainy seasons)	<b>1.6</b> (2 times /year x 200 USD / point x 2 points x 2 years)	<b>Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water (Land /Inland Surface Water)]</b> 1. <b>TSP</b> : 200 / 50 mg/L 2. <b>pH</b> : 5.5-9.0 / same mg/L 3. <b>Temperature</b> : <40 / same °C 4. <b>TDS</b> : no standard mg/L 5. <b>BOD</b> : 50 / same mg/L
	3	Waste	Volume of waste soil, tree cuttings and domestic garbage	Record volume of generated waste in the project area	<b>Waste Storage and collection points</b>	<b>4 times / year x 2 years</b>	<b>1.6</b> (4 times /year x 200 USD/point x 1 point x 2 years)	<ul style="list-style-type: none"> <li>Generated construction waste and domestic waste shall be reused or disposed at designated site.</li> <li>Follow the Solid Waste Management Act (2011)</li> </ul>
	4	Soil Contamination and Sedimentation Quality	1.Cadmium, 2.Hexavalent chromium, 3.Mercury, 4.Lead, 5.Arsenic, 6.Cyanide, 7.Selenium, 8.Fluorine, 9.Boron	same methodology used in baseline surveys	<b>1 Location</b> Where baseline monitoring was carried out.	<b>1 time (before excavation)</b>	<b>1.0</b> (1 time x 1,000 USD / point x 1 points)	There are no law-based criteria nor international guidelines to be followed, thus following referred standards are proposed (Japanese heavy metal 9 items) 1. Cadmium (45mg/kg) 2. Hexavalent chromium (250 mg/kg) 3. Mercury (15 mg/kg) 4. Lead (150 mg/kg) 5. Arsenic (150 mg/kg) 6. Cyanide (50 mg/kg) 7. Selenium (150 mg/kg) 8. Fluorine (4,000 mg/kg) 9. Boron (4,000 mg/kg)

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target
	5	Noise	Construction noise (dB(A) <sub>L<sub>Aeq</sub></sub> )	Noise: 24 hrs continuous measurement (at least 10 min in an hour x 24 hours)	<b>2 Locations</b> (NV-1 :Dhulikhel Hospital Quadrangle NV-2: Project Site North)	<b>2 times / year x 2 years</b> (2 times / Dry Season)	<b>4.0</b>  (2 times/year x 500 USD / point x 2 years x 2 points)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target. Japanese Standard During Construction [Noise] dB(A) Reference Standard in Japan (Construction Noise) 07:00-19:00: 85 dB(A)
Natural Env.	12	Topography and Geology	Stability of embankment/ retaining wall	Condition of embankment/ retaining wall	Project area	<b>4 times/ year x 2 years</b>	<b>0.8</b>  (4 times /year x 100 USD/time x 2 years)	The embankment and retaining wall do not have any crack nor displacement.
Social Environment	13 14	Involuntary Resettlement and the Poor	Payment and implementation of social assistance in accordance with ARAP	Consultation meeting with and/or survey of the project-affected persons (PAPs)	Affected area	Refer to ARAP monitoring plan	Refer to ARAP monitoring plan	There are no law-based criteria nor international guidelines to be followed, thus the following is established as conservation target  JICA Guidelines: Compensation shall be completed prior to actual construction activities, and livelihood standards shall not get worse.  Note) If compensation regarding land acquisition before construction is implemented, monitoring shall be done by internal and external monitoring bodies.
	18	Water Usage	Impacts on surrounding well (underground water level)	Underground water level	2 wells in the Dhulikhel Hospital	<b>12 times / year x 2 years</b> (every month)	<b>2.4</b> (12 times /year x 100 USD / time x 2 years)	Adverse impacts to the existing wells shall be minimized and/or alternative routes shall be secured as mitigation measures, if water level changes
	27	Infectious diseases such as HIV/AIDS	Number of infected patient such as COVID-19	Confirmation of health check list from contractor	Project area (base-camp site)	<b>4 times / year x 2 years</b> (2 times / year (Rainy and Dry Season)	<b>1.6</b> (4 times /year x 200 USD/time x 2 years)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target Infection diseases are not caused by the project
	28	Labor Environment	Construction workers' condition	Confirmation of safety devices and conditions via interviews	Project area (basecamp site)	<b>4 times / year x 2 years</b> (2 times / Rainy and Dry Seasons)	<b>1.6</b> (4 times /year x 200 USD / time x 2 years)	Following laws and guidelines shall be followed 1. The Labor Act 2017 2. IFC Performance Standard 2, Labor and Working Conditions (FIDIC 2010)
Other	29	Accident	Number of accidents	Confirmation of accident list from local government/ police department	Project area	<b>4 times / year x 4 years</b> (2 times / Rainy and Dry Season)	<b>1.6</b> (4 times /year x 200 USD / time x 2 years)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target Any accidents are not caused by construction activities.

**Total Cost During Construction: 18,200 (USD) for 2 years (during construction)**

Remarks

\*1: Frequency and timing of monitoring shall be modified at detailed design stage

\*2: The cost indicates direct cost, not including consultant fee, overhead and personal expense

Source: JICA Survey Team



Environmental monitoring survey plan for operational phase is proposed as follows. Proposed monitoring period is at least three (3) years.

**Table 1-12 Environmental Monitoring Plan After Construction Phase (3 Years)**

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target
Pollution	1	Air pollution	TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, Ozone	Based on the indicated methodology in the National Ambient Air Quality Standards for Nepal, 2012	<b>2 Locations</b> Where baseline monitoring was carried out.	<b>2 times / year x 3 years</b> (Dry season and rainy season)	<b>6.0</b>  (2 times /year x 500 USD / point x 2 points x 3 years)	<b>National Ambient Air Quality Standards for Nepal, 2012</b> 1. <u>Total Suspended Solid (TSP)</u> · 24 hours: 230 µg/m <sup>3</sup> 2. <u>PM<sub>10</sub> (Ø&lt; 10µm)</u> · 24 hours: 120 µg/m <sup>3</sup> 3. <u>PM<sub>2.5</sub> (Ø&lt; 2.5µm)</u> · 24 hours: 40 µg/m <sup>3</sup> 4. <u>Sulphur Dioxide (SO<sub>2</sub>)</u> · 24 hours: 70 µg/m <sup>3</sup> · Annual: 50 µg/m <sup>3</sup> 5. <u>Nitrogen Dioxide (NO<sub>2</sub>)</u> · 24 hours: 80 µg/m <sup>3</sup> · Annual: 40 µg/m <sup>3</sup> 6. <u>Carbon Monoxide (CO)</u> · 8 hours: 10,000 µg/m <sup>3</sup> · 24 hours: 50 µg/m <sup>3</sup> 7. <u>Ozone</u> 8 hours: 157 µg/m <sup>3</sup>
	2	Water Quality	pH, BOD, SS, Total Coliform	Based on the Nepal Gazette, 30 April 2001 and 23 June 2003 editions and/or use of same methodology of baseline surveys	<b>2 Locations</b> Upstream of construction area and downstream of construction area	<b>2 times / year x 3 years</b> (Dry and Rainy season)	<b>2.4</b>  (2 times /year x 200 USD /point x 2 points x 3 years)	<b>Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water (Land /Inland Surface Water))</b> 1. <u>TSP</u> : 30-200 / 50 mg/L 2. <u>pH</u> : 5.5-9.0 / same mg/L 3. <u>Temperature</u> : <40 / same °C 4. <u>TDS</u> : no standard mg/L 5. <u>BOD</u> : 50 / same mg/L
	3	Waste	Volume of domestic waste / medical waste /night soil from the facilities	Record volume of generated waste from facilities	<b>Waste Storage and collection points</b>	<b>2 times / year x 3 years</b>	<b>1.2</b>  (2 times /year x 200 USD/time x 3 years)	Follow the Solid Waste Management Act (2011) Generated construction waste and domestic waste shall be reused or disposed at designated site.
	4	Soil Contamination and Sedimentation Quality	1.Cadmium, 2. Hexavalent chromium, 3. Mercury, 4. Lead, 5. Arsenic, 6. Cyanide, 7. Selenium, 8. Fluorine, 9. Boron	Use of same methodology of baseline surveys	<b>1 Location</b>  Where baseline monitoring was carried out.	<b>1 time</b>	<b>3.0</b>  (1 time/year x 1,000 USD / point x 1 point x 3 years)	There are no law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal, 9 items) 1. Cadmium (45mg/kg) 2. Hexavalent chromium (250 mg/kg) 3. Mercury (15 mg/kg) 4. Lead (150 mg/kg) 5. Arsenic (150 mg/kg) 6. Cyanide (50 mg/kg) 7. Selenium (150 mg/kg) 8. Fluorine (4,000 mg/kg) Boron (4,000 mg/kg)
	5	Noise	Ambient Noise (dB(A) <sub>L<sub>Aeq</sub></sub> )	Noise: 24 hrs continuous measurement (at least 10 min in an hour x 24 hours)	<b>2 Locations</b> (NV-1: Dhulikhel Hospital Quadrangle NV-2: Project Site North)	<b>2 times / year x 3 years</b> (2 times / Dry Season)	<b>6.0</b>  (2 times/year x 500 USD / point x 3 years x 2 points)	Mixed Residential (Ministry of Environment, Science and Technology, Nepal Gazette 2069-07-13/IFC) Daytime 6:00-18:00 63 dB(A)/70 dB(A) Nighttime 18:00-6:00 55 dB(A) / 70 dB(A)
Natural Env.	12	Topography and Geology	Stability of embankment / retaining wall	Condition of embankment / retaining wall	Project area	<b>2 times/ year x 3 years</b>	<b>1.8</b>  (2 times /year x 100 USD/time x 3 years)	The embankment and retaining wall do not have any crack.

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target
Social Env.	18	Water Usage	Impacts on surrounding well (underground water level)	Underground water level	2 Wells in the Dhulikhel Hospital	<b>2 times / year x 3 years</b> (Dry and rainy seasons)	<b>0.6</b> (2 times /year x 100 USD / time x 3 years)	Adverse impacts to the existing wells shall be minimized and or alternative routes shall be secured as mitigation measures, if water level changes
<b>Total Cost During Construction: 21,000 (USD) for 3 years (After construction)</b>								
Remarks								
*1: Frequency and timing of monitoring shall be modified at detailed design stage								
*2: The cost indicates direct cost, not including consultant's fee, overhead, and personal expenses								

Source: JICA Survey Team

The environmental monitoring sheet in accordance with JICA's Guidelines are shown below. The Project Responsible Authority of Nepal side shall submit the result of environmental monitoring as a part of project status report (PSR) every quarter to JICA.

**Table 1-13 Environmental Monitoring Sheet During Construction Based on the JICA Format**

Item	Parameter Standard	Data by Location (Exceeding Standard)			Major Impacts During Construction, Standard Source, Monitoring Frequency
		Location Date	Air-1 (Project Site)	Air-2 (Project Site)	
Air pollution					[Major Impacts] Dust from project site and access road
	TSP 230 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2022			[Standard Source] National Ambient Air Quality Standards for Nepal, 2012
	PM <sub>10</sub> 120 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2022			[Monitoring Frequency] 1 time / year x 2 years (Dry season)
	PM <sub>2.5</sub> 40 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2022			
	SO <sub>2</sub> 70 $\mu\text{g}/\text{m}^3$	Jul/2021 **/2022			
	NO <sub>2</sub> 80 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2022			
	CO 50 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2022			
	Ozone 157 $\mu\text{g}/\text{m}^3$ (8hrs)	Jul/2021 **/2022			
Water Quality		Location Date	Surface Water-1 (Upstream)	Surface Water-1 (Downstream)	Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water(Land /Inland Surface Water)]  2 times / year x 2 years (1 time / Dry and Rainy seasons)
	TSP 30-200 / 50 mg/L	Jul/2021 **/2022			
	pH 5.5-9.0 / same mg/L	Jul/2021 **/2022			
	Temperature <40 / same °C	Jul/2021 **/2022			
	TDS no standard mg/L	Jul/2021 **/2022			
	BOD 50 / same mg/L	Jul/2021 **/2022			
	Total Coliform 5,000 MPN/100 mL (Japanese Standard)	Jul/2021 **/2022			
Waste	Waste soil (accumulated m <sup>3</sup> )	**/2022			Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
	Domestic garbage (basecamp, if any)	**/2022			

Item	Parameter Standard	Data by Location (Exceeding Standard)				Major Impacts During Construction, Standard Source, Monitoring Frequency
		Location Date	Soil-1 (Project Site)			
Soil Contamination and Sedimentation Quality	Cadmium 45 mg/kg	Jul/2021				There are not law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal 9 items)  1 time (Before excavation)
		**/2022				
	Hexavalent Chromium 250 mg/kg	Jul/2021				
		**/2022				
	Mercury 15 mg/kg	Jul/2021				
		**/2022				
	Lead 150 mg/kg	Jul/2021				
		**/2022				
	Arsenic 150 mg/kg	Jul/2021				
		**/2022				
Cyanide 50 mg/kg	Jul/2021					
	**/2022					
Selenium 150 mg/kg	Jul/2021					
	**/2022					
Fluorine 4,000 mg/kg	Jul/2021					
	**/2022					
Boron 4,000 mg/kg	Jul/2021					
	**/2022					
Noise	Construction noise (dB(A) <sub>L<sub>Aeq</sub></sub> ) 85 dB(A)	Location Date	NV-1 (Project Site North)	NV-2 (Project Site South)	NV-3 (DH Quadrangle)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target: Japanese Standard during Construction [Noise] dB(A) Reference standard in Japan (construction noise) 07:00-19:00: 85 dB(A)
		Jul/2021	Day 67/ Night 61	Day 65/ Night 62	Day 67/ Night 61	
		**/2022			No need for monitoring	
Topography and Geology	Stability of embankment / retaining wall	Condition of embankment/retaining wall				The embankment and retaining wall do not have any crack
Involuntary Resettlement	Payment and implementation of social assistance in accordance with ARAP	Confirmation of conflicts and claims from resettlers Confirmation of livelihood including income				The resettler keeps their quality of life after resettlement
Infectious Diseases such as HIV/AIDS	Number of infected patients such as those of COVID-19	Construction workers				Not to cause infectious diseases in the project activities
Labor Environment and Accidents	Construction workers' condition	Number of accidents for the project				Follow the Labor Act 2017

Source: JICA Survey Team

**Table 1-14 Environmental Monitoring Sheet After Construction Based on the JICA Format**

Item	Parameter and Standard	Data by Location (Exceeding Standard)				Major Impacts During Construction, Standard Source, Monitoring Frequency
		Location Date	Air-1 (Project Site)	Air-2 (Project Site)	Air-3 (Inside of DH)	
Air pollution	TSP 230 $\mu$ g/m <sup>3</sup> (24 hrs)	Jul/2021				[Major Impacts] Dust from project site and access road  [Standard] National Ambient Air Quality Standards for Nepal, 2012  [Monitoring Frequency] 1 time / year x 2 years (Dry season)
		**/2022				
	PM <sub>10</sub> 120 $\mu$ g/m <sup>3</sup> (24 hrs)	Jul/2021				
		**/2022				
	PM <sub>2.5</sub> 40 $\mu$ g/m <sup>3</sup> (24 hrs)	Jul/2021				
**/2022						
SO <sub>2</sub> 70 $\mu$ g/m <sup>3</sup>	Jul/2021					
	**/2022					

Item	Parameter and Standard	Data by Location (Exceeding Standard)				Major Impacts During Construction, Standard Source, Monitoring Frequency
	NO <sub>2</sub> 80 µg/m <sup>3</sup> (24 hrs)	Jul/2021				
		**/2022				
	CO 50 µg/m <sup>3</sup> (24 hrs)	Jul/2021				
	**/2022					
Ozone 157 µg/m <sup>3</sup> (8 hrs)	Jul/2021					
	**/2022					
Water Quality		Location Date	Surface Water-1 (Upstream)	Surface Water-1 (Downstream)		Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water (Land /Inland Surface Water])  2 times / year x 2 years (1 time / Dry and Rainy seasons)
	TSP 30-200 / 50 mg/L	Jul/2021				
		**/2022				
	pH 5.5-9.0 / same mg/L	Jul/2021				
		**/2022				
	Temperature <40 / same °C	Jul/2021				
		**/2022				
	TDS no standard mg/L	Jul/2021				
	**/2022					
BOD 50 / same mg/L	Jul/2021					
	**/2022					
Total Coliform 5,000 MPN/100mL (Japanese Standard)	Jul/2021					
	**/2022					
Waste	Waste soil (accumulated m <sup>3</sup> )	**/2022				Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
	Domestic garbage (basecamp, if any)	**/2022				
Soil Contamination and Sedimentation Quality		Location Date	Soil-1 (Project Site)			There are not law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal 9 items)  1 time (Before excavation)
	Cadmium 45 mg/kg	Jul/2021				
		**/2022				
	Hexavalent Chromium 250 mg/kg	Jul/2021				
		**/2022				
	Mercury 15 mg/kg	Jul/2021				
		**/2022				
	Lead 150 mg/kg	Jul/2021				
		**/2022				
	Arsenic 150 mg/kg	Jul/2021				
		**/2022				
Cyanide 50 mg/kg	Jul/2021					
	**/2022					
Selenium 150 mg/kg	Jul/2021					
	**/2022					
Fluorine 4,000 mg/kg	Jul/2021					
	**/2022					
Boron 4,000 mg/kg	Jul/2021					
	**/2022					
Noise		Location Date	NV-1 (Project Site North)	NV-2 (Project Site South)	NV-3 (DH Quadrangle)	Mixed Residential (Ministry of Environment, Science and Technology, Nepal Gazette 2069-07-13/IFC) Daytime 6:00-18:00 63 dB(A) /70 dB(A) Nighttime 18:00-6:00 55 dB(A) / 70 dB(A)
	Ambient noise Daytime 6:00-18:00 63 dB(A) /70 dB(A) Nighttime 18:00-6:00 55 dB(A) / 70 dB(A)		Day 67/ Night 61	Day 65/ Night 62	Day 67/ Night 61	
		Jul/2021			No need for monitoring	
	**/2022					

Item	Parameter and Standard	Data by Location (Exceeding Standard)				Major Impacts During Construction, Standard Source, Monitoring Frequency
Topography and Geology	Stability of embankment / retaining wall	Condition of embankment/retaining wall				The embankment and retaining wall do not have any crack.
Involuntary Resettlement	Payment and implementation of social assistance in accordance with ARAP	Confirmation of conflicts and claims from resettlers Confirmation of livelihood including income				The resettler keeps their quality of life after resettlement
Water Use	Water level does not drop in the project area and surrounding area	Location	New Well-1	New Well-2	Dulikhel Hospital	Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
		Date				
		**/2022				
		**/2023				

Source: JICA Survey Team

## 2) Institutional Framework for the Environmental Monitoring

### During Construction

The objectives and design of the EMP and Environmental Monitoring Plan are described in the earlier sections of this chapter. There is a necessity to form a proper institutional framework for the effective implementation of the formulated environmental management and monitoring plan. The elements of this institutional framework will coordinate and work with each other throughout the project, i.e., during pre-construction, construction and operation stages.

The implementation of formulated environmental mitigation measures comes with a cost, so the budgeting of EMP is necessary, and also the financial source that will provide this budget is discussed in this section.

The suggested elements of institutional framework for implementing EMP during construction will be as follows:

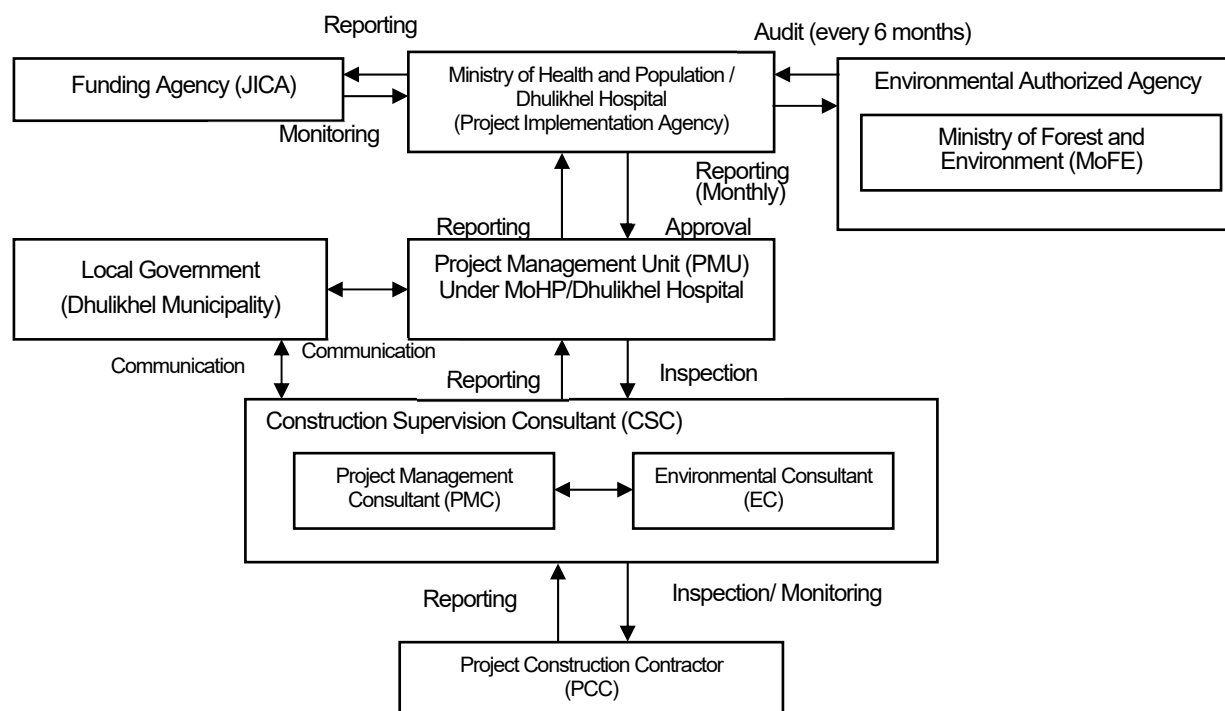
- Project Management Unit (PMU) under Ministry of Health and Population (MoHP)
- Construction Supervision Consultant (CSC)
- Project Management Consultant (PMC)
- Environmental Consultant (EC)
- Project Construction Contractor - Construction Company (PCC)
- Authorized Environmental Agency [Ministry of Forest Environment (MoFE)]
- Local Government –Dhulikhel Municipality
- Funding Agency – JICA

The above stated elements comprised the “Institutional Framework” that will work together to effectively implement the formulated Environmental Management Plan. The roles and responsibilities of these elements are given in Table 1-15.

**Table 1-15 Environmental Management Organization During Construction**

Name of Organization	Roles and Responsibilities
Project Management Unit under Dhulikhel Hospital/ MOHP (PMU)	Initiate the coordination process among the concerned organizations (Elements of Institutional Framework) for EMP implementation. Management of EMP in association with CSC Review and approve monthly Environmental Report from CSC and sending the report to MoHP and MoFE
Construction Supervision Consultant (CSC)	CSC works in association with Project Construction Contractor (PCC) and the Environmental Consultant (EC) on a full-time basis at the project site office. PMC mainly looks after managing engineering and construction-related activities.
Environmental Consultant (EC)	EC inspects the implementation of mitigation measures and environmental monitoring conducted by PCC. EC reviews and corrects Environmental Monitoring Report (EMR) submitted by PCC and then submit it to PMU after inspection.
Project Construction Company (PCC)	PCC implements approved EMP (mitigation measures) under observation of PMC and EC. PCC submits EMR for all conducted mitigation measures on site to the EC on weekly and/or monthly basis.
Authorized Environmental Agency (MoFE)	Inspect and audit periodical environmental monitoring report (once 6 months) Inspect the implementation of mitigation measures on site, as required Request for necessary action and additional surveys and implementation of mitigation measures, if required
Local Government (Dhulikhel Municipality)	Monitor construction activities Request for necessary action and additional surveys and implementation of mitigation measures, if required
Funding Agency (JICA)	Review periodic environmental monitoring report Request for necessary action and additional surveys and implementation of mitigation measures, if required

Source: JICA Study Team



Source: JICA Survey Team

**Figure 1-10 Environmental Management Implementing Organization During Construction**

**After Construction**

The major authorities for implementing the EMP after construction are as follows:

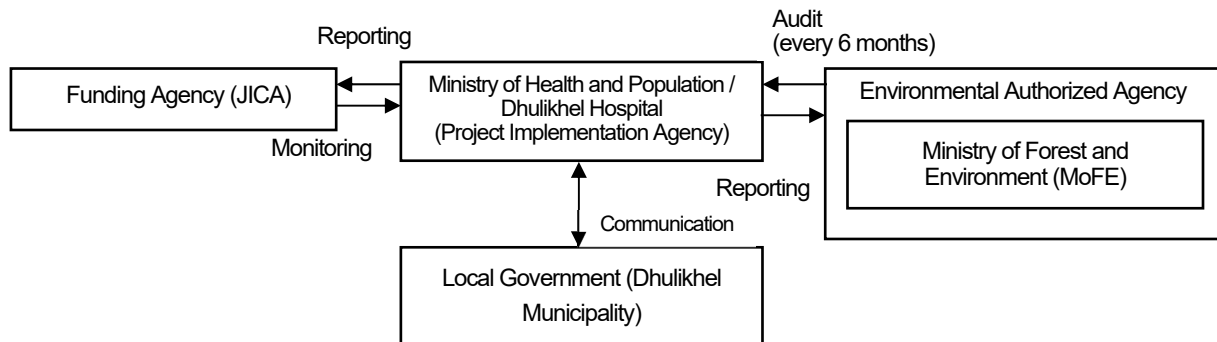
- Responsible Agency: Ministry of Health and Population (MoHP) and Dhulikhel Hospital
- Local Government: Dhulikhel Municipality
- Authorized Environmental Agency (MoFE)
- Funding Agency – JICA

The roles and responsibilities of each organization are shown below:

**Table 1-16 Environmental Management Organization After Construction**

Name of Organization	Roles and Responsibilities
Ministry of Health and Population (MoHP)/ Dhulikhel Hospital	Implementation of Environmental Monitoring in accordance with approved EMP in the EIA Preparation of Monitoring Report and Submission to MoEF
Local Government (Dhulikhel Municipality)	Monitor project site (natural condition and social condition) Request for necessary action and additional surveys and implementation of mitigation measures, if required
Authorized Environmental Agency (MoFE)	Inspect and audit the periodic environmental monitoring report Inspect the implementation of mitigation measures on site, as required Request for necessary action and additional surveys and implementation of mitigation measures, if required
Funding Agency (JICA) Regional Office	Review the quarterly environmental report and monthly report Request for necessary action and additional surveys and implementation of mitigation measures, if required

Source: JICA Survey Team



Source: JICA Survey Team

**Figure 1-11 Environmental Management Implementing Organization After Construction**

### 1-4-1-10 Implementation of Public Consultation

#### (1) 1st Public Consultation on the Scoping Stage

The result of the 1<sup>st</sup> Local Stakeholder Meeting is shown below.

In the meeting, Dhulikhel Hospital and MoHP, in cooperation with JICA Study Team, had explained the outline of the project, its positive and negative impacts, and tentative project schedule.

Some comments and questions were raised by the attendees. Nevertheless, all participants agreed to proceed with the project and formulated consensus for the project.



**Table 1-17 Overview of the Public Consultation**

Name of Meeting (date and venue)	Agenda	Major Attendees	Methodology
Scoping Meeting (1 <sup>st</sup> Local Stakeholder Meeting)  (11:40-12:40 / 23 <sup>rd</sup> of September 2021 at the Conference Room of the Dhulikhel Municipality)	Opening Remarks Project Outline Alternative Analysis of the Building Location Positive and Negative Impacts of the Project Opinion Exchange Closing Remarks	Participants: Local people, Kathmandu University, Dhulikhel Municipality, Dhulikhel Hospital, JICA Study Team Total Number of Participants: 20 (Males: 17, Females: 3)	1) Information disclosure Direct informing 2) Language used was Nepali.

Source: JICA Survey Team

The opinions, questions, and corresponding answers during the discussion session are shown below.

**Table 1-18 Opinions Raised in the Public Consultation (23<sup>rd</sup> of September 2021)**

No	Major Opinion and Answer				
	Question/Comment		Answer		Reaction of Questioner
	Name/Position	Question/Comment	Position	Answer	
1	Engineer (male)	How will you manage the hospital waste?	Dhulikhel Hospital	Proposed Trauma Center will follow same process in waste management of Dhulikhel Hospital.	Accepted the answer
2	Engineer (male)	How will you manage the waste water?	Dhulikhel Hospital	Still not final but planning to manage the wastewater in Dhulikhel Hospital wastewater treatment plant.	Accepted the answer
3	Engineer (male)	How will you manage the supply of drinking water in the Trauma Center?	Dhulikhel Hospital	Drinking water will be supplied from Dhulikhel municipality pipeline and also well water will be used to fulfill water demand.	Accepted the answer
4	Local People (female)	What about demarcation of Raj Kulo (boundary) and land acquisition process?	Dhulikhel Hospital	Demarcation of Rajkulo will be fixed very soon with presence of local people, and private land is already purchased.	Accepted the answer
5	Deputy Mayor (female)	The Trauma Center Building should be disabled friendly as well as child friendly, and it should have a separate room for breast feeding.	Dhulikhel Hospital	The Trauma Center Building will be built with disabled friendly features (construct ramp, lift, etc.), and there will be a separate room for breast feeding.	Accepted the answer
6	Ward Chief (male)	Employment opportunities should be provided to the local people according to their qualifications.	Dhulikhel Hospital	Hospital management team will decide about priority to give employment opportunities to the local people.	Accepted the answer

Source: JICA Survey Team

## (2) 2nd Public Consultation During the Draft EIA Stage

The result of the 2<sup>nd</sup> Local Stakeholder Meeting, which is called as “Public Hearing” in the EIA law, is described below.

In the meeting, Dhulikhel Hospital and MoHP, in cooperation with JICA Study Team (subcontractor), had explained the updated outline of the project, predicted positive and negative impacts, and tentative project schedule. Some comments and questions were raised by the attendees of the meeting, nevertheless, all participants agreed to proceed with the project and formulated a consensus.

**Table 1-19 Overview of the Public Consultation**

Name of Meeting (Date and Venue)	Agenda	Major Attendees	Methodology
Public Hearing  (10:45-12:30 / 14th of June 2022 at the Conference Room of Dhulikhel Municipality)	Opening Remarks Project Outline Alternative Analysis of the Building Location Environmental Impacts, Enhancement and Mitigation Measures Environmental Management Plan Environmental Monitoring Plan Environmental Auditing Plan Conclusion and Commitment Exchange of Opinions Closing Remarks	Participants: Local People, Dhulikhel Municipality, Dhulikhel Municipality Ward Number 6, Dhulikhel Hospital Number of Total Participants: 44 (Males: 41, Females: 3)	1) Information disclosure Direct informing 2) Language used was Nepali.

Source: JICA Survey Team

The opinions, questions, and corresponding answers during the discussion session are shown below.

**Table 1-20 Opinions Raised in the Public Consultation (14<sup>th</sup> of June 2022)**

No	Major Opinions and Answers				Reaction of Questioner
	Question/Comment		Answer		
	Name/Position	Question/Comment	Position	Answer	
1	Engineer (male)	How will you manage solid waste?	Dhulikhel Hospital	Trauma Center will follow Healthcare Waste Guideline 2014 to manage solid waste. Segregation of waste from the source will be implemented and infectious waste will be autoclaved. Also, the 3R principle will be followed.	Accepted the answer
2	Engineer (male)	How will you manage the liquid waste?	Dhulikhel Hospital	Proposed Trauma Center will follow same process as in liquid waste management in Dhulikhel Hospital, for which certain land area is allocated for the installation of wastewater treatment plant.	Accepted the answer
3	Local People (Male)	How will you manage drinking water in the Trauma Center?	Dhulikhel Hospital	Drinking water will be supplied from Dhulikhel municipality pipeline and also groundwater will be used to fulfill water demand.	Accepted the answer
4	Local People (Male)	Project building should be constructed only after approval of the drawing.	Dhulikhel Hospital	Building of project will be constructed only after the approval of drawing by the municipality.	Accepted the answer
5	Local People (Male)	How will you manage parking issue?	Dhulikhel Hospital	Sufficient land is allocated for parking.	Accepted the answer
6	Local People (Male)	How will you dispose wastewater without affecting the agricultural sector?	Dhulikhel Hospital	Research work is going on to construct wastewater treatment plant.	Accepted the answer
7	Ward Female Member	Employment opportunity should be provided to the local people according to their qualifications.	Dhulikhel Hospital	Hospital management team will decide about priority to give employment opportunities to the local people.	Accepted the answer
8	Ward Chief (Male)	Proper management of mercury waste and canteen waste should be done.	Dhulikhel Hospital	Mercury free instrument and equipment like thermometer and BP set will be used.	Accepted the answer

Source: JICA Survey Team

## **1-4-2 Social Considerations (Land Acquisition and Resettlement)**

During the preparatory survey, the land acquisition payments for two plots have been carried out by Dhulikhel Hospital in April and December 2021. In addition, after preparation of Abbreviated Resettlement Action Plan (ARAP), Dhulikhel Hospital side has paid compensation for the resettlement and relocation of buildings in September 2022. In both cases, the procedure and compensation policy based on JICA guidelines were applied, the affected persons and household agreed and the payment was completed.

### **1-4-2-1 Necessity of Land Acquisition and Resettlement**

This project involves the construction and development of a trauma and emergency center at Dhulikhel Hospital. The alternative plan selected at the initial stage of the survey (i.e., the stage of considering alternatives for the project location) indicated land acquisition and small-scale resettlement, so an Abbreviated Resettlement Action Plan (ARAP) was required and prepared.

However, during the period of the study, Nepalese side confirmed that the land acquisition and resettlement had been carried out in accordance with the policy of the formulated ARAP. Therefore, no new land acquisition or resettlement is expected after February 2023.

### **1-4-2-2 Policy and Legal Framework**

#### **(1) Land Acquisition Act**

The Land Acquisition Act, 1977 has been enacted to integrate the laws for Acquisition of Land, 1962, which was partially updated in 1993 by its subsequent amendment. The process of land acquisition for public purpose has two types.

In this project, since there are few private land owners, the hospital will negotiate directly. Additionally, based on the Land Acquisition Guidelines (1989), related governmental organizations shall grasp the living standards of affected households. In addition, the amount of compensation for land and buildings is determined with reference to similar market prices. This guideline also includes items for livelihood recovery measures.

#### **1) Establishment of Compensation Determination Committee**

In the case of public works projects that require negotiations with a large number of landowners, an organization called the Compensation Determination Committee (CDC) will be established to negotiate with the landowners.

#### **2) Direct Negotiation with Landowners**

In the case of small businesses or individual purchases that require negotiations with a small number of landowners, the business entity negotiates with the landowners themselves in accordance with the Land Acquisition Act clause 27.

**(2) Environmental and Social Management Framework (ESMF), DOR, (2007)**

The project is not categorized as road project, however, the hospital side has agreed to follow this ESMF through discussion with JICA Study Team in April and August, 2021.

This Environmental and Social Management Framework report (ESMF) is prepared for the Department of Roads (DOR) to compile in an overview and guidance manner, various safeguards and compliance aspects of environmental and social issues related with the Sector Wide Road Program and the Priority Investment Plan Study for Nepal’s Strategic Road Network (SRN) planning for 2007 to 2016. The Study commenced in September 2005 and was completed in December 2006. The ESMF intends to provide technical and managerial inputs and guidance into the design of the strategic roads (both designated for rehabilitation and, to lesser extent, to new construction), through identification of key environmental and social issues related to the foreseen projects (hereunder referred as “SRN subprojects”), mitigate potential impacts and concerns, and devise opportunities to enhance the benefits. The framework integrates in a step-wise approach the most important environmental and social considerations into all stages of project preparation, implementation, monitoring, and operation and is applicable to all future subprojects funded under the SRN program. The ESMF is applicable to all proposed subproject activities and through all stages of the subproject cycle, i.e., from pre-planning, planning and design, implementation to post-implementation. The design flow of ESMF activities will be coordinated and integrated into the project cycle.

**(3) Gap Analysis Between Land Act in Nepal and JICA Guidelines**

According to the result of gap analysis between Land Act in Nepal and JICA Guidelines for Environmental and Social Considerations (2010), one of the considerable gaps is on the provision of compensation. Nepal laws and applicable ESMF prescribe that persons who do not have any evidence are not compensated; on the other hand, JICA guidelines stipulates to compensate persons who do not have formal legal rights on the land. However, Nepal side has agreed to follow JICA’s Guidelines for this project.

**Table 1-21 Comparisons Between Laws in Nepal and JICA Guidelines**

No.	JICA Guidelines	Laws and Guidelines in Nepal	Gap Between JICA GL and Laws in Nepal (Lower Column)	Project Policy
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	The adverse impacts can be minimized or avoided or dealt with in positive and constructive ways (1.1.1, ESMF)	There is no significant difference.	Follow JICA GL
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	-The adverse impacts can be minimized or avoided or dealt with in positive and constructive ways (1.1.1, ESMF)  -Government of Nepal may, if it so deemed necessary, acquire any land at any place for any public	There is no significant difference.	Follow JICA GL

No.	JICA Guidelines	Laws and Guidelines in Nepal	Gap Between JICA GL and Laws in Nepal (Lower Column)	Project Policy
		purpose, subject to compensation under this Act (Article 3, Land Acquisition Act)		
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities, and production levels to pre-project levels. (JICA GL)	Thus, the affected persons in the project will be entitled to various types of compensation and resettlement assistance that will help in the restoration of their livelihoods, at least, to the pre-project standards. (7.3.1, ESMF)	There is no significant difference.	Follow JICA GL  The project considers the assistance to improve or restore the livelihood of project-affected persons.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	When GON requires assets, national law does not specify about the provision of mandatory replacement cost. Therefore, ESMF strongly recommended that: Practical provisions must be made for the compensation for all lost assets to be made at replacement cost without depreciation or reductions for salvage materials. Efforts must be made to assess the real replacement costs of land to the extent possible. A procedure should be established for determining compensation rates accurately plus rigorous efforts to assess the replacement costs and market rates for all assets, including labor costs for construction.	There might be gaps on determination of compensation rate between Nepali side and the JICA Environment Guidelines. In the past cases, deduction and/or using government fixed rate lower than market price is common.	Follow JICA GL  The result is compared with the government's official unit price for determining validity.
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	ESMF referred OP 4.12: The measures (i.e., the RP) include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required.	There is no significant difference.	Follow JICA GL
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	ESMF regulated RAP preparation and disclose to the PAPs	There is no significant difference.	Follow JICA GL The project will hold consultations with the affected people and their communities and sufficient information will be made available to them in advance.

No.	JICA Guidelines	Laws and Guidelines in Nepal	Gap Between JICA GL and Laws in Nepal (Lower Column)	Project Policy
7	In preparing a Resettlement Action Plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	-In Chapter 5, the section of 2.2.1: The Procedural Steps in Road IEEs and EIAs of ESMF, and other sections covers all conditions concerning public participation/consultation. -Domestic EIA procedure supported by some conditions in ESMF requires public consultation meeting.	There is no significant difference.	Follow JICA GL  Consultations will be held at the initial stage and after preparation stage during JICA's preparatory survey.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)			Follow JICA GL  The project considers appropriate explanation when consultations are held by using local language.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)			Follow JICA GL  The project considers the appropriate participation of affected people.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	5.1 and 7.5 of ESMF stipulate the establishment of grievance redress mechanism (GRM)	There is no significant difference.	Follow JICA GL  The project considers the grievance redress mechanism by utilizing the existing administration system to make it convenient for PAPs.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers or others who wish to take advantage of such benefits. (WB OP 4.12 Para. 6)	N/A *Cut-off date is recommended to set as the date of census survey (7.2.3, ESMF)	There is no direct regulation of recommendation regarding the item.	Follow JICA GL  Based on the JICA's Environmental Guidelines, the cut-off date is explained at the 1st stakeholder meeting. In case that certain time, e.g., two years, will have passed since the cut-off-date declaration before land acquisition is commenced, census and other relevant field surveys shall be updated and revised with the latest situation.

No.	JICA Guidelines	Laws and Guidelines in Nepal	Gap Between JICA GL and Laws in Nepal (Lower Column)	Project Policy
12	Eligibility of benefits covers the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under the law), the PAPs who do not have formal legal rights to land at the time of census but have a claim to such land or assets, and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	In the proposed project, the absence of formal titles of the affected persons will not make them eligible for resettlement assistance and rehabilitation. (7.3.1, ESMF)	Nepal laws and applicable ESMF prescribe that the persons who do not have any evidence of land ownership are not compensated. On the other hand, JICA guidelines stipulates to compensate persons who do not have formal legal rights on the land.	Follow JICA GL  The project considers eligibility for assistance of all households whose income sources or assets are confirmed as affected due to project implementation.
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP 4.12 Para. 11)	Not Applicable	Cash for land is the common way of compensation for both formal and informal land cases in Nepal, and PAPs also prefer cash compensation generally.	Follow JICA GL  The project considers the land-based resettlement strategies.
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4.12, para.6)	Not Applicable	The item is not clearly mentioned even in ESMF. Some kinds of assistance have a function to support such transition period.	Follow JICA GL  The project considers the support for the transition period.
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those living below the poverty line, landless, elderly, women and children, ethnic minorities, etc. (WB OP 4.12 Para. 8)	Section 8.3 of ESMF, or the part of Entitlement Matrix, stipulates the consideration scheme for such vulnerable groups.	There is no significant difference.	Follow JICA GL  The project pays particular attention to vulnerable groups.

Source: JICA Survey Team

### 1-4-2-3 Land Acquisition and Resettlement Scope

In the environmental and social reconnaissance, 1 restaurant cottage, 2 residences, and 2 landowners have been observed in the project area. However, the Dhulikhel Hospital side has negotiated and purchased a plot of private land before ARAP surveys. Affected properties are shown below.

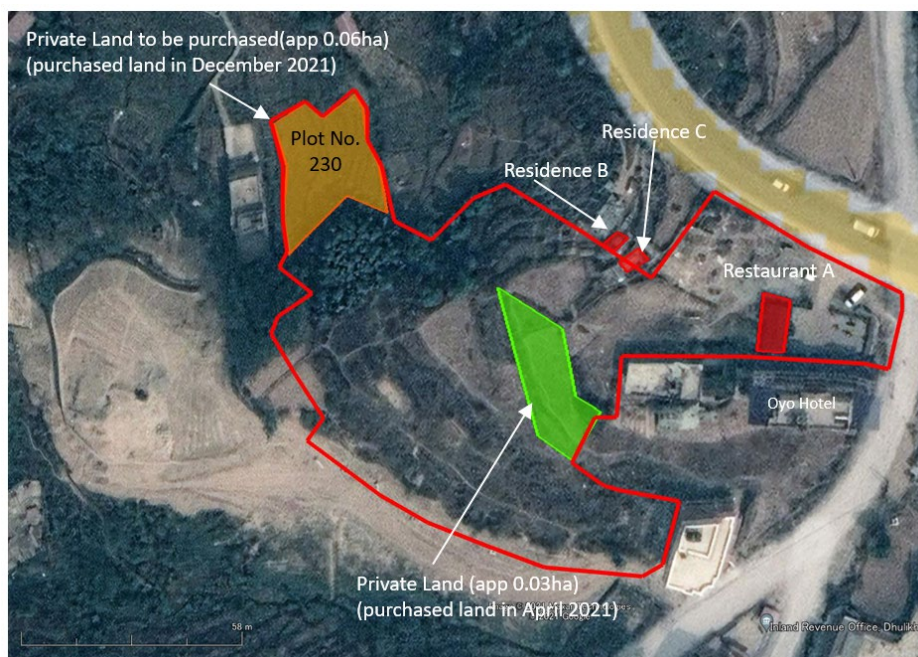
**Table 1-22 Affected Properties by the Project**

Affected Property	Specification	Current Status as of Nov, 2022
Restaurant (Cottage-A)	All structures of the restaurant are located in the Project area (Leased land of Dhulikhel Hospital)	The lease contract between Ministry of Industry and Kathmandu University is for 30 years 9 <sup>th</sup> of June, 2014 Payment was done in Sep. 2022
Residence -B	A part of residence is located in the project area	A family (4 persons) is living in this residence. Payment was done in Sep. 2022



Affected Property	Specification	Current Status as of Nov, 2022
Residence-C	Approximately 50% of residence is located in the project area.	A family (7 persons) is living in this residence. Payment was done in Sep. 2022
Private Land –A (0.03 ha)	This private land plot is located in the center of project area	Dhulikhel Hospital side has purchased at market price and registered this plot 0.03 ha on 13 <sup>th</sup> of April, 2021.
Private Land –B (0.06 ha)	This private land plot is located in the center of project area	App. 0.06 ha is affected

Source: JICA Survey Team



Source: JICA Survey Team

**Figure 1-12 Detailed Layout Plan and Affected Property**

## (1) Summary of Project Impact

### 1) Summary of Project-Affected Households and Persons

As a result of the census survey, it was found that the total number of affected households (PAHs) of the project was 5, and the total number of project-affected persons (PAPs) was 27. Table 1-23 shows the breakdown of the number of affected households and the number of affected persons.

**Table 1-23 Summary of Project Affected Households and Persons**

Affected Item	Affected Number		of which			
	Total		Relocation Households		Vulnerable Households	
	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs
1. Landowner	2	12	0	0	0	0
2. Resident (tenant)	2	11	2	11	2	11
3. Commercial worker (tenant) at cottage restaurant	1	4	1	4	0	0
Total (1+2)	5	27	3	15	2	11

Source: JICA Survey Team

## 2) Summary of Inventory of Loss Assets Survey Results

Summary of the affected properties such as lands, structures, trees, and crops are shown below.

Total PAHs and PAPs are 5 and 27, respectively, and affected land area is approximately 0.09 ha.

**Table 1-24 Summary of Project-Affected Properties**

Affected Item	Affected Number		of which			
	Total		Relocation Households		Vulnerable Households*	
	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs
Land	2	12	0	0	0	0
Structure(including residence)	3	15	3	15	2	11
Trees and Crops	0	0	0	0	0	0
Other Properties (fence/wall secondary structures)	0	0	0	0	0	0
<b>Total (1+2+3+4)*</b>	<b>5</b>	<b>27</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>11</b>

Notes) \*Vulnerable Households: Landless (2 HHs:PAH03 and 04), Living under poverty line (1 HH: PAH03), Elderly (1 HH: PAH04)

Source: JICA Survey Team

**Table 1-25 Summary of Lands to Be Acquired**

No. of Affected Landowners (No.)	Total Affected Area (ha)	Land Use
2	0.09	Open land

Source: JICA Survey Team

**Table 1-26 Inventory of Affected Structures**

No. of Affected Structures	Structure Type	Affected Secondary Structures	Material
2	Residence (tenant land)	Wall, fence	Bamboo, Galvanized iron, and clay-soil
1	Restaurant	Wall, fence	Bamboo, Galvanized iron, and wood

Source: JICA Survey Team

## 3) Summary of Socioeconomic Survey Results

Summary of socioeconomic surveys are shown below.

**Table 1-27 Summary of Socioeconomic Survey Results**

Item	Summary of Results
1) Gender	Males-15; Females- 12
2) Ethnicity (persons)	Ethnic group (Janjati)- 23 persons ; Upper caste (Bramhn, Chhetri, Thakuri)- 4 persons
3) Religion	Hindu (5 HHs)
4) Language	Nepali (5 HHs)
5) Education Level of Household Heads	Bachelor level(1 House head (Hh)), Primary School (1 Hh), Secondary School (1 Hh) , Normal reading and writing (not enrolled in school) Level (2 Hhs)

Item	Summary of Results		
6) Occupation of Household Heads	Business (Private land restaurant owner (2 Hhs), Business (1 Hh), Farmer cum wage earner (2 Hhs)		
7) Annual Income and Expenditure of PAHs	PAH	Annual Income and Expenditure of PAHs	PAH
	PAH01	6.0 million NPR	PAH01
	PAH02	1.8 million NPR	PAH02
	PAH03	0.02 million NPR	PAH03
	PAH04	0.045 million NPR	PAH04
8) Vulnerability	Landless (2 HHS:PAH03 and 04), Household living under poverty line (1 HH: PAH03), Household headed by an elderly (1 HH: PAH04)		
9) Project Acceptability	Accept (if appropriate compensation is provided)		

Notes) Description of vulnerable people: Elderly more than 60 years old, woman head of households, household living under poverty line, disabled people, indigenous people, and landless people.

Source: JICA Survey Team

#### 4) Replacement Cost Study Result

The result of replacement cost study is shown below. The land price was surveyed based on the real transaction price recorded in the Dhulikhel Municipality and indicated price at some real estate offices. On the other hand, cost of residences and restaurant were evaluated directly by the architects and engineers.

**Table 1-28 Result of Replacement Cost Survey of Affected Properties**

Item	Result of Valuation	Result of Validation
Structure	Restaurant Cottage-A (including secondary structures) 281,892 NPR (Relocation Cost*)	Market price without depreciation
	Residence B (including secondary structures) 81,676 NPR (Replacement Cost)	
	Residence C (including secondary structures) 75,487 NPR (Replacement Cost)	
Land	Open land (App. 0.03 ha) along the Sindhuli Road 1. Concluded Price (as of April, 2021) Unit Price : 66,667 NPR/m <sup>2</sup> 2. Local Government Unit Price Unit Price : 2,017 NPR/m <sup>2</sup> 3. Market Price (Average of Real Estate Companies) Unit Price Unit Price : 68,300 NPR/m <sup>2</sup>	The concluded price is higher than government price and market price.
	Open land (App. 0.06 ha) not along the Sindhuli Road 1. Concluded Price (as of September, 2021) Unit Price: 37,736 NPR/ m <sup>2</sup> 2. Local Government Unit Price Unit Price : 2,001 NPR/m <sup>2</sup> 3. Market Price (Average of Real Estate Companies) Unit Price Unit Price : 38,116 NPR/m <sup>2</sup>	

Notes) \* Relocation cost includes dismantling of current structure, transporting of materials from current structure and reassembling at the relocation site.

Source: JICA Study Team

#### 1-4-2-4 Compensation Entitlements and Entitlement Matrix

##### (1) Cut-off Date

The cut-off-date of eligibility refers to the date prior to which the occupation or use of the project area makes residents/users of the same eligible to be categorized as PAPs and be eligible to project entitlements. In the Project, the cut-off dates for titleholders will be the date of notification under the Land Acquisition Act; and for non-titled holders will be the beginning date of the population census, 24<sup>th</sup> of August and 13<sup>th</sup> of November, 2021, respectively. Dhulikhel Hospital side is monitoring the lands in the project site to avoid inflow of informal settlers after the declaration of cut-off date.

##### (2) Entitlement Matrix

The entitlement matrix systematically shows the relations of compensation, which include type of loss, application, person entitled, assistance policy, and responsible entity. The matrix is developed based on the impacts identified through the census survey and other related activities. In this Project, the Entitlement Matrix was prepared as Table 1-29 to show the eligibility conditions and the main compensation measures proposed to PAPs according to the type of impact. It should be noted that depending on the type of impact, the PAP may be eligible for one or more compensation measure.

**Table 1-29 Entitlement Matrix**

	Type of Loss/ Impact	Application	Eligible Persons	Entitlements	Implementation Issues
1	Land				
1.1	Residential or Farm Land	Full or Partial Impact	Landowner/ Occupant or a person who has recognizable right to claim the land	Cash compensation at replacement cost for the affected land area or provide full title to land of equal area and productivity acceptable to owner in the vicinity. Resettlement assistance in lieu of compensation for land occupied (land, other assets, employment) at least restore their livelihood living standard to pre-displacement levels. In the case of farm land, the PAPs will be entitled the cultivation disruption allowance equal to one-year production.	<ul style="list-style-type: none"> <li>a) Valuation for land undertaken by the project authorities should respect the results of replacement cost survey and the RAP supported by JICA's preparatory survey</li> <li>b) Direct negotiation with the landowner can be done for land valuation as per Land Acquisition Act clause 27</li> <li>c) Notice to vacate will be served at least 35 days prior to acquisition.</li> <li>d) Compensation and relevant assistance must be paid and conducted in advance, at least before the notification of relocation</li> </ul>
			Loss of leasehold due to end of agreement before expiry (Tenant)	Allowance for finding of new land is paid for 6 months of rent * if the landlord refunds lease fee, this is not applicable	<ul style="list-style-type: none"> <li>a) Notice to vacate will be served at least 35 days prior to acquisition.</li> <li>b) Compensation and relevant assistance must be paid and conducted in advance at least before the notification of relocation</li> </ul>

	Type of Loss/ Impact	Application	Eligible Persons	Entitlements	Implementation Issues
2	Structure				
2.1	Private Residential House	Loss of partial or full houses	House owner regardless of tenure status	Cash compensation at full replacement cost with no depreciation, according to house type. For houses and structures, the market cost of the materials and labor to build a replacement structure of a similar quality or better than the affected structure. If the owner wants to relocate using the materials of the current building, the cost of dismantling, transporting, and reassembling are paid in cash. Assistance to repair the remaining portion of structure in case of partial impacts, or full compensation is carried out from the view of safety.	<ul style="list-style-type: none"> <li>a) Valuation for structures undertaken by the project authorities on the basis of standard norms of the Department of Urban Development should respect the results of replacement cost survey and the RAP supported by JICA's preparatory survey</li> <li>b) Construction material can be salvaged by PAPs</li> <li>c) Deduction from the full replacement cost is not allowed</li> <li>d) Displaced households will receive a housing displacement allowance and transportation cost.</li> <li>e) Notice of relocation will be given at least 35 days prior to the land clearance</li> <li>f) Compensation and relevant assistance must be paid in advance, at least before the notification of relocation</li> </ul>
2.2	Other Private Structures	Loss of partial or full structure	House owner regardless of tenure status	Same as 2.1	In addition to above conditions in the case of 2.1: <ul style="list-style-type: none"> <li>a) Other structures include: fence, walls, etc.</li> <li>b) Only the case of loss of structures is not eligible for the displacement allowance.</li> </ul>
3	Loss of Business/work/employment				
3.1	Loss of Business (Hotel/ Restaurant other businesses)	Direct impact on the business	Owners of the business (hotel/shop/restaurant/other businesses)	(A) One time cash assistance for the income loss during the period of the business disruption while the remaining structure is being repaired	a) One-time cash assistance will be paid equivalent to two-month's income based on the nature of business for re-establishing the businesses at the alternative premise. Shifting allowance (transport plus loading / unloading charges) will be paid to affected businessmen (if applicable), on actual cost basis. The amount of deposit or advance payment paid by the business tenant to the landlord will be deducted from the payment of the landlord.
3.2	Loss of wages by employees	Income reduction during period of readjustment	Employees of business	(A) One-time financial assistance to hired employees equivalent to 30 days wages to be computed based on local wage rate as determined by the evidence	a) PAPs who are eligible for semi-skilled and unskilled labor will be given priority employment opportunities in the Project's implementation works.

	Type of Loss/ Impact	Application	Eligible Persons	Entitlements	Implementation Issues
4	Rehabilitation Assistance				
4.1	Relocation stabilization assistance		Displaced household	Housing displacement allowance for loss of own residential accommodation.	a) Displaced households will receive a displacement allowance equal to 90 days minimum wage rate as established at the national or local level. b) Allowances will be paid at the time of serving the notice to vacate.
4.2	Special assistance for vulnerable people		Women-headed households, Dalit households, disabled, elderly or more than 60 years old, and households living below the poverty level, and landless households	Special allowance for stabilization of livelihood	a) Cash assistance for 90 days at the local agricultural wage rate for respective district. b) Assistance in re-establishment and improvement of livelihood. c) Preferential employment in the project to the extent possible.
4.3	Transportation Assistance		Household for Relocation	(A) One-time cash assistance for transportation cost for moving	a) The transportation assistance amount will be determined during the RAP updating

Source: JICA Survey Team

#### 1-4-2-5 Grievance Redress Mechanism

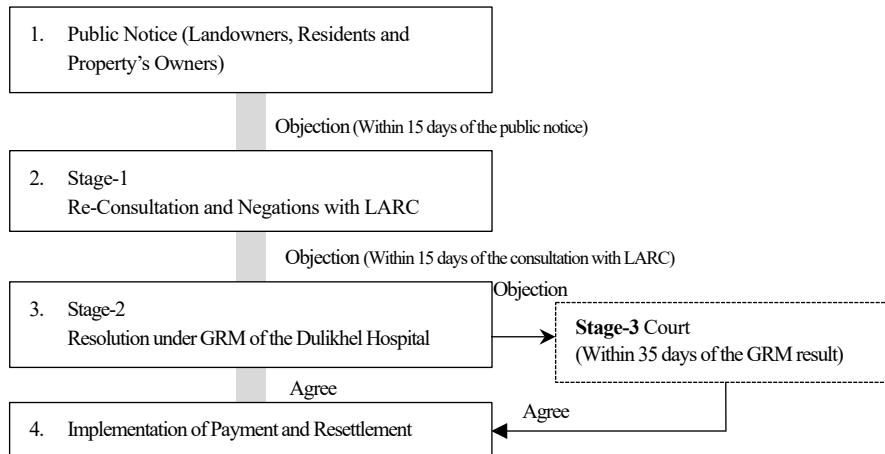
Agencies in charge of implementing the procedure for handling grievance during compensation and land acquisition in the project-affected areas should be established as Grievance Redress Committee (GRC) of the Project. Detailed procedures on handling grievances will be established for the Project to ensure that PAPs have the opportunity to present their complaints about compensation and resettlement. PAPs have formal option to appeal to GRM of the Dhulikhel Hospital or to the court as shown in Table 1-30 and Figure 1-13.

**Table 1-30 Process and Role of Grievance Redress Mechanism**

Stage	Process
Stage-1	Complaints of PAPs on any aspect of compensation, resettlement, or unaddressed losses shall in first instance be settled verbally or in written form in Land Acquisition and Resettlement Committee (LARC) of the Dhulikhel Hospital. The complaint can discuss with member(s) of LARC in an informal meeting. LARC shall explain detailed compensation policy such as the entitlement and eligibility and survey results.
Stage-2	If the conflict(s) between LARC and PAP(s) is not solved, PAP(s) is able to appeal with GRM. The PAP(s) can be accompanied by NGOs or, village/community leader(s) in the discussion of GRM. GRM shall reassess the findings and then arbitrate the complaint.
Stage-3	If the PAP(s) is not satisfied with the decision of the GRM, within 35 days of the complaint, the PAP(s), in his/her last resort, may submit its case to the court.

Source: JICA Survey Team

Proposed mechanism for grievance resolution is given below:

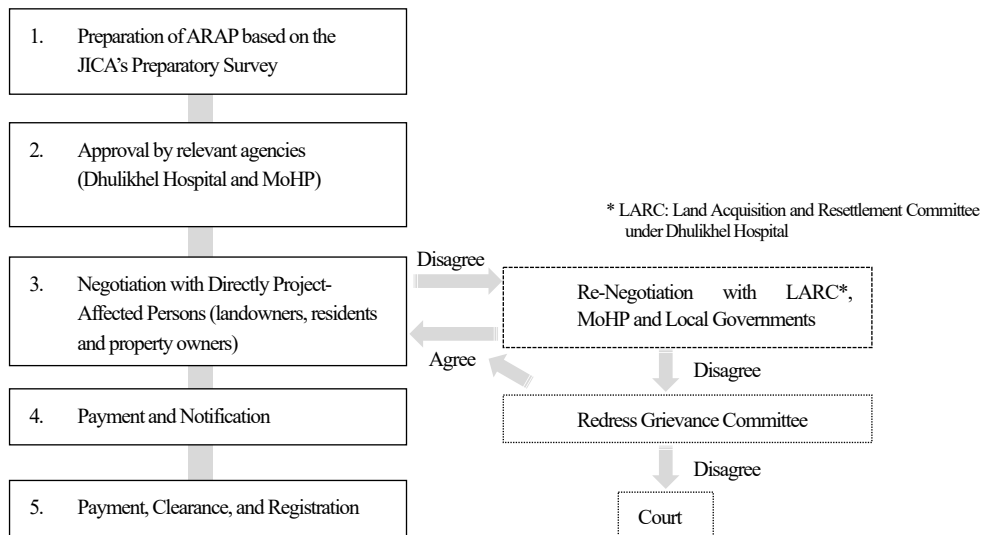


Source: JICA Survey Team

**Figure 1-13 Grievance Redress Mechanism and Process**

**1-4-2-6 Implementation Framework**

With regard to the acquisition of privately owned land in this project, the Dhulikhel Hospital (DH) has formed a committee to acquire land directly through negotiation with the landowner(s), property owner(s), and resident(s). The DH has already acquired 0.9 ha private land in April and December 2021 from 2 landowners of 2 plots through appropriate negotiation process, which is stipulated in the Land Acquisition Act 1977 (clause 27) of Nepal and JICA’s Guidelines. This process is carried out under the supervision of the Ministry of Health and local governments. The process and organization of the land acquisition and provision of compensation are shown below.



Source: JICA Survey Team

**Figure 1-14 Process of ARAP Implementation**

**Table 1-31 Roles of Organizations in Implementing Land Acquisition and Resettlement**

Organization	Composition	Major Roles
Land Acquisition and Resettlement Committee under Dhulikhel Hospital (LARC)	Representative members of Dhulikhel Hospital	Overall Execution of the Project Directs the PMU Responsibilities for approving Updated ARAP (UARAP), if necessary Securing resources for compensation based on the final approved ARAP
Project Management Unit (PMU)	Ministry of Health and Population (MoPH) Board Member of Dhulikhel Hospital	Responsibilities to update ARAP during the Detailed Design Stage, if necessary Responsibility to coordinate all organizations concerned on ARAP activities after the preparatory survey stage To supervise ARAP implementation activities after the preparatory survey
Local Government (Dhulikhel Municipality, Kavrepalanchowk Districts, Bagmati Province)	MoHP, DH and Dhulikhel Municipality	To monitor encroachment of illegal settlers into the project area after declaration of the Cut-off-Date To cooperate negotiation between Dhulikhel Hospital and directly project-affected persons
Grievance Redress Committee	Members of LARC, Local Government, MoHP, NGO (upon request of complaining PAP)	Resolution of opposition from PAPs

Source: JICA Survey Team

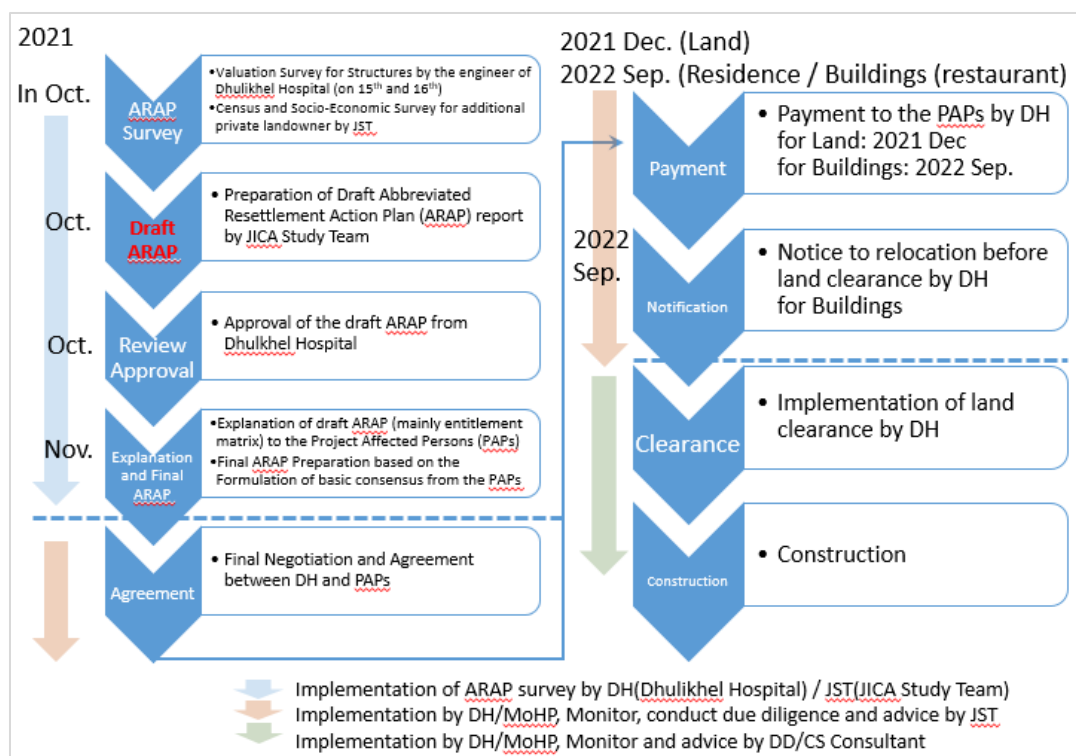
#### 1-4-2-7 Implementation Schedule

The expected ARAP approval and implementation schedule is shown below.

With regard to the land acquisition, a part of the land was secured before the start of the field survey for this preparatory survey (April 2021). In addition, as shown in the figure below, after preparation of draft ARAP in October 2021, the draft ARAP was reviewed and approved by Dhulikhel Hospital. In September 2022, resettlement and compensation payment, removal, and relocation of buildings (residential and restaurant) were implemented. It was confirmed that a series of compensations, payments, and resettlement were implemented in accordance with the approved ARAP based on JICA Guidelines and relevant laws of Nepal.

The expected process and schedule are shown in below.





Source: JICA Survey Team

**Figure 1-15 Process of ARAP Implementation**

**Table 1-32 ARAP Implementation Schedule(as of October 2021)**

Item	2021					2022		DD/Const.			
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Dec			
1 Draft ARAP Preparation				● Final explanation to PAPs							
2 Approval of ARAP by DH											
3 Implementation of ARAP (Final Negotiation, Agreement, Payment)					● For the Land			● For the resettlement and buildings			
4 Monitoring (by JICA Study Team)											
5 Monitoring (Livelihood Level of Resettlers), if necessary											

Source: JICA Survey Team

### 1-4-2-8 Cost and Financing

The total budget for land acquisition and resettlement for this project is approximately 33 million NPR. This budget includes compensation costs for PAPs, ARAP implementation, and operation costs, and other costs related to land acquisition for Dhulikhel Hospital. The detailed cost is shown below.

**Table 1-33 Cost Estimation for ARAP Implementation**

No.	Item	Cost (NPR)
1	Compensation for the PAPs	
1.1	Private Land-A <sup>note-1</sup> (Purchased Land in April 2021)	(20,000,000) <sup>note</sup>
1	Compensation for the PAPs	
1.1	Private Land-A <sup>note-1</sup> (Purchased Land in April 2021)	(20,000,000) <sup>note</sup>
1.2	Private Land-B <sup>note-2</sup> (Plot No. 230)	24,372,173
1.3	Structures (Replacement of 2 residences and relocation** of 1 restaurant) including secondary structures	439,055
1.4	Relocation stabilization assistance for displaced household	126,000
1.5	Special allowance for vulnerable people (2 Households)	126,000
1.6	Transportation (2 Residence Heads)	20,000
1.7	Updating of ARAP During Detailed Design Stage (if necessary)	1,000,000
1.8	Contingency for compensation 1.2-1.7 (20%)	5,216,646
	Subtotal for 1 (not including 1.1 20,000,000 NPR)	31,299,874
2	ARAP Management Cost	
2.1	External ARAP Monitoring, if necessary (subcontract with an external organization)	1,500,000

Note-1: Private Land-A has already been purchased before the preparatory survey and registered as the property of Dhulikhel Hospital on 13th of April 2021, thus land cost will be deducted from Subtotal 1 and Grand Total.

Private Land-B has been purchased after preparation of draft final ARAP on 28th of December 2021. The cost is included in the above table.

Note-2: Relocation cost includes dismantling of current structure, and transporting of materials from current structure and reassembling at the relocation site.

Source: JICA Survey Team

#### 1-4-2-9 Monitoring Activities

Internal and external monitoring for the implementation of ARAP in the project shall be carried out in accordance with relevant laws and guidelines. The main purpose of monitoring is to ensure that PAPs have been adequately compensated and paid for lost assets in accordance with the policies and procedures set out in the ARAP. The main tasks and responsible bodies for internal and external monitoring are as follows.

##### (1) Internal Monitoring

Internal monitoring will be carried out by LARC. The main activities are as follows:

- Appropriate management and monitoring of the implementation of approved RAP
- Ensuring timely and appropriate compensation payments based on agreements with PAPs
- Recording of all complaints from PAPs and their resolution process and results.

##### (2) External Monitoring

External monitoring is carried out by an independent body employed by LARC. The main activities are as follows:

- Monitoring the implementation of appropriate compensation and resettlement in accordance with the ARAP

- Recommendations for implementing RAP in accordance with JICA guidelines and related laws, if necessary

#### 1-4-2-10 Information Disclosure, Consultation and Participation

##### (1) Outline of RAP Socializations Conducted

The summary of conducted meetings for the directly project-affected persons are shown below.

**Table 1-34 Meetings/Activities of Directly Project-Affected Persons**

Objectives (Date and Venue)	Agenda	Major Participants	Announcement
1 <sup>st</sup> Meeting for 2 residences and 1 structure owner  (11:00-14:00, 24 <sup>th</sup> of July, 2021/ Project site /Dhulikhel Hospital)	Introduction of project Explanation of necessity of resettlement and relocation Explanation of Cut-off Date Explanation of Census and Socioeconomic survey Explanation of basic compensation policy Implementation of ARAP Survey	Participants Project-Affected Persons (PAPs who are nontitle holders/tenants), Dhulikhel Hospital, JICA Study Team (Local consultant) Number of Total Participants: 13 (Males: 10, Females: 3) PAPs: 7 Dhulikhel Hospital: 1 JICA Study Team (Local Consultant): 5	Method: Direct inviting by telephone Language: Nepali
1 <sup>st</sup> Meeting for 1 land owner for Plot No.230 (12:00-13.30, 13 <sup>th</sup> of November, 2021/ venue: Project Site)	Introduction of project Explanation of necessity of resettlement and relocation Explanation of Cut-off Date Explanation of Census and Socioeconomic survey Explanation of basic compensation policy and the entitlement matrix Implementation of ARAP Survey	Participants Project-Affected Persons (PAPs, Dhulikhel Hospital, JICA Study Team (Local consultant) Number of Total Participants: 7 (Males: 5, Females: 2) PAPs: 2 Dhulikhel Hospital: 1 JICA Study Team (Local consultant): 3 Community people: 1	
2 <sup>nd</sup> Meeting for the 2 residences and 1 structure owner Explanation of draft ARAP report and the Entitlement Matrix (14:00-16:00, 13 <sup>th</sup> of November, 2021/ Venue: Project site)	Introduction of project Explanation of compensation policy (the Entitlement Matrix) Conclusion of the consensus of compensation policy	Participants Project-Affected Persons (PAPs who are nontitle holders/tenants), Dhulikhel Hospital, JICA Study Team (Local consultant) Number of Total Participants: 14 (Males: 9, Females: 5) PAPs: 10 Dhulikhel Hospital: 1 JICA Study Team (Local consultant): 3	

Source: JICA Survey Team

The opinions, questions, and corresponding answers during discussion session are presented below.

**Table 1-35 Opinions Raised in the Meeting**

ARAP Meeting	Opinion/Question (Questioner)	Answer (Respondent)	Reaction of Questioner	Item to Be Reflected in the Project or ARAP
1 <sup>st</sup> ARAP Meeting  (For 2 residences and 1	When will the project construction starts?	The schedule of the project implementation is not fixed yet, however, the hospital side would like to proceed a series of land acquisition process after the meeting. (Dhulikhel Hospital side)	Accept the answer	None

ARAP Meeting	Opinion/Question (Questioner)	Answer (Respondent)	Reaction of Questioner	Item to Be Reflected in the Project or ARAP
restaurant owner) (24 <sup>th</sup> of July 2021)	Will prior notice be published for the demolition of structures?	The hospital management will issue prior notice for the demolition of structures.	Accept the answer	Reflected in the Entitlement Matrix
	How is valuation carried out for the structures?	Valuation will be carried out by the competent engineer from Dhulikhel Hospital as a market rate without depreciation	Accept the answer	Reflected to the Entitlement Matrix
	Does the landlord will refund the advance payment?	Project (resettlement team) will facilitate that the landlord will refund this.	Accept the answer	None
1 <sup>st</sup> ARAP Meeting (For 1 landowner of Plot No. 230)  (13 <sup>th</sup> of November 2021)	When will the construction starts?	The schedule of the project implementation is not fixed yet, however, the hospital side would like to proceed a series of land acquisition process after the meeting. (Dhulikhel Hospital side)	Accept the answer	None
	When will be the ownership transfer of the land?	Most probably by the end of December 2021.	Accept the answer	None
	Is there any employment opportunity for a family member?	During and after construction, job vacancy may be announced. DH will consider hiring based on qualifications.	Accept the answer	None
	Is there any discount provided for the treatment?	Not yet known.	Accept the answer	None
2 <sup>nd</sup> ARAP Meeting (For 2 residences and 1 restaurant owner) 13 <sup>th</sup> of November, 2021	When will compensation and other allowances be distributed?	After approval of final ARAP by the DH and JICA	Accept the answer	To be confirmed during the monitoring
	Does unskilled labor get opportunity in construction work?	Contractor, JICA and DH will decide on this. Not yet known	Accept the answer	None
	When does ownership transfer of Plot 230 take place?	Most probably by the end of December 2021.	Accept the answer	None

Source: JICA Survey Team

## (2) Activities on Information Disclosure

Another important activity for promoting the people's understanding of the Project is information disclosure. Explanation/Discussion during public consultation is part of information disclosure. The ARAP document and related information on the ARAP are required to be disclosed in accordance with JICA Guidelines and WB OP4.12. Apart from public consultation (socialization), the activity of information disclosure is planned as described below.

### 1) Preparatory Survey Stage (ARAP Preparation Stage)

In the preparatory survey stage, the finalized ARAP (in English and Nepali) will be uploaded on JICA's website and made available to the public. Additionally, the ARAP will be disclosed at the Dhulikhel Hospital office.

## **2) Detailed Design Stage (Updated ARAP)**

ARAP will be updated if there are additional affected areas and/or project-affected persons during the detailed design stage. After updating the ARAP in the DD stage, the approved updated ARAP will be translated into Nepali and disclosed in the location where the PAPs can access it, such as local administration offices.

## Chapter 2 Contents of the Project

### 2-1 Basic Concept of the Project

The basic concept of the project is as follows:

**Table 2-1 Overview of the Project**

Component	Facility Details
Facility construction	Total Floor Area: 6,484.4 m <sup>2</sup>
Trauma and Emergency Center  - 3 basement floors - 2 floors above ground - 1 penthouse - 98 beds	<ul style="list-style-type: none"> <li>• Emergency department: 31 beds Triage area / Contamination shower room / Treatment room (red) (4 beds) / Treatment room (yellow) (6 beds) / Treatment room (green) (10 beds) / Observation room (11 beds) / Staff station / Plaster procedure room</li> <li>• Emergency operating room: Operating room (1 room) / Scrub area / Storage and preparation room / Recovery room / Changing room</li> <li>• Surgical department: 5 beds Operating rooms (2 rooms) / Scrub area / Anesthesia room / Storage / Preparation room / Recovery room / Changing room / Post-operation ward (5 beds)</li> <li>• Radiology department: X-ray room / CT room / MRI room / Angiography room / Ultrasonography room / Control room / Report room</li> <li>• Laboratory department: Sample collection room / Urine collection toilet / Biochemistry laboratory / Hematology laboratory / Microbiology laboratory / Pathology laboratory / Storage / Blood bank room</li> <li>• Outpatient department Consultation room (3 rooms) / Treatment room / Recovery room</li> <li>• Rehabilitation department: Rehabilitation room / Storage</li> <li>• Pharmacy department: Office / Reception / Storage</li> <li>• Intensive care unit: 16 beds ICU (10 beds) / HDU (High dependency unit) (6 beds) / Staff station / Storage</li> <li>• General ward: 46 beds 1-bed room (4 rooms) / 4-bed rooms (5rooms) / 5-bed rooms (2 rooms) / 6-bed rooms (2 rooms) / Staff station / Drug preparation room / Treatment room / Counseling room / Storage / Staff room</li> <li>• Administrative department: Director's office / Office / IT &amp; server room</li> <li>• Education and research department: Office / Library / Conference Hall &amp; workshop room</li> <li>• Supply department and others: CSSD / Linen storage / Kitchen / Staff cafeteria / Changing room / Waste storage / Mortuary</li> </ul>
Building electrical and mechanical equipment	<ul style="list-style-type: none"> <li>• Electrical works (Power receiving and transforming system, Trunk line equipment, Power generator system, Uninterruptible power supply system, Photovoltaic power generation equipment, Lighting and electrical outlet equipment, Telecommunication system, Television communicating system, Nurse call system, Security system, Fire alarm system, Broadcasting system, Lightning protection system)</li> <li>• Air conditioning and ventilation system</li> <li>• Water supply and drainage sanitation system (Water supply system, Well system, Sanitary fixtures, Drainage system)</li> <li>• Fire extinguishing system</li> <li>• Medical gas system</li> </ul>
Utility building, Exterior facilities, etc.	<ul style="list-style-type: none"> <li>• Medical gas building, Generator building, Guardhouse, Wastewater treatment facility, Retaining walls, Slope measures (Greenery work, Sprayed concrete), Stairs, Railings, Parking lots, Roads, and Sidewalks on the premises</li> </ul>
Equipment procurement	CT (1), C-arm (1), X-ray (1), Operating light (3), Operating table (3), Anesthesia machine (3), Bed (84), ICU bed (16), Autoclave (1), MRI (1), Portable ventilator (2), Ultrasound machine (2), Blood bank refrigerator (1)
Soft component	N/A

Source: JICA Survey Team

## **2-2 Outline Design of the Japanese Assistance**

### **2-2-1 Design Policy**

#### **2-2-1-1 Study on Requested Support**

##### **(1) Requested Facility**

Dhulikhel Hospital is one of the largest tertiary care hospitals in Nepal with a wide range of departments. It is located at the transportation hub before the Kathmandu Valley. The hospital's patients have increased in number over the years, with a particularly significant increase in emergency patients. The number of inpatients with noncommunicable diseases (NCDs) such as stroke, heart disease, and hypertension is increasing, while emergency patients are most frequently trauma patients. More than 20 surgeries are performed per day, mostly for C-sections and fractures. The hospital receives more than 2,000 referrals per year from lower-level health facilities, while it transfers severely ill patients (about 700 cases per year) to specialized hospitals in Kathmandu such as cardiac disease, cerebrovascular disease, multiple trauma, and burn patients that require cardiovascular treatment.

Dhulikhel Hospital also established an ambulance dispatch center in 2018, overseeing 41 ambulances with GPS and operating a 24-hour emergency transport service for two neighboring districts (Sindhupalchok and Kavrepalanchok). In January 2021, the center was recognized as an official ambulance dispatch center by the Ministry of Health and Population (MoHP) and Provincial Social Welfare Ministry of Bagmati Province, and was given Nepal's common emergency number of 102. Against this background, the establishment of a trauma and emergency center is desired.

The informal request presented by Dhulikhel Hospital prior to the field survey indicated a "trauma center with 55 beds." The construction of a "trauma and emergency center with 100 inpatient beds" was requested during the field survey and as an answer to the questionnaire.

The change in the requested facility is attributed to the dramatic increase in traffic accidents due to the opening of the Sindhuli Road, while the population of Dhulikhel Hospital's coverage area (3 groups, 21 districts) increased by 12.4%, from 11,215,421 in 2011 to 12,614,570 in 2021, or 10 years later. Sindhuli Road was officially handed over in 2015 and has been open to general vehicular traffic since 2016, playing a very important role as an arterial road in the eastern region (Province 2, 3).

In 2012, before the opening of the road, the emergency department (30 beds) of Dhulikhel Hospital received a total of 147,002 emergency and trauma patients per year. At that time, Dhulikhel Hospital planned to increase the number of beds to 55 beds in anticipation of the subsequent opening of the Sindhuli Road, which was expected to increase the number of traffic accidents.

However, in 2016, when Sindhuli Road began full operation, the number of patients was 190,899, and it increased to 316,037 in 2021, or approximately 120,000 more than the number of patients in 2016. For reference, the number of traffic accidents in Nepal nationwide doubled between 2016 and 2021, from 10,178 to 24,537, and in the eastern region that includes Dhulikhel Hospital, the number of traffic

accidents increased up to 1.8 times in 2021 from 2,144 accidents in 2016 (survey area of region changed partially).

The establishment of a trauma and emergency center at Dhulikhel Hospital is highly significant in the eastern region as this facility will receive the rapidly increasing number of emergency trauma patients due to traffic accidents. The hospital is also the only referral facility in the eastern region that is covered by the government-recognized National Health Insurance. Thus, it has doubled the planned 55-bed expansion as of 2016 to 100 beds.

Dhulikhel Hospital provided the following explanations for the change in facility content from a trauma center to a trauma and emergency center.

- As shown in Nepal's overall health statistics and patient disease trends at Dhulikhel Hospital, the disease burden of NCDs is extremely high, and the number of emergency patients with stroke, myocardial infarction, and other NCDs is expected to increase in the future. Therefore, it will be beneficial to consider establishing a medical facility that can treat not only trauma patients but also emergency patients with NCDs, as it will be able to respond to a wider range of future needs.
- By making it a trauma and emergency center, Dhulikhel Hospital will also be able to integrate existing emergency department functions, minimizing duplication of personnel, equipment, and facilities and operating more efficiently.
- In Nepal, emergency centers including trauma centers are generally called trauma centers, but in reality, they accept general emergency patients other than trauma patients. That is why, the Project is called emergency center as in Japan and other countries.

Outline of the requested facility is as follows:

**Table 2-2 Outline of the Requested Facility**

Department	Rooms
Emergency	Treatment and Diagnosis Room (20 beds), Observation Wards (11 beds), Operation Room (1 room)
Outpatient	Consultation Room (3 rooms)
Rehabilitation	Physiotherapy and Rehabilitation Room (1 room)
Radiology	X-ray (Digital), CT, MRI, DSA (Digital subtraction angiography), Ultrasonography
Laboratory	Biochemistry, Microbiology, Pathology
Pharmacy	Outpatient, Inpatient
Operation	Operation Room (2 rooms), Post Operative Ward (5 beds)
ICU	ICU (10 beds), HDU (High Dependency Unit) (6 beds)
In-Patient Ward	46 beds (6 beds x 2 rooms, 5 beds x 2 rooms, 4 beds x 5 rooms, individual room x 4 rooms)
Administration	Administration Office, Director's Office
Research and Education	Conference Room, Library, Department Office
Service	CSSD, Laundry, Kitchen, Waste Management

Source: JICA Survey Team



## (2) Requested Equipment

Major requested equipment confirmed before the field survey is as follows:

**Table 2-3 Major Requested Equipment**

Priority	Qty	Major Equipment
A	51	MRI, CT, Angiography, X-ray (Digital), C-arm, Ultrasonography, Electrocardiogram, Stretcher, Defibrillator, Trolley, Blood Gas Analyzer, Ventilator, Patient Monitor, Infusion Pump, Syringe Pump, Bed, Operating Light, Operating Table, Surgical Microscope, Electro Surgical Cautery, Surgical Instrument Set, Biochemistry Analyzer, Hemodialysis machine, Oxygen Concentrator, CPAP/BPAP, Autoclave, etc.
B	23	Surgical Navigation System, Fluid Pump, Blood Warmer, Spinal Board, PCR, Wheelchair, etc.
C	10	DEXA Scan, Glucometer, Pulse Oximeter, ENT Set, Chair, etc.

Source: JICA Survey Team

### 2-2-1-2 Facility Design Policy

#### (1) Proposed Construction Site

The proposed site for the Trauma and Emergency Center is an 8,460 m<sup>2</sup> sloping land located on the east side of the Dhulikhel Hospital site, bordering the Sindhuli Road. This land was leased by Kathmandu University and Dhulikhel Hospital from the Government of Nepal (Dhulikhel Division, Kavrepalanchowk District, Ministry of Industry) for the construction of a trauma center. Under a Memorandum of Understanding between the Ministry of Education, Ministry of Finance, Ministry of Industry and Kathmandu University, Kathmandu University and Dhulikhel Hospital will lease this land for 30 years effective December 12, 2013.

#### (2) Layout and Flow Line

Since the proposed site is located on a slope, the design will minimize the need for development work and retaining wall construction by considering the topographical characteristics and the shape of the site. The building will be accessible from two different levels to achieve both economic efficiency and functionality. The higher elevation area has access from the Sindhuli roadside, whereas the lower elevation area is accessible to the south road.

To provide prompt emergency medical care, ambulance access is given the highest priority for this facility. The design will separate access for ambulances and outpatients' from Sindhuli Road, whereas staff and service access will be provided from the south side of the road. This will ease the functional flow and will not interfere with emergency transport.

To link the functions of the existing hospital with the Trauma and Emergency Center, a stairway and pathway connecting the two facilities will be planned to allow staff to come and go.

#### (3) Main Structure / Scale

The building shall be a reinforced concrete (RC) structure with three basement floors, two above-ground floors, and one penthouse (the first floor shall be at the Sindhuli roadside level). The foundation

type will be spread foundation and the framed structure with bearing wall with a combination of basic 6.0m x 6.0m and some 6.0m x 9.0m modules.

It was agreed with Dhulikhel Hospital that the total number of beds for the Trauma and Emergency Center will be ninety-eight. The facility will prioritize securing the number of beds by compactly combining facilities necessary for emergency medicine and clinical training, while basic education, research, and administrative departments will use existing facilities.

#### **(4) Various Rooms, Zoning, and Floor Plan**

The facility will be equipped with diagnostic and treatment facilities, inpatient facilities, outpatient aftercare and rehabilitation departments related to trauma and emergency medicine. It will be able to provide consistent medical care from receiving emergency patients to aftercare.

To achieve prompt medical treatment, the departmental layout will allow for efficient coordination of related functions and departments, particularly in trauma and emergency medicine.

To meet the increasing medical needs, the floor plan should have short flow lines and high functional efficiency.

#### **(5) Electrical and Mechanical Systems**

City water and sand-filtered well water are collected and stored in a receiving tank and supplied to the Trauma and Emergency Center. The building is supplied by a pressurized water pump system. RO equipment for purification will be installed separately in areas used for drinking and washing.

General domestic wastewater in the building will be treated by a sewage and miscellaneous wastewater treatment system, and laboratory wastewater will be treated by a separate system in a wastewater treatment plant dedicated to the Trauma and Emergency Center. The wastewater from various parts of the building to the wastewater treatment plant will flow naturally by gravity. The lowest three basement floors will be installed with pump-up system.

The air-conditioning system will be a system employing packaged air conditioners. Air-cooled heat pump packaged air-conditioning multi or split type will be selected for each department or room use according to the time of use, air-conditioning heat load, and other factors.

Electric power will be drawn from a general transmission line on the east side of the site, and a new transformer will be installed in the generator building on the site. Power will be supplied to the hospital from the electrical room in the building via the transformer.

The communication facilities will be connected to the MDF in the server room by pulling in external lines from the front road and internal lines will be connected to the existing hospital PBX with optical cables to construct a network.

### 2-2-1-3 Equipment Planning Policy

The medical equipment to be procured under this plan will be prioritized in order of necessity to provide medical services as a trauma and emergency center, and will be within the budget. The specifications of the equipment shall be in accordance with the medical services required as a top referral hospital in Nepal, performance of the existing equipment, technical level of medical staff, and expansion plan of medical services based on the hospital policy, and shall enable the maintenance and management in Nepal.

### 2-2-1-4 Policy of Project Scale

Limit of project cost was shared with Dhulikhel Hospital within which building construction cost and equipment procurement cost were planned JPY 1.6 billion and JPY 1.0 billion as a general framework.

The following examples from the 2017 JICA grant assistance was used as reference for the construction cost of hospital building. The difference in the unit price per square meter between the Paropakar Maternity and Women's Hospital and the Bir Hospital attributed to the difference in floor area even though both hospitals were equipped with similar utility equipment. Since the new center is expected to be larger than the Paropakar Hospital, the unit price per square meter of the Paropakar Hospital was adopted, and adjusted taking into account Nepal's inflation rate over the past five years.

**Table 2-4 Construction Cost Reference**

Name		Financial Source	Construction Cost (JPY)	Floor Area (m <sup>2</sup> )	Unit Price (JPY/m <sup>2</sup> )
1	Paropakar Maternity and Women's Hospital	JICA Grant Aid	1,075,254,874	5,415.62	198,546
2	Bir Hospital	JICA Grant Aid	745,174,582	3,487.38	213,677

Source: JICA Survey Team

**Table 2-5 Inflation Rate**

Year	2017	2018	2019	2020	2021	2017-2021
Inflation Rate	4.45	4.15	4.64	6.15	4.2	25.9

Source: IMF (April 2021)

At the time of the second field survey in 2021, facility and equipment plans were developed within the above limit. However, it was found that the cost of construction work would significantly exceed the limit due to the global rise in fuel and material prices and the significant depreciation of Japanese yen in 2022. After consultation between JICA Survey Team and Dhulikhel Hospital, it was confirmed that the scale of the facility plan would remain unchanged and the equipment plan would be adjusted accordingly.

### 2-2-1-5 Policy for Natural Conditions

#### (1) Temperature/Humidity

Dhulikhel is located at an altitude of 1,500 meters above sea level. It has a temperate climate with an average temperature of around 18°C. The average monthly minimum temperature is about 5.28°C

(December) and the average monthly maximum temperature is 27.50°C (April). The annual average relative humidity is about 78%.

Air-conditioning systems should be planned for the medical treatment rooms and for rooms where medical equipment and devices generate heat.

**Table 2-6 Average Temperature Data for Dhulikhel (2021)**

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temperature	12.40	13.85	17.42	19.83	19.70	22.30	22.62	22.30	22.38	20.24	15.00	11.71
Average minimum temperature	5.40	6.64	10.23	12.16	14.85	17.88	18.81	18.60	17.53	15.24	8.67	5.28
Average maximum temperature	19.40	21.05	24.61	27.50	24.54	26.72	26.42	26.00	27.22	25.23	21.13	18.14

(Unit: °C)

Source: Department of Hydrology and Meteorology

## (2) Rainfall

Although influenced by climate change, Nepal's climate is divided into a dry season from October to May and a rainy season from June to September. Since there is a large difference in the amount of rainfall between the dry and rainy seasons, care should be taken in planning for the prevention of rainfall, on-site treatment of rainwater, and prevention of moisture in the basement.

**Table 2-7 Rainfall and Rainfall-Day Data for Dhulikhel (2021)**

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	0.01	3.24	6.52	42.11	173.42	171.54	496.41	320.00	135.72	77.00	0	54.52
Rainfall days (days)	1	5	4	7	16	19	27	22	19	12	0	5

Source: Department of Hydrology and Meteorology

## (3) Earthquake

Nepal's past earthquakes include an M7.8 earthquake in 2015 centered northwest of Kathmandu (Gorkha District), which collapsed buildings and caused human casualties. Earthquake loads will be planned with reference to the latest Nepalese standards.

### 2-2-2 Basic Plan

#### 2-2-2-1 Facility Outline Design

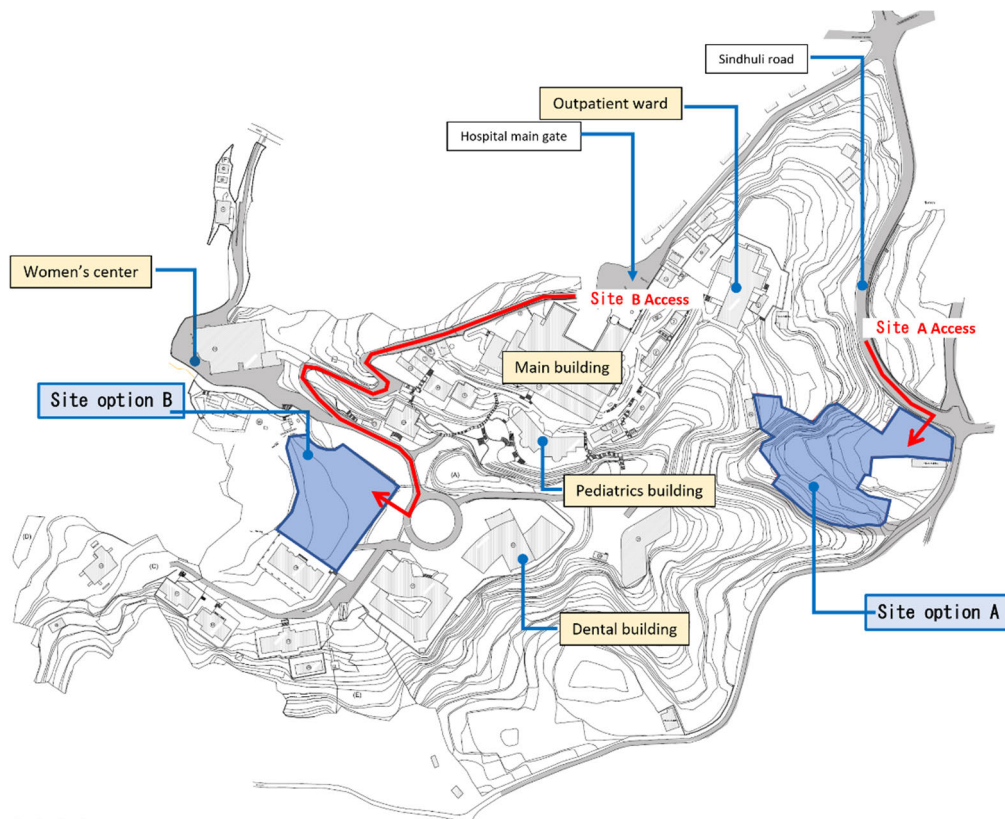
##### (1) Site and Layout Plan

###### 1) Site Conditions

The construction site for the Trauma and Emergency Center was selected by comparing two sites, A and B, proposed by the Nepalese stakeholder and survey team respectively.

- Site A is a land leased by Kathmandu University and Dhulikhel Hospital from the Nepalese government for the construction of a trauma center. While the site is easily accessible from the main Sindhuli Road, the slope of the land requires land development and retaining walls for construction work. Also, the shape of the lot is irregular.
- Site B is used as a sports field for Dhulikhel Hospital. It has a flat topography and a relatively regular shape. The soil is soft alluvial, which is not expected to be stable as a foundation for construction. The narrow and steep road to the site does not make it a suitable access route for ambulances. In addition, Site B is the only flat land on the hospital site. It is used as a disaster evacuation site, space for a temporary hospital, and a helipad. Therefore, Dhulikhel Hospital expressed its desire to retain the use of the site.

Based on the above, Site A was selected as the site for the construction of the Trauma and Emergency Center.



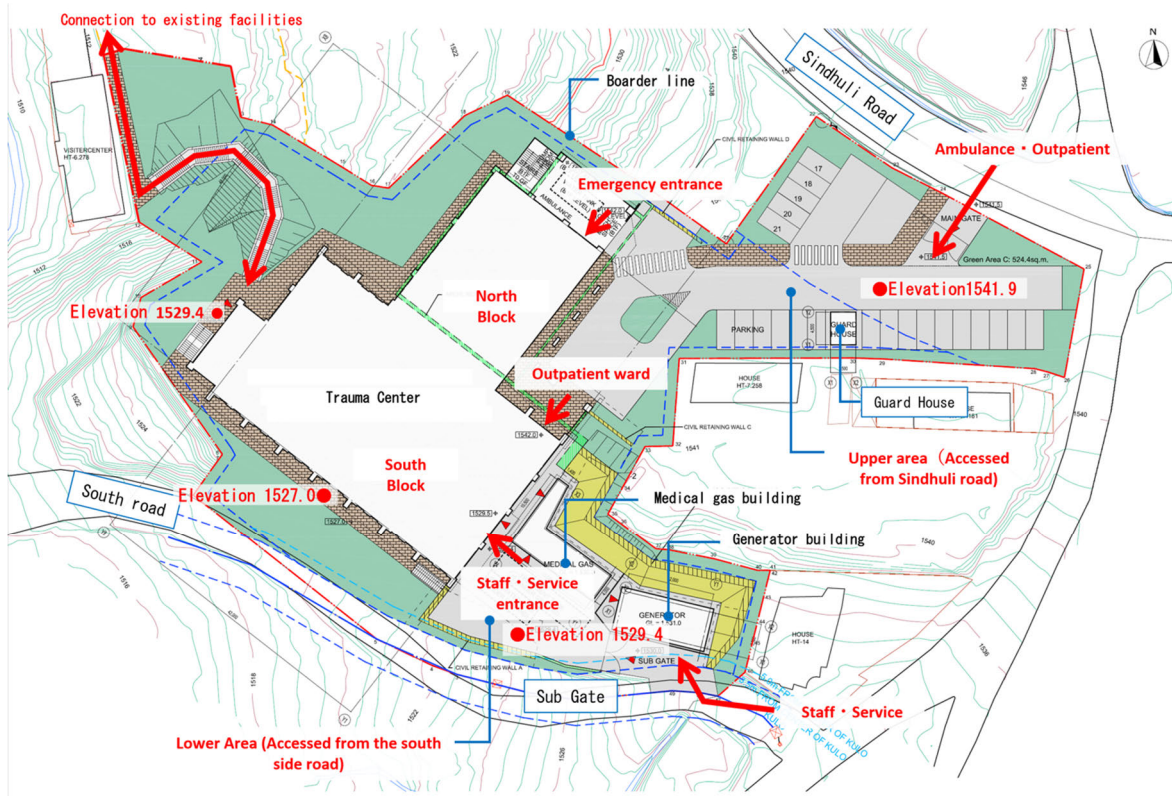
Source: JICA Survey Team

**Figure 2-1 Location Map of Potential Construction Sites**

## 2) Layout and Zoning

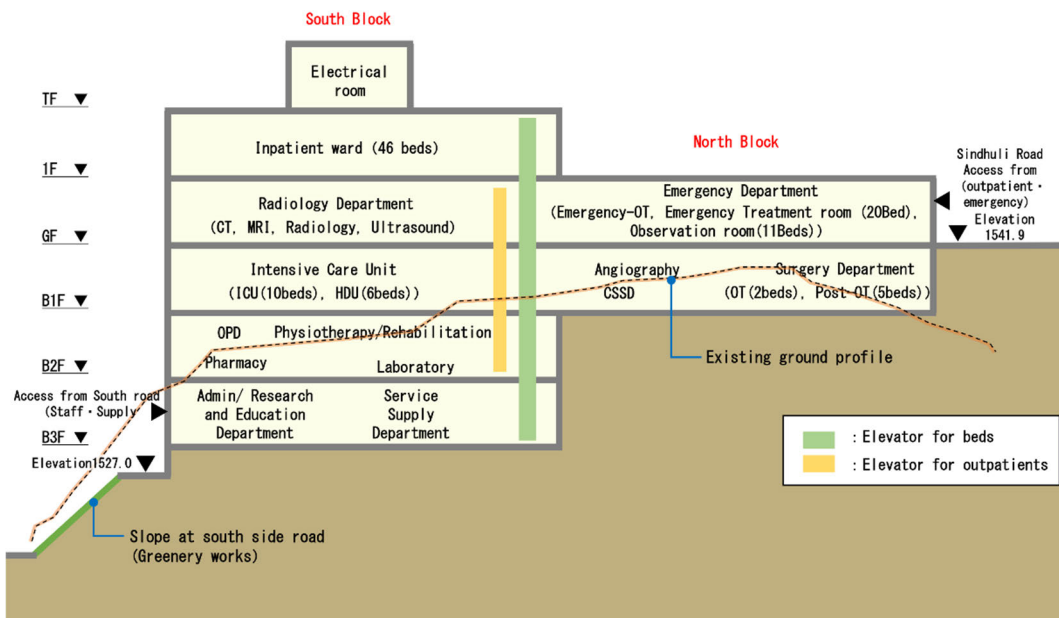
The building layout and cross-sectional shape will be planned based on a comprehensive assessment of the existing topography, the level of connection between the building foundation ground and the roads to the north and south, and the amount of land development and retaining wall work.

- Since the proposed site is on a slope with a maximum height difference of approximately 28 m, the building layout will be safe, economical, and efficient, taking into consideration the height difference and ground conditions of the site.
- Two flat land levels within the proposed construction site will be provided to match the existing ground level. The upper-level land will be on the northwest side at the same level as the front road (Sindhuli Road), whereas the lower-level land will be accessible from the south side road.
- To prioritize rapid emergency response, ambulance and outpatient access will be from Sindhuli Road, with the emergency department located on the same level as the Trauma and Emergency Center. (The access level from Sindhuli Road will be set at the ground level or G level).
- Loading and unloading of goods will be from the south side of the street along with staff access. The administrative and supply departments will be located on the same floor to separate the flow lines from ambulances and outpatients.
- The Trauma and Emergency Center will have two stories in the north block and five stories with a wing in the south block. The number of stories is set in line with the existing ground level to minimize the amount of excavated soil.
- The amount of construction of retaining walls will be controlled by lowering the ground level as much as possible along the road on the south side.
- In the northeast, a passageway and stairway will be provided to connect with the existing facility to allow staff to come and go.
- In addition to the Trauma and Emergency Center building, a gate, generator building, and medical gas building will be provided in a separate zone for safety reasons and as mitigation for noise and vibration.
- The south block of the Trauma and Emergency Center will have three basement levels, but because of the construction on a sloping site, three sides of the building will have exterior walls facing the open air.



Source: JICA Survey Team

Figure 2-2 Layout, Zoning, and Flow Plan



Source: JICA Survey Team

Figure 2-3 Cross-Sectional Schematic Diagram

## **(2) Architectural Design**

### **1) Basic Composition**

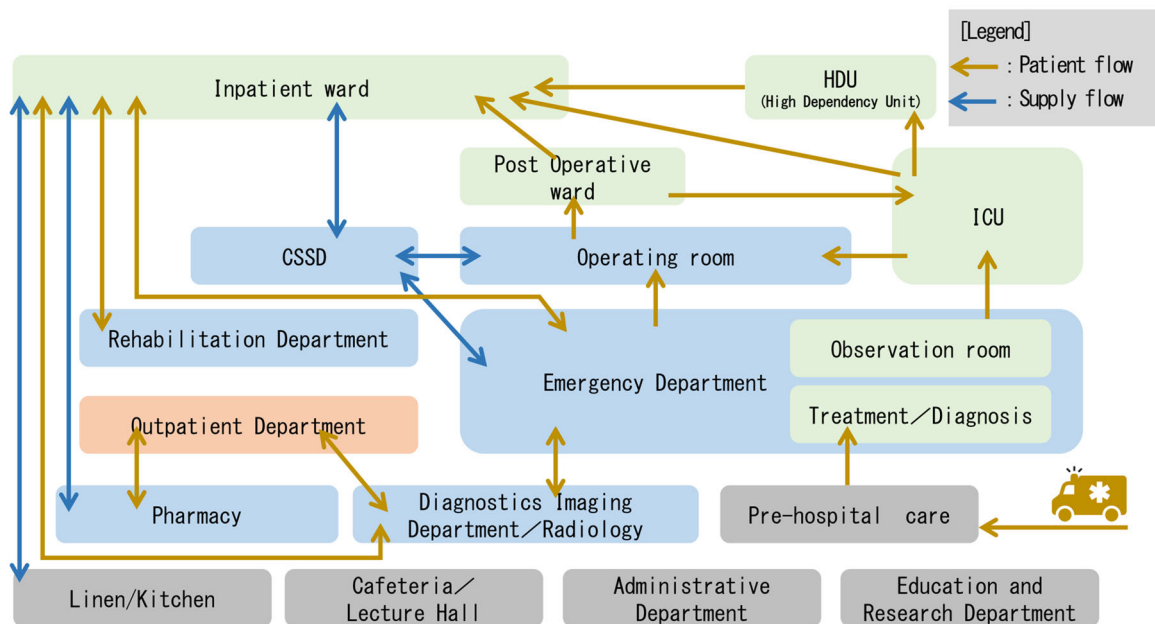
The basic composition of the main departments of the Emergency and Trauma Medical Center is shown below. The departmental layout will be centered on the emergency department to ensure efficient coordination of related functions.

- Ward department (1F)
- Emergency department, Diagnostic imaging section (GF)
- Surgery department, CSSD, Intensive care unit (B1F)
- Outpatient department, Rehabilitation department, Pharmacy department, Laboratory department (B2F)
- Administration, Education and supply departments (B3F)

The Emergency and Trauma Medical Center building is roughly divided into a north block facing the north Sindhuli Road and a south block facing the south road. The north block consists of two levels, one above ground and one below ground. The main gate is located with the level of the north Sindhuli Road, as the first floor above ground (G-floor). The south block will consist of five levels with three basement levels and two above-ground levels and a tower wing. Because the building is constructed on a slope, even the basement floors have windows in three directions to face the outside air. The basic structure of the Emergency and Trauma Medical Center is shown below.

- The G and B1 floors will provide the largest floor space and will house departments that require a large space for coordination of related departments.
- Floor G will house the emergency department and the diagnostic imaging department, considering ambulance access and inter-departmental collaboration.
- The first basement floor is planned to accommodate the surgery department, intensive care unit, angiography room, and CSSD to facilitate smooth pre- and post-operative care and efficient equipment management.
- The second basement floor will house the outpatient department and other departments related to outpatient services, such as the testing, pharmaceutical, and rehabilitation departments.
- On the first floor, a general ward will be located where windows can be installed on all four sides to get sufficient natural lighting and ventilation.
- The third basement floor, accessible from the service yard, will house the supply and administrative/education departments and will be used by staff only.





Source: JICA Survey Team

**Figure 2-4 Schematic Diagram of Functional Linkage**

## 2) Facility Component Contents

The facility components of this plan are shown in Table 2-8.

**Table 2-8 Composition of the Facility Components**

Components	Facility Details
Penthouse	Stairwells, electrical room
1F	Ward Department 1-bed room (4 rooms) / 4-bed rooms (5 rooms) / 5-bed rooms (2 rooms) / 6-bed rooms (2 rooms) / Staff station / Drug preparation room / Treatment room / Counseling room / Storage / Staff room
GF	Emergency Department, Radiology Department [Emergency Department] Triage area / Contamination shower room / Treatment room (red) (4 beds) / Treatment room (yellow) (6 beds) / Treatment room (green) (10 beds) / Observation room (11 beds) / Staff station / Plaster procedure room, emergency operating room (1 room) / Scrub area / Storage and preparation room / Recovery room / Changing room [Radiology Department] X-ray room / CT room / MRI room / Ultrasonography room / Control room / Report room
B1F	Surgical Department, CSSD, Intensive Care Unit [Surgical Department and CSSD] Operating rooms (2 rooms) / Scrub area / Anesthesia room / Storage / Preparation room / Recovery room / Changing room / Post-operative ward (5 beds), CSSD [Intensive Care Unit] ICU (10 beds) / HDU (High Dependency Unit) (6 beds) / Staff station / Storage angiography room
B2F	Outpatient Department, Rehabilitation Department, Pharmacy Department, Laboratory Department [Outpatient Department] Consultation room (3 rooms) / Treatment room / Recovery room [Rehabilitation Department] Rehabilitation room / Storage [Pharmacy Department] Office / Reception / Storage [Laboratory Department] Sample collection room / urine collection toilet / biochemistry laboratory / hematology laboratory / microbiology laboratory / pathology laboratory / Storage / Blood bank room

Components	Facility Details
B3F	Administration, Education and Supply Department [Administrative Department] Director's Office / Office / IT & Server Room [Education Department] Office / Library / Conference Hall & Workshop Room [Supply Department] Linen storage / Kitchen / Staff cafeteria / Changing room / Waste storage / Mortuary
Utility building, Exterior facilities, etc.	Medical gas building, generator building, guardhouse, wastewater treatment facility, retaining walls, slope measures (greenery work, sprayed concrete), stairs, railings, parking lots, roads and sidewalks on the premises

Source: JICA Survey Team

### 3) Floor Plan

The floor plan should be based on a study of the function, scale, and zoning of each office room. The main policies of the floor plan are as follows:

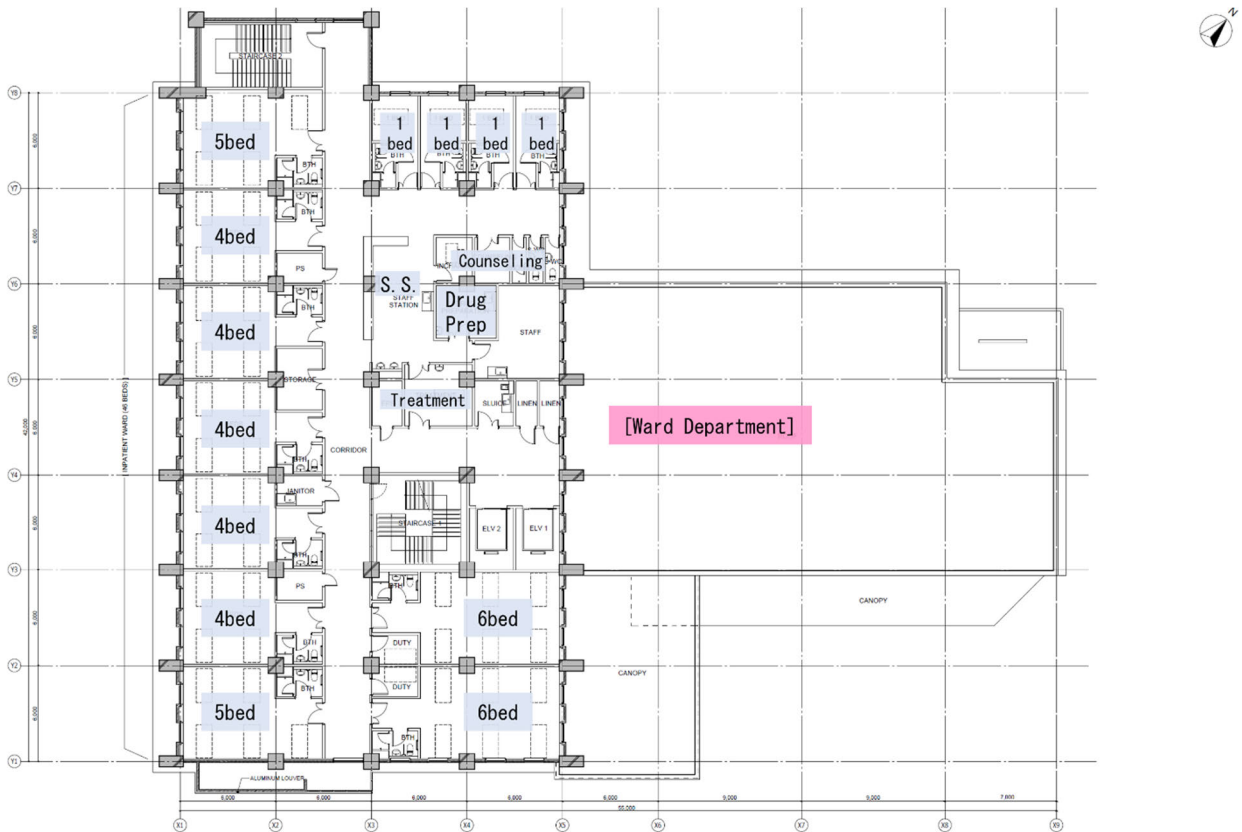
- To realize prompt provision of emergency medical care, the layout plan for departments that should be in proximity or on the same floor, such as the emergency department and the diagnostic imaging department, or the surgery department and the intensive care unit, should be made in consideration of medical functions such as inter-departmental collaboration and the flow lines of patients and staff.
- A mid-corridor style with short flow lines and high area efficiency will be adopted. The corridor ends will be open-ended, and each room will have windows as much as possible to allow for natural lighting and ventilation.
- Stairways and elevators used frequently will be in the center of the building to provide proximity to each department, reducing the burden on patients and allowing for a rapid supply of necessities.
- For departments such as surgery and CSSD areas requiring high cleanliness, planning should clearly separate clean and contamination flow lines in the supply of goods as well as take infection control measures into consideration.
- Considering that it is an emergency / trauma center, the facility should be barrier-free and easily accessible to injured and sick patients and wheelchair users. There should be at least one toilet with a large space on the floor used by emergency, outpatients, and other patients.
- The wards will be designed with consideration for patient amenities, with each room having a toilet with a shower.
- For the medical gas building and generator building, the plan should consider space for oxygen cylinders, fuel for generators, and provision of future equipment upgrades, as well as space for vehicles to easily unload.

#### 4) Plans for Each Department

The following is a description of the design policies of the major departments.

##### a) Ward Department (1F)

The ward department will have 46 beds for one nursing unit, which will be consolidated and located on the first floor. It consists of four 1-bed rooms, five 4-bed rooms, two 5-bed rooms, and two 6-bed rooms, and is equipped with washrooms (with washbasin, toilet, and shower). The staff station will be in the center of the ward, close to the 1-bed rooms, and will be surrounded by a drug preparation room, a nurse manager's office, a counseling room, a treatment room, a sluice room, a linen storage room, and a storage. While public hospitals in Nepal generally have multi-bed rooms with a large number of beds, the multi-bed rooms in the Emergency and Trauma Medical Center will be based on 4-bed rooms, and each room will have a washroom to provide a conducive environment for patient care.

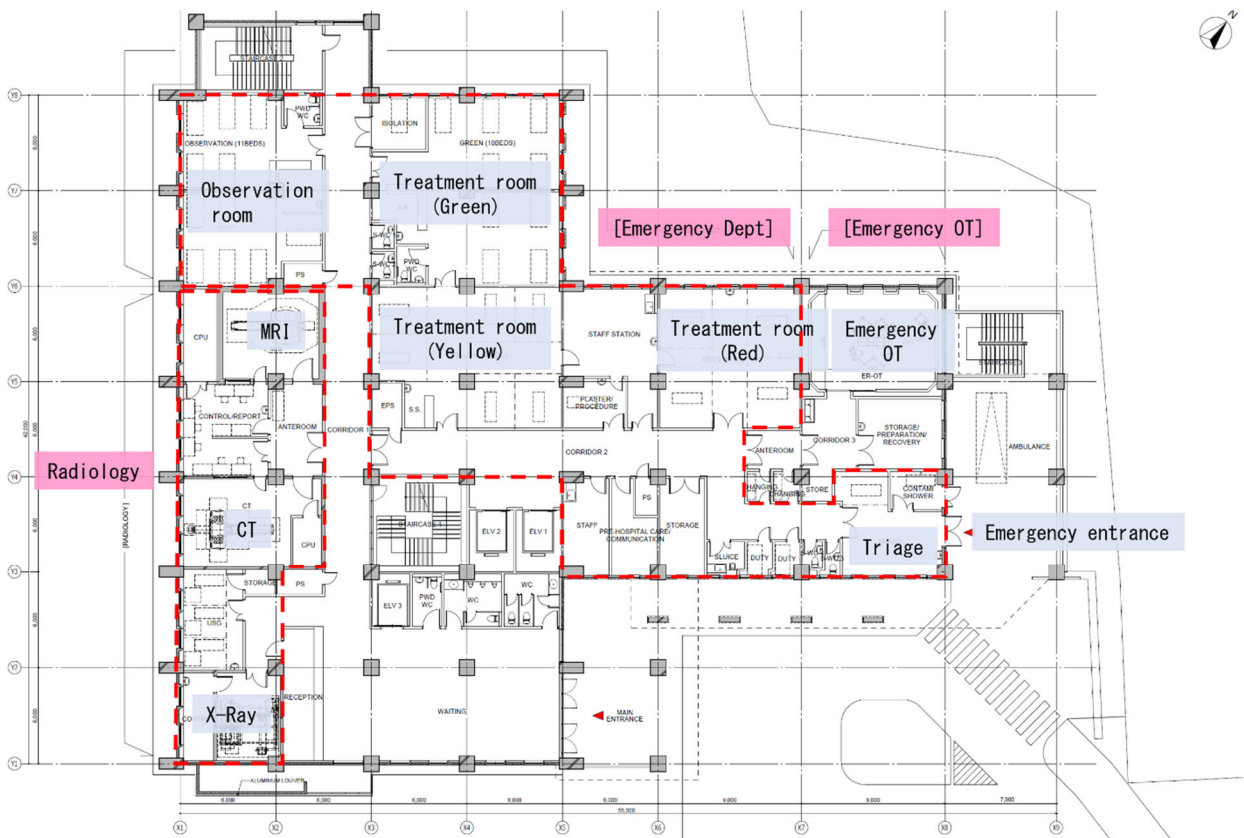


Source: JICA Survey Team

Figure 2-5 Ward Department

**b) Emergency Department, Radiology Department (GF)**

The proposed emergency department will also have three types of treatment rooms (red, yellow, and green) using triage colors that are currently practiced in the emergency department of Dhulikhel Hospital. Patients brought to the emergency department will be triaged and assigned to each treatment room, so the most urgent treatment rooms will be located closer to the entrance. A radiology department will be located adjacent to the emergency department to enable rapid diagnosis. In addition, an operating room dedicated for emergencies will be located adjacent to the treatment rooms to enable prompt treatment.

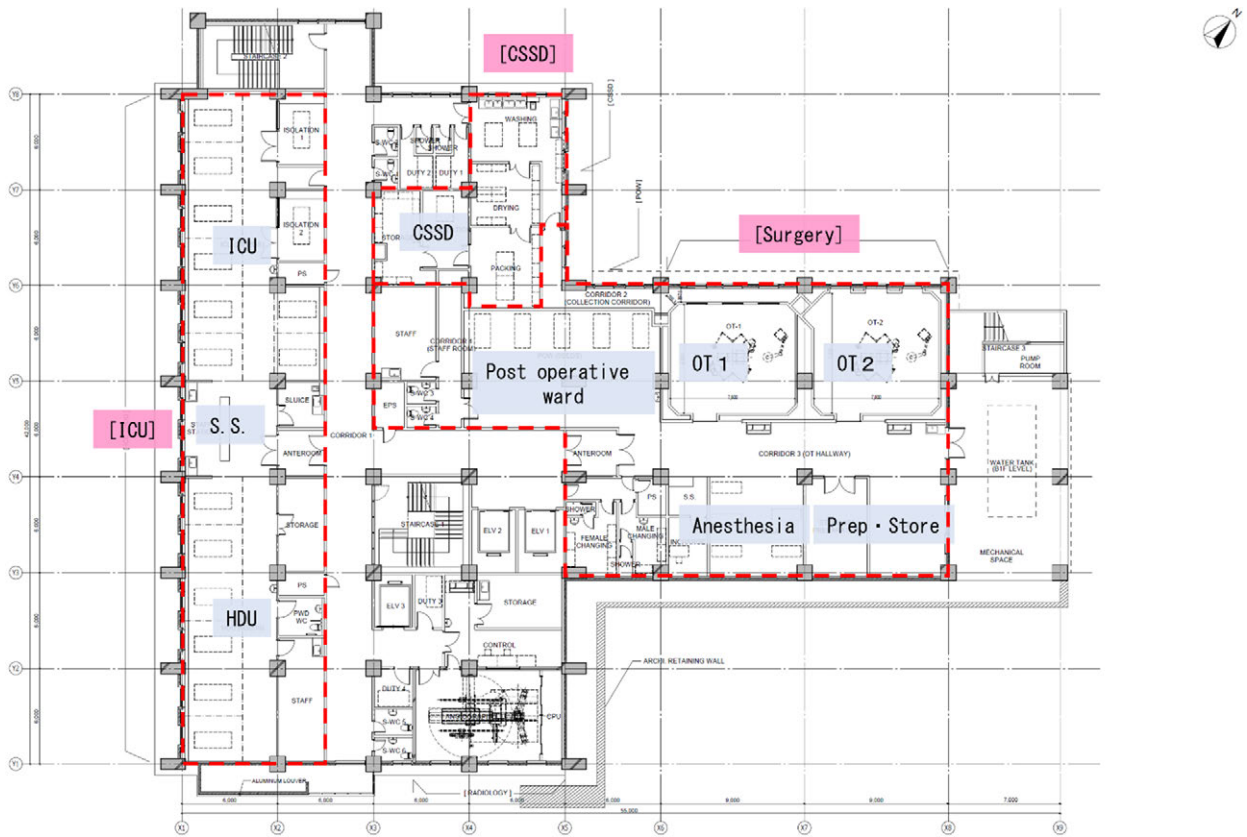


Source: JICA Survey Team

**Figure 2-6 Emergency Department and Radiology Department**

c) **Surgery Department, CSSD, Intensive Care Unit (ICU) (B1F)**

The surgical department will have two operating rooms with a correction corridor, and a short and efficient layout plan with a short flow line with the storage and preparation room, anesthesia room, and post-operative ward surrounding the operating rooms. The ICU and HDU will be located on either side of the staff station, with two individual bed rooms in the ICU. By placing the entrances to the operating rooms and intensive care units facing each other, the distance between the preoperative and post-operative transport of patients, especially those in critical condition, will be short, placing less burden on both the patients and staff. In Nepal, it is common practice to build separate cleaning and sterilization rooms for operating rooms and for general use, but the Emergency and Trauma Medical Center will consolidate them in one location to improve space and human resource efficiency.

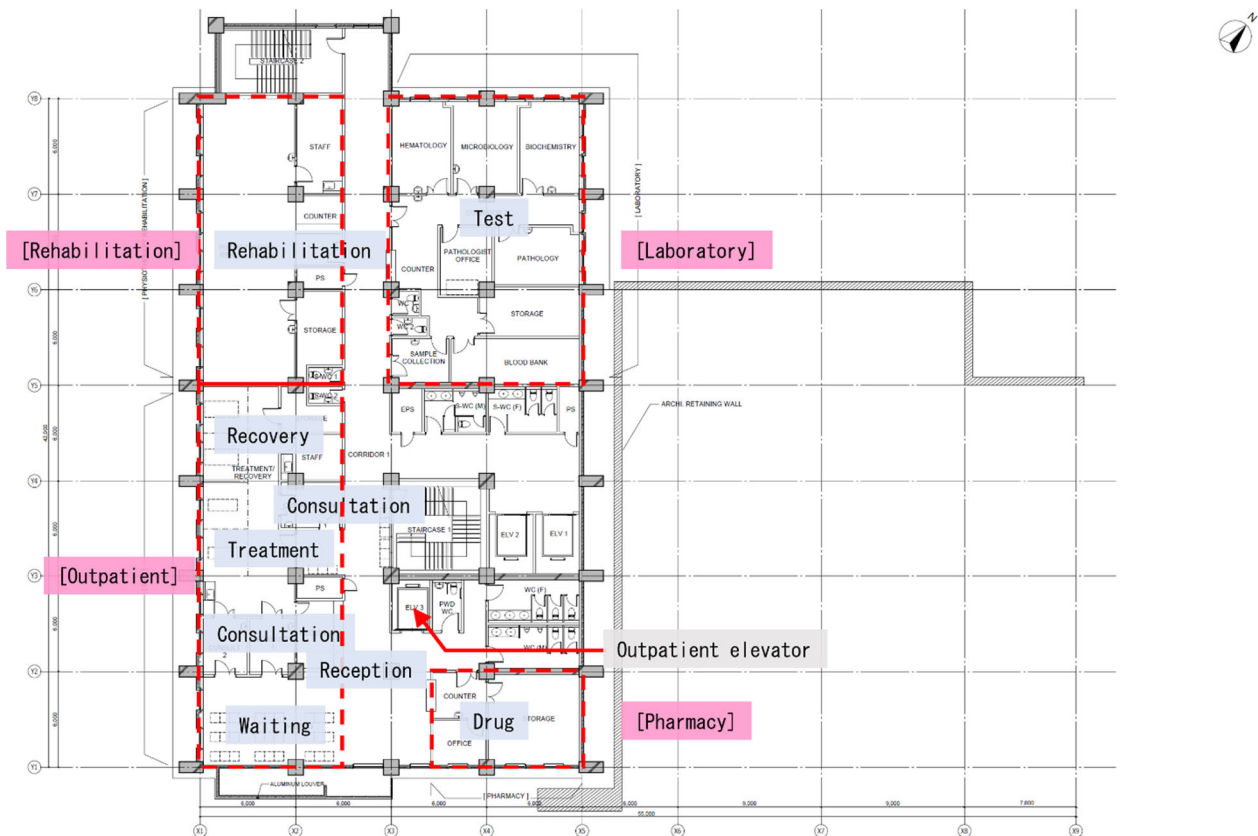


Source: JICA Survey Team

**Figure 2-7 Surgical Department, CSSD, Intensive Care Unit**

**d) Outpatient Department, Rehabilitation Department, Pharmacy Department, Laboratory Department (B2F)**

The outpatient department will be located on the second basement floor but will be accessible from the GF by a dedicated elevator. In consideration of patient privacy, three private consultation rooms will be provided, and a treatment / recovery room will be located behind the consultation rooms to organize the flow line. The laboratory, pharmacy, and rehabilitation departments related to the outpatient department will also be concentrated on the same floor to improve patient convenience. On the second basement floor, the area used by patients faces an exterior window, allowing for natural lighting and ventilation.



Source: JICA Survey Team

**Figure 2-8 Outpatient Department, Rehabilitation Department, Pharmacy Department, Laboratory Department**

e) **Supply and Administration Department (B3F)**

The third basement level will be dedicated to staff, with the administrative, educational, and supply departments. Since the level is accessible from the south road, the entrances for staff and services will also be located on the same floor.



Source: JICA Survey Team

**Figure 2-9 Supply and Administration Division**

**5) Floor Area**

The area of the new facility is shown below.

**Table 2-9 Floor Area**

Trauma and Emergency Center

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
3 <sup>rd</sup> Basement Floor	ADMIN/ RESEARCH AND EDUCATION/SERVICE	DIRECTOR	38.1	606.0
		SECRETARY	12.8	
		WC 1	6.0	
		ADMIN OFFICE	27.4	
		OFFICER	13.5	
		TRAINING EQUIPMENT	9.0	
		R&E OFFICE	27.4	
		LIBRARY	27.0	
		DEPT OFFICE 1	9.2	
		DEPT OFFICE 2	9.0	
		DEPT OFFICE 3	9.0	
		FEMALE CHANGING	42.3	



Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
		MALE CHANGING	21.0	
		POLICE	7.4	
		IT OFFICE	18.2	
		SERVER	18.2	
		JANITOR	13.5	
		AMBULANCE DRIVER	24.4	
		WC 2	3.2	
		CHANGING 1	6.8	
		MORTUARY	20.0	
		CONFERENCE HALL	72.4	
		CONFERENCE	10.0	
		CAFETERIA	80.4	
		KITCHEN	49.5	
		S-WC (F)	18.0	
		S-WC (M)	12.0	
	COMMON AREA	STAIRCASE 1	37.4	456.9
		STAIRCASE 2	34.6	
		CORRIDOR	216.6	
		PS 1	4.5	
		PS 2	4.5	
		PS 3	4.5	
		EPS	6.0	
		ELV 1	12.2	
		ELV 2	11.9	
		LINEN (CLEAN)	10.6	
	LINEN (DIRTY)	10.6		
	FIRE PUMP	21.2		
	CHANGING 2	9.2		
	GENERAL WASTE STORAGE	21.4		
	MEDICAL WASTE STORAGE	15.3		
	DISASTER MANAGEMENT STORAGE	36.6		
2 <sup>nd</sup> Basement Floor	PHYSIOTHERAPY REHABILITATION	PHYSIOTHERAPY REHABILITATION	117.0	158.7
		STAFF 1	18.8	
		COUNTER 1	7.5	
		STORAGE 1	15.3	
	OPD	TREATMENT/ RECOVERY	79.6	150.0
		STORAGE 2	9.3	
		STAFF 2	12.0	
		CONSULTATION 1	10.9	
		CONSULTATION 2	11.5	
		CONSULTATION 3	12.0	
	PHARMACY	RECEPTION	14.7	56.7
		COUNTER 2	10.4	
		OFFICE	10.3	
	LABORATORY	STORAGE 3	36.0	216.8
		HEMATOLOGY	22.6	
		MICROBIOLOGY	25.8	
		BOICHEMISTRY	24.1	
		CORRIDOR 2	41.4	
		PATHOLOGY	20.9	
		PATHOLOGIST OFFICE	14.9	
		COUNTER 3	4.5	
		STORAGE 4	20.7	
		SAMPLE COLLECTION	11.1	
		BLOOD BANK	24.9	
	COMMON AREA	WC 1	3.1	480.6
WC 2		3.0		
STAIRCASE 1		37.4		
STAIRCASE 2		34.6		
S- WC 1		2.7		
	S- WC 2	2.7		



Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
		S-WC (MALE)	12.0	
		S-WC (FEMALE)	13.5	
		PS 1	4.5	
		PS 2	4.5	
		PS 3	4.5	
		PWD WC	6.9	
		EPS	6.0	
		ELV 1	12.2	
		ELV 2	11.9	
		ELV 3	8.6	
		WC (M)	18.0	
		WC (F)	17.6	
		CORRIDOR 1, WAITING	283.2	
1 <sup>st</sup> Basement Floor	ICU / HDU	ICU (10 BEDS)	133.5	374.6
		ISOLATION 1	14.3	
		ISOLATION 2	13.5	
		STAFF STATION	36.4	
		SLUICE	9.0	
		ANTEROOM 1	9.0	
		STORAGE 1	18.0	
		HDU (6 BEDS)	109.3	
		PWD WC	7.5	
		STAFF	24.0	
	CSSD	WASHING	32.6	135.8
		DRYING	18.0	
		PACKING	24.0	
STERILIZATION		15.0		
STORAGE		19.0		
OPERATION THEATER	CORRIDOR 2 (COLLECTION CORRIDOR)	27.2	516.7	
	STAFF	24.0		
	CORRIDOR 4 (STAFF ROOM)	16.2		
	S-WC 3	3.0		
	S-WC 4	3.0		
	POW (5 BEDS)	93.1		
	OT-1	65.3		
	OT-2	77.5		
	CORRIDOR 3 (OT HALLWAY)	77.9		
	STORAGE 2	32.0		
	STORAGE/PREPARATION	25.6		
	ANESTHESIA	38.4		
	SS	6.4		
	INCHARGE	10.0		
	PS 3	4.8		
	MALE CHANGING	11.0		
	SHOWER 1	2.4		
	FEMALE CHANGING	14.2		
	SHOWER 2	2.0		
	ANTEROOM 2	9.9		
RADIOLOGY	ANGIOGRAPHY	47.7	101.7	
	CPU	9.0		
	CONTROL	25.9		
	STORAGE 3	19.1		
COMMON AREA	STAIRCASE 1	37.4	385.9	
	STAIRCASE 2	34.6		
	S-WC 1	3.2		
	S-WC 2	3.2		
	PS 1	4.5		
	PS 2	4.5		
	ELV 1	12.2		

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
		ELV 2	11.9	
		ELV 3	8.6	
		DUTY 1	6.7	
		SHOWER 1	2.2	
		DUTY 2	6.6	
		SHOWER 2	2.1	
		DUTY 3	6.5	
		DUTY 4	6.4	
		S-WC 5	4.5	
		S-WC 6	4.5	
		PUMP ROOM	10.3	
		CORRIDOR 1	210.2	
Ground Floor	EMERGENCY ER-OT	OBSERVATION (11 BEDS)	92.3	838.4
		PWD WC 1	5.9	
		S.S. 1	10.5	
		ISOLATION	12.3	
		GREEN (10 BEDS)	110.2	
		S.S. 2	11.2	
		PWD WC 2	5.1	
		YELLOW (6 BEDS)	96.2	
		S.S. 3	5.8	
		CORRIDOR 2	106.3	
		STAFF STATION	40.9	
		PLASTER/ PROCEDURE	13.1	
		RED (4 BEDS)	81.0	
		ER-OT	63.0	
		ANTEROOM 1	9.0	
		CORRIDOR 3 (SCRUB AREA)	16.0	
		STORAGE/PREPARATION/RECOVERY	25.2	
		CONTAMI SHOWER	8.8	
		TRIAGE	36.5	
		STORE	4.1	
		S-WC 3	2.9	
		S-WC 4	3.1	
		CHANGING 1	3.7	
		CHANGING 2	3.3	
		DUTY 1	4.3	
		DUTY 2	4.3	
		SLUICE	5.8	
		STORAGE 1	19.2	
		PS 3	3.8	
		PRE-HOSPITAL CARE/COMMUNICATION	15.5	
		STAFF	19.2	
	RADIOLOGY	MRI	37.1	248.3
		CPU 1	15.2	
		CONTROL/REPORT	33.9	
		ANTEROOM 2	20.6	
		CT	45.8	
		CPU 2	6.6	
		USG	26.3	
		STORAGE 2	3.5	
		X-RAY	24.1	
		CONTROL	13.1	
		RECEPTION	22.2	
	COMMON AREA	CORRIDOR 1	259.0	417.8
		STAIRCASE 1	37.4	
		STAIRCASE 2	34.6	
		S-WC 1	2.7	
		S-WC 2	3.4	
		PS 1	4.4	

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
		PS 2	5.2	
		EPS	6.0	
		ELV 1	12.2	
		ELV 2	11.9	
		ELV 3	8.6	
		PWD WC 3	6.9	
		WC (M)	12.8	
		WC (F)	12.8	
1 <sup>st</sup> Floor	INPATIENT WARD	5-BED 1	51.0	674.0
		BTH 1	6.0	
		4-BED 1	42.4	
		BTH 2	6.0	
		4-BED 2	42.4	
		BATH 3	6.0	
		4-BED 3	42.4	
		BATH 4	6.0	
		4-BED 4	42.4	
		BATH 5	6.0	
		4-BED 5	42.4	
		BATH 6	6.0	
		5-BED 2	48.4	
		BATH 7	6.0	
		6-BED 1	60.4	
		BATH 8	6.0	
		6-BED 2	59.8	
		BATH 9	5.8	
		TREATMENT	17.7	
		STAFF	28.7	
		DRUG PREPARATION	13.7	
		STAFF STATION	41.6	
		COUNSELLING	7.0	
		INCHARGE	7.3	
		1-BED 1	13.6	
		BATH 10	4.8	
		1-BED 2	13.4	
		BATH 11	4.6	
		1-BED 3	13.4	
		BATH 12	4.6	
		1-BED 4	13.4	
		BATH 13	4.6	
	COMMON AREA	STAIRCASE 2	34.6	391.1
		PS 1	6.0	
		STORAGE	12.0	
		JANITOR	6.0	
		PS 2	6.0	
		DUTY 1	6.0	
		DUTY 2	6.0	
		SLUICE	7.7	
		LINEN 1	4.5	
		LINEN 2	4.7	
		EPS	6.0	
		ELV 1	12.5	
		ELV 2	11.9	
		STAIRCASE 1	37.4	
		S-WC 1	3.7	
		S-WC 2	3.2	
		SHOWER	3.2	
		CORRIDOR	219.8	
Penthouse Floor	COMMON AREA	STAIRCASE 1	43.5	127.8
		ELECTRICAL	84.3	

#### Medical Gas Building

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
Ground Floor	—	MEDICAL GAS STORAGE (SUPPLY)	32.1	70.6
		MEDICAL GAS STORAGE (USED)	13.3	
		COMPRESSOR / VACUUM PUMP ROOM	25.2	

#### Generator Building

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
Ground Floor	—	GENERATOR	60.0	60.0

#### Guard House

Floor	Department	Room	Room Floor Area (m <sup>2</sup> )	Dept. Floor Area (m <sup>2</sup> )
Ground Floor	—	GUARD HOUSE	15.8	15.8

#### Total Floor Area

Building	Floor	Floor Area (m <sup>2</sup> )	Total Floor Area (m <sup>2</sup> )
Trauma and Emergency Center	3 <sup>rd</sup> Basement Floor	1,062.9	6,338.0
	2 <sup>nd</sup> Basement Floor	1,062.9	
	1 <sup>st</sup> Basement Floor	1,514.8	
	Ground Floor	1,504.5	
	1 <sup>st</sup> Floor	1,065.1	
	Penthouse Floor	127.8	
Medical Gas Building	Ground Floor	70.6	70.6
Generator Building	Ground Floor	60.0	60.0
Guard House	Ground Floor	15.8	15.8
Total Floor Area			6,484.4

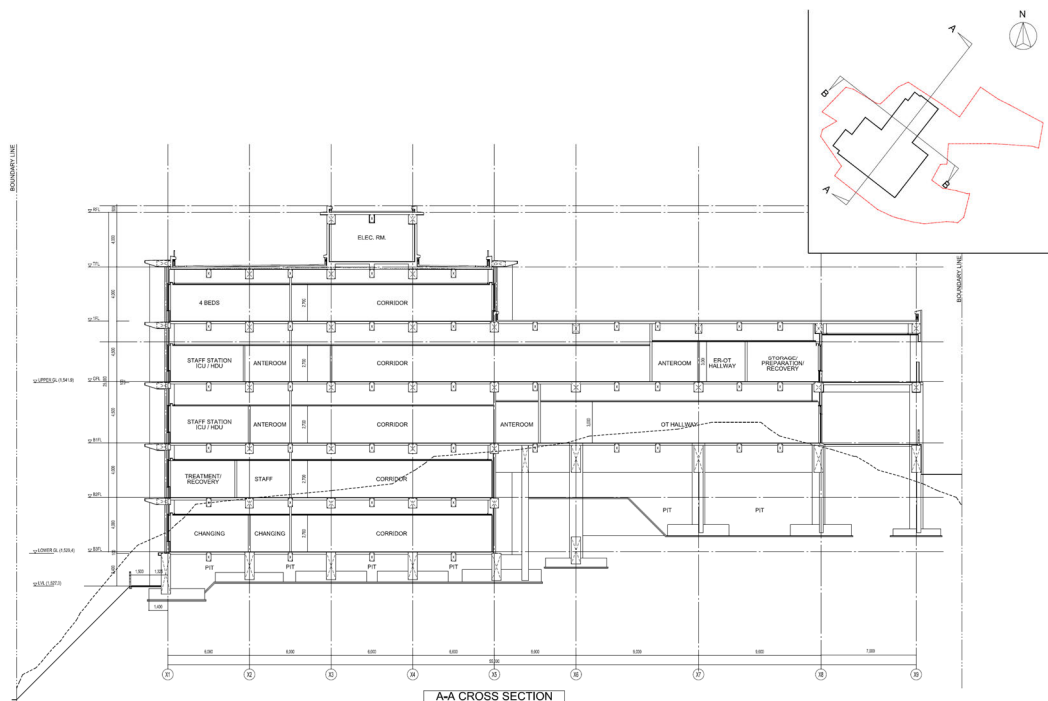
Source: JICA Survey Team

## 6) Sectional Plan

In planning each section, it is necessary to consider the differences in elevation of the site, the fact that it is a Trauma and Emergency Center, and the climatic factors.

- Considering the site shape with the difference in elevation, the area facing the road on the north side will be built from the first basement level, where the building can be supported on spread foundations. In the area along the road on the south side, the ground level will be lowered to the third basement level to minimize the difference in elevation from the road and the amount of retaining wall construction.
- Dry areas will be provided on some of the exterior basement walls facing the soil to create a physical distance between the building and the soil to avoid the seepage of spring water and moisture.
- The south facade, which has a large exterior wall area, is designed with deep eaves to control solar radiation for a comfortable indoor environment and to allow natural ventilation even when it rains.

- The floor height of the GF and B1F, where the emergency and surgical departments are located, should be 4.5 m, while the other floors should be 4.0 m. The standard ceiling height of the rooms should be 2.7 m. The plan should not interfere with mechanical equipment piping, etc. in the ceiling.
- For rapid patient transport, two elevators that can transport patients in bed will be installed. Since the outpatient area is expected to be used by many trauma patients, an elevator dedicated to outpatient care as well as outpatient rehabilitation will be installed to ensure rapid patient transport and a universal design.
- The facility from the second basement to the first floor above ground will be used by patients, and the staff and supply/administration departments will be concentrated on the third basement floor, separating the patient and staff areas by level.



Source: JICA Survey Team

**Figure 2-10 Sectional Plan**

### (3) Structural Planning

#### 1) Basic Policies

The following policies shall apply to the structural plan.

- Accurate assessment of topography, geology, supporting ground, and other ground conditions of the proposed site, and plan safe and rational foundations and basement floors.
- Since the building will be constructed on a sloping site, earth pressure should be considered in the design.

- The structural frame should consider deflection, vibration, etc. under long-term loading so that it does not interfere with the medical facility.
- Ensure sufficient safety without compromising the building's capacity to withstand short-term loads such as earthquakes and strong winds.
- The main structure will be a reinforced concrete frame structure, which is common and economical in Nepal.
- Structural bearing walls shall be reinforced concrete, and general exterior and interior walls other than bearing walls shall be based on brick walls.
- The roof is planned as a reinforced concrete flat roof.

## 2) Structural Design Policies

- The foundation structure will be spread foundation, as the results of the ground investigation have confirmed stable ground.
- The foundation type shall be pad foundation (partially used combination of continuous strip foundation and raft foundation) with the bottom level of the foundation set at GL-2.2 – 3.5 m.
- The long-term allowable bearing capacity of the ground shall be 200 kN/m<sup>2</sup>.
- If the support layer is deeper from the bottom of the foundation due to the slope of the ground, rubble concrete should be placed up to the stable ground to support the building.
- In the basement floors, load-bearing walls should be appropriately placed to ensure safety against earth pressure.
- The design load shall be determined with reference to Nepal Building Codes (NBC103, IS: 875 part 2) and Japanese standards.
- For seismic design, base shear coefficients are determined based on Nepal Building Codes (NBC 105).
- For the wind resistance design, the reference wind speed shall be 47 m/sec based on Nepal Building Codes (NBC104).
- Snow loads are not considered since the area is snow free according to Nepal Building Codes (NBC106).

**Table 2-10 Factors for Setting Seismic Forces**

Seismic load	
Seismic Zone Factor	Z=0.35
Importance factor	I =1.5 (Hospital)
Soil Type	Soil Type A Stiff or Hard Soil Sites (N-Value > 30)
Ductility Factor	R <sub>μ</sub> =4
Over-strength factor	Ω <sub>u</sub> =1.5

Source: NBC105

**Table 2-11 Design Loads (Live Loads)**

Live Load for floor and small beam design (N/m <sup>2</sup> )	
Roof	1,000
Bed room	2,000
Office	2,500
Treatment Rooms and Operating Rooms	3,900
Machine Room and Electrical Room	5,000

Source: NBC105

### 3) Structural Materials

Structural materials used are shown in Table 2-12.

**Table 2-12 Structural Materials**

Concrete	Foundation to B3 floor	M30 (Cube compressive strength) $F_c=24\text{N/mm}^2$
	B3F Pillar to Roof	M30 (Cube compressive strength) $F_c=24\text{N/mm}^2$
	Utility building	M30 (Cube compressive strength) $F_c=24\text{N/mm}^2$
Rebar	Deformed rebar D10 to D16	Grade Fe500
	Deformed rebar D20 to D25	Grade Fe500
Steel	Utility building structural member	Grade E250

Source: JICA Survey Team

### (4) Mechanical Design

#### 1) Plumbing

##### a) Water Supply Equipment

The water supply system will be based on receiving tank operated by a pressurized water pump system to supply water to sanitary equipment and medical devices that require a water supply. The water receiving tank will be made of FRP and installed outside on the first basement level in consideration of sanitation.

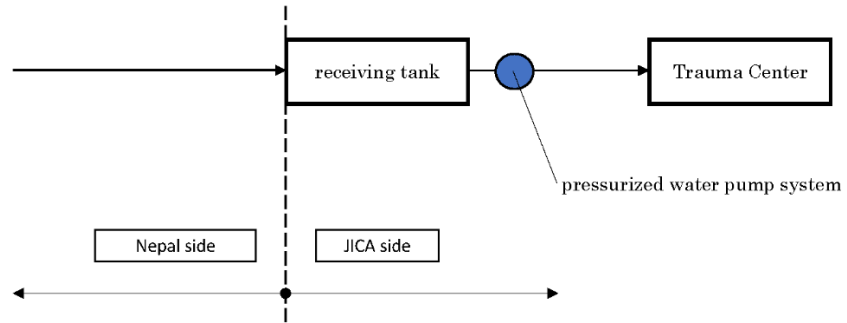
The planned water supply volume is 34 m<sup>3</sup>/day according to Nepalese national regulation, but considering the actual use of the existing hospital, it is set at 50 m<sup>3</sup>.

- Planned water volume: 50 m<sup>3</sup> (500 L/day per floor)
- Receiving tank capacity: 50 m<sup>3</sup> (daily water supply usage)

Water sources shall be city water and well water.

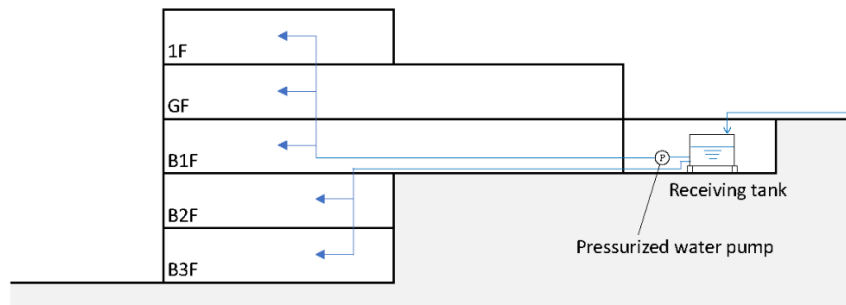
- The piping within the existing hospital site from the city water intake to the new water receiving tank shall be borne by Nepalese side.
- Water and well water will be piped from a newly constructed well on the site to the Trauma and Emergency Center site.

- Install a sand filtration system near the receiving water tank. Install RO equipment to purify the water separately at water supply points for drinking water, sterilization equipment, etc.



Source: JICA Survey Team

**Figure 2-11 Water Supply Construction Classification Chart**



Source: JICA Survey Team

**Figure 2-12 Water Supply System Diagram**

**b) Drainage System**

Drainage shall be by indoor diversion. In principle, gravity drainage is used, but if the drainage slope to the discharge point cannot be secured due to the location of the building in relation to the site level, a pump should be used.

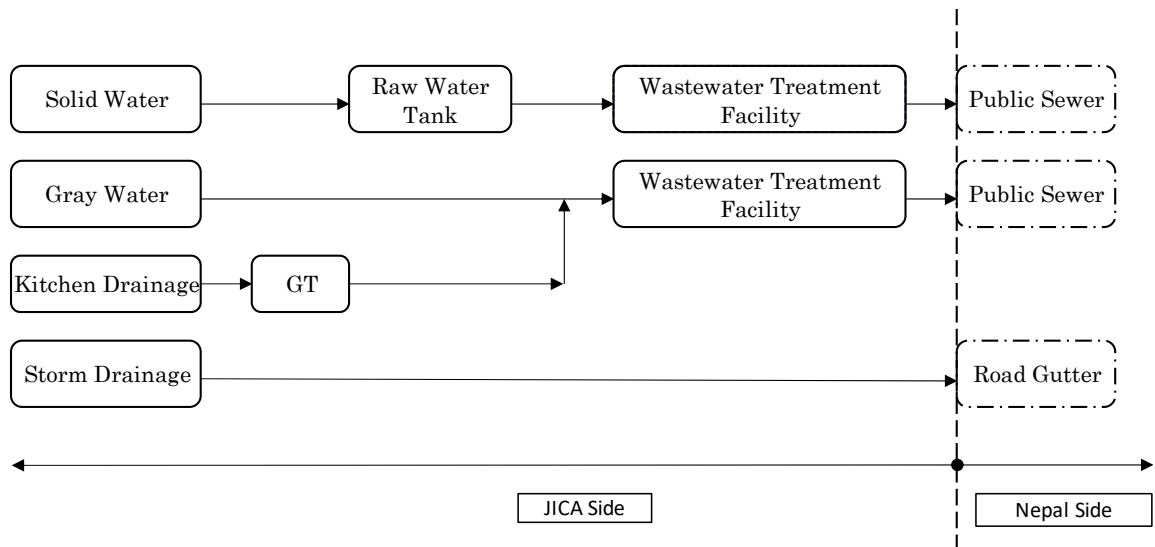
A new wastewater treatment facility dedicated to the Trauma and Emergency Center will be constructed to treat laboratory wastewater, sewage, and miscellaneous wastewater, which will be discharged to the existing public sewer on the south side of the site. Stormwater drainage will be discharged to the public sewer on the south side of the proposed construction site and to the road gutter on the east side.

**Table 2-13 Effluent Standards**

Classification.	Standard Value		
	TSS (mg/L)	BOD (mg/L)	COD (mg/L)
Effluent standards for discharges from sewage treatment plants to inland waters	50	50	250

Source: Nepal's general standards on permissible limits for wastewater discharged to inland surface waters





Source: JICA Survey Team

**Figure 2-13 Drainage Construction Classification Chart**

**c) Hot Water Supply System**

The main supply points for hot water will be hand wash basins for staff, hand wash basins for surgery, showers, etc. A central hot water supply system will be provided by solar water heaters.



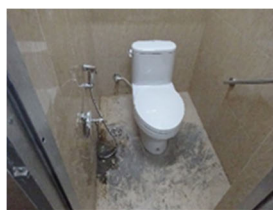
Source: JICA Survey Team

**Figure 2-14 Reference Photograph of Solar Heat Collector**

**d) Sanitary Appliances**

Select appropriate sanitation equipment for the intended use.

- The large urinals will be Western-style toilets, but the installation of *adiampan* toilets will be considered for some of the toilets used by patients.
- Faucets will be lever-type, but automatic faucets for handwashing to be used by hospital staff are considered.



Western-style toilet



Asian panhandle



Western-style toilet

Source: JICA Survey Team

**Figure 2-15 Large Urinal Reference Photograph**

**e) Fire Extinguishing Equipment**

Fire extinguishing equipment shall comply with Nepalese national standards, and the following equipment shall be installed:

- Indoor fire hydrant
- Fire hydrant pump
- Fire extinguisher

**f) Medical Gas Facilities**

Venting equipment for oxygen, laughing gas, air, suction, and excess anesthetic gas should be provided. Nontherapeutic air should be identified for use or not.

The following table shows the proposed medical gas supply locations for each department.

**Table 2-14 Medical Gas Supply**

Floor	Department	Rooms and Types of Medical Gas Outlets to Be Installed
GF	Emergency	Triage area: OV, Treatment room (red) (4 beds): Treatment room (yellow) (6 beds): OAV, Treatment room (green) (10 beds): OV, Observation room (11 beds): OV
GF	Emergency surgery	Emergency operating room: ONAV, Preparation/recovery room: OAV
GF	Radiology	X-ray room: OV
1F	Ward	Treatment rooms: OV, 1-bed rooms x 4: OV, 4-bed rooms x 5: OV, 5-bed rooms x 2: OV, 6-bed room x 2: OV
B1F	Surgery	Operating rooms (2 rooms): OAV, Anesthesia rooms: OAV, Post-op ward: OAV
B1F	Intensive care unit	ICU (10 beds): OAV, HDU (6 beds): OAV
B2F	Outpatient	Recovery room: OV

Source: JICA Survey Team

The amount of each medical gas used shall be calculated in accordance with the Japanese "JMG-FCT0001 Medical Gas Piping System Design Guideline".

## 2) Air Conditioning and Ventilation Equipment

### a) Air Conditioning

Air-conditioning system shall be planned as multitype air-cooled heat pump packaged air conditioner or split type for each department or room use, taking into consideration the time of use, air-conditioning heat load, etc.

The air-cooled heat pump package system is suitable for this project due to the following features:

- It is easy to follow the air-conditioning load processing, and it is easy to individualize the system for each department.
- It is easy to switch between cooling and heating operation for each system.
- Suitable for exothermic treatment of medical equipment.
- No need for dedicated machine room space in the building.
- No piping for cold water, hot water, etc. as heat exchange media is required, reducing PS (pipe space/shaft) area in the building, and conveying power.
- By installing outdoor units on equipment balconies near each system, the length of refrigerant piping can also be reduced.
- Maintenance is easy without the need to constantly assign specialized maintenance personnel.

The capacity of each air conditioner shall be calculated and selected based on the following design conditions. The design ambient air conditions shall be based on ASHRAE Fundamental 2012.

**Table 2-15 Air Conditioning Design Conditions**

	Outside Air Temperature	Indoor Temperature and Humidity Condition		
		General Room	Operating Rooms	
	Dry Bulb (°C)	Dry Bulb (°C)	Dry Bulb (°C)	Relative Humidity (%)
Summer Period	29.1 (Jun)	26	25	55
Winter Period	2.4 (January)	22	25	55

Source: JICA Survey Team

In addition, the scope of air-conditioning installation is planned to maintain an appropriate room environment for advanced medical activities and to remove heat generated by medical equipment. Table 2-16 shows the rooms that may require individual air-conditioning for these purposes.

Table 2-17 shows rooms that should be air-conditioned, but the necessity of installing air-conditioning equipment should be planned in consideration of the project cost and other factors.

These rooms are for the Director and medical personnel, so it is necessary to consider installing air conditioners.

**Table 2-16 Rooms to Be Air-Conditioned**

Floor	Department	Rooms to Be Air-Conditioned
GF	Emergency	Triage area / Contamination shower room / Treatment room (red) (4 beds) / Treatment room (yellow) (6 beds) / Treatment room (green) (10 beds) / Observation room (11 beds) / Staff station / Plaster procedure room
GF	Emergency surgery	Emergency operating room (1 room) / Storage and preparation room / Recovery room / Changing room
GF	Radiology	MRI / X-ray room / Ultrasonography room / Control room / Report room
1F	Ward	1-bed room (4 rooms) / 4-bed rooms (5 rooms) / 5-bed rooms (2 rooms) / 6-bed rooms (2 rooms) / Staff station / Drug preparation room / Treatment room / Counseling room / Staff room
B1F	Surgery	Operating rooms (2 rooms) / Anesthesia rooms / Storage / Preparation room / Recovery room / Changing room / Post-operative ward (5 beds), CSSD
B1F	Intensive care unit	ICU (10 beds) / HDU (High Dependency Unit) (6 beds) / Staff Station
B2F	Rehabilitation	Rehabilitation Room / Staff Room
B2F	Outpatient	Consultation room (3 rooms) / Treatment room / Recovery room
B2F	Pharmacy	Office / Reception / Storage
B2F	Laboratory	Sample collection room / urine collection toilet / biochemistry laboratory / hematology laboratory / microbiology laboratory / pathology laboratory / Storage / Blood bank room
B3F	Administration Education Supply	Director's Office / Office / IT & Server Room Office / Library / Conference Hall & Workshop Room Linen storage / Kitchen / Staff cafeteria / Changing room / Mortuary

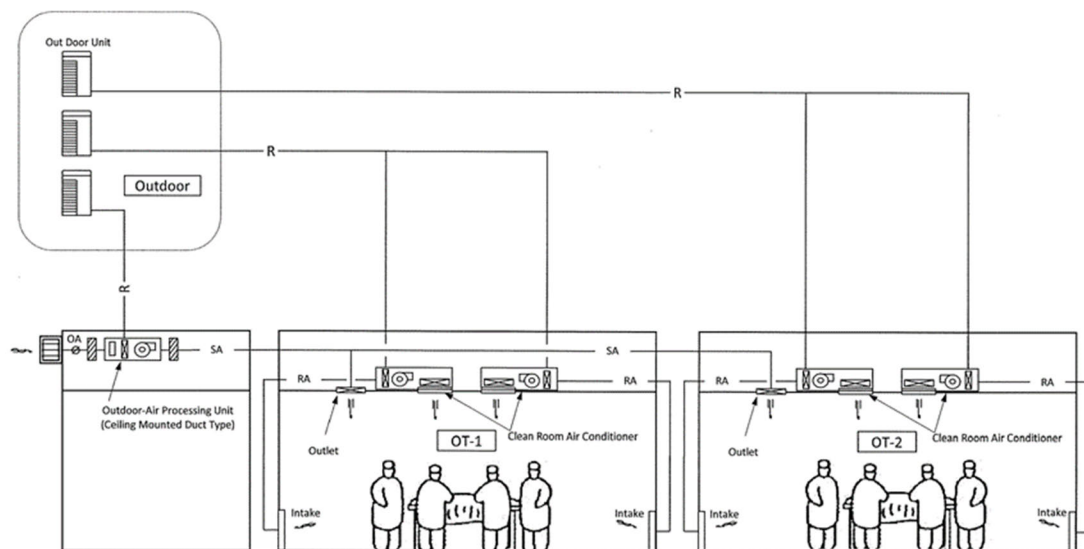
Source: JICA Survey Team

**Table 2-17 Rooms to Be Considered for HVAC Installation**

Floor	Department	Rooms to Be Air-Conditioned
B3	Administration Education Supply	Director's Office / Office / IT and Server Room Office / Library / Conference Hall and Workshop Room Linen storage / Kitchen / Staff cafeteria / Changing room / Mortuary

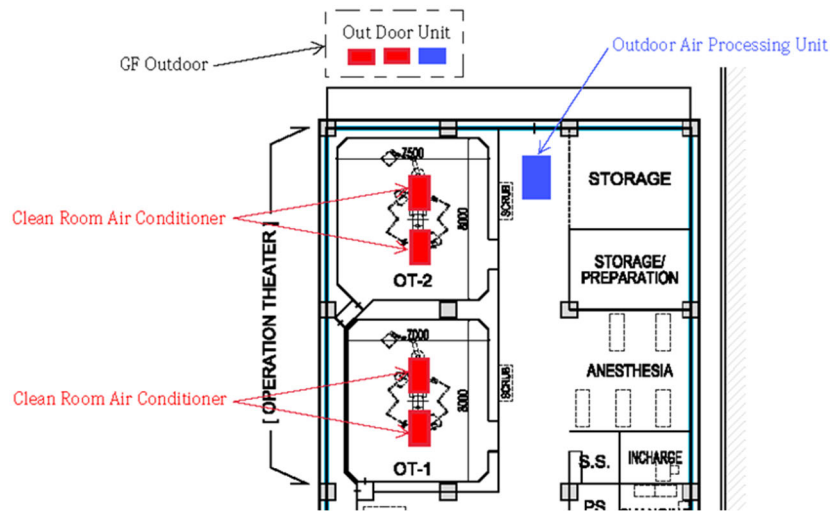
Source: JICA Survey Team

A vertical laminar flow air-conditioning system with a clean package equipped with a HEPA filter on the ceiling will be considered for the operating room. The air cleanliness of the surgical field is assumed to be ISO Class 7. The operating rooms in the main building are equipped with the same system, and a HEPA filter replacement system is in place.



Source: JICA Survey Team

**Figure 2-16 Operating Room Air-Conditioning Flowchart**



Source: JICA Survey Team

**Figure 2-17 Operating Room Air-Conditioner Plot Diagram**

**b) Ventilation Equipment**

Plan appropriate mechanical ventilation equipment considering the use of each room. The table below shows the criteria for installation of ventilation equipment.

**Table 2-18 Ventilation System Installation Standards**

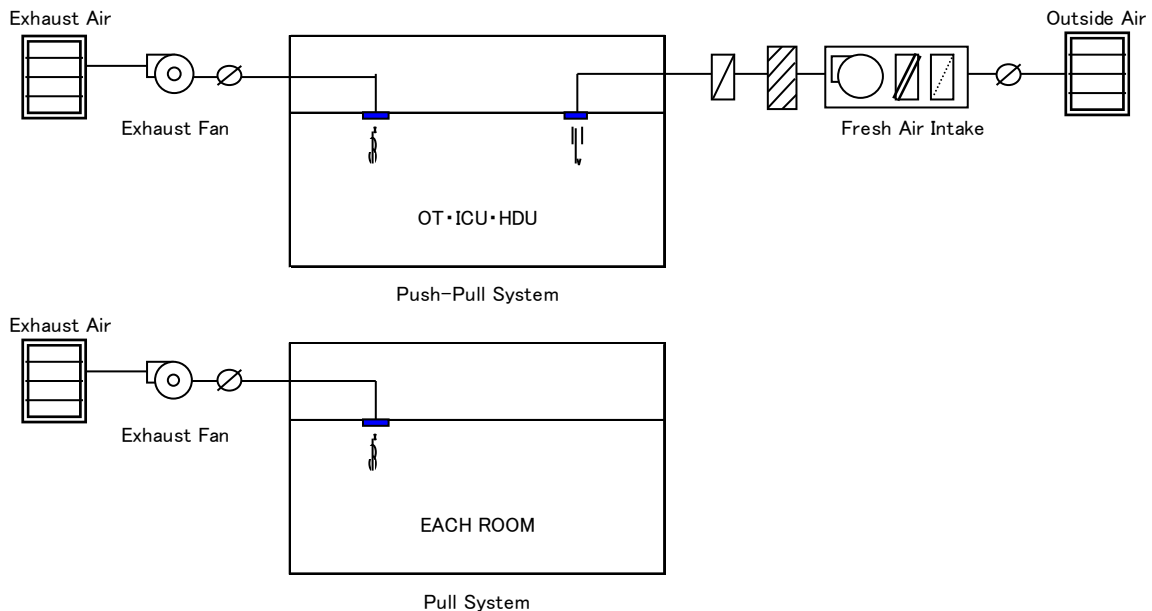
Room	Type of Ventilation	Unit Ventilation Rate	Remarks
Rooms to Be Air-Conditioned : Operating Room · ICU · HDU	Air Supply Fan Exhaust Fan	25 m <sup>3</sup> / person · hr.	Consider if there is a need to install a HEPA filter.
Rooms to Be Air-Conditioned : Rooms Other Than the Above	Exhaust Fan	2 times / hr.	
WC	Exhaust Fan	10 times / hr.	
BTH	Exhaust Fan	5 times / hr.	
Storage	Exhaust Fan	5 times / hr.	

Source: JICA Survey Team

Room	Type of ventilation	Unit ventilation rate	Remarks
Rooms to be air-conditioned : operating room · ICU · HDU	air supply fan exhaust fan	25m <sup>3</sup> / person · hr.	Need to consider whether or not a HEPA filter is installed.
Rooms to be air-conditioned : rooms other than the above	exhaust fan	2 times / hr.	
WC	exhaust fan	1 0 times / hr.	
BTH	exhaust fan	5 times / hr.	
storage	exhaust fan	5 times / hr.	

Note: Unit ventilation rate is based on the Japanese standard, and its adoption or non-adoption requires consideration.

Source: JICA Survey Team



Source: JICA Survey Team

**Figure 2-18 Schematic Diagram of Ventilation System**

Air supply to operating rooms and ICU/HDU will be provided by air-cooled packaged air conditioners with outside air treatment. Especially in the following rooms, differential pressure settings between rooms should be considered in consideration of a pandemic.

- Operating room: switchable between negative and positive pressure.
- Treatment rooms (red) (4 beds), Intensive Care Unit: Negative pressure can be set.

### 3) Electrical Equipment

#### a) Transformer Substation

The existing facility draws power overhead from Banepa substation of Nepal Electricity Authority (NEA) connected to Dhulikhel Hospital's dedicated medium-voltage transmission line (11kV) which receives power directly from a transformer installed outside. Three transformers of 500kVA, 630kVA, and 200kVA (total: 1,330kVA) are installed on the hospital site to supply low-voltage power to each area of the hospital. However, due to distance to the proposed construction site and height difference, it is difficult to use the existing transformer. Therefore, it is preferable to supply power to the new planned building by drawing power from a new source. A new Bakunde power line laid on the front road of the proposed construction site will be pulled in, and a 500kVA transformer and power receiving panel will be installed on the site. The site will have overhead electric lines laid and drawn into the generator room.

- Receiving voltage: 11kV 3-phase 3-wire, 50Hz

The assumed capacity calculation table for power receiving and transforming facilities shall be the total capacity calculated according to the following table.

**Table 2-19 Assumed Load Capacity Calculation Table (Entire Building)**

Load Name	Load Density (w/m <sup>2</sup> )	Floor Space (m <sup>2</sup> )	Load Carrying Capacity (kW)
Lighting outlet load pumps, conveyors, etc.	30	6,564	196.92
Medical and laboratory equipment, etc.	11	6,564	72.2
Air-conditioning equipment	100	1,000	100
plan			369.1
kVA conversion			461.4 kVA
Demand rate 70%			323kVA
Total amount			350kVA

Source: JICA Survey Team

The total assumed installed capacity is 461 kVA, and assuming a demand rate of 70%, the maximum power demand is as follows:

- Assumed capacity:  $461\text{kVA} \times 0.7 = 323\text{kVA} \rightarrow 350\text{kVA}$

Adding the capacity of the radiation equipment to be installed in the future (150 kVA) to the above, the maximum power demand will be 500 kVA (400 kW).

#### b) Emergency Power Generation Equipment

Two private generators will be installed in the new generator building and will be operated alternately in the event of a major disaster. Fuel will be stored in drums and refueling will be provided at a nearby gas station.

- Generator specifications: Outdoor cubicle type 3Φ4W 400V 350kVA x 2 units, prime mover diesel engine
- Fuel stockpile: 2,000 liters of diesel oil (installed outdoors) for 48 hours

**c) Uninterruptible Power Supply Equipment**

An uninterruptible power supply (UPS) will be installed in the electrical room for medical rooms where critically ill patients are treated, and which even a momentary power failure is not tolerated. Backups are also expected for radiological equipment such as angiography rooms, CT, and X-ray equipment to be installed in the future. In addition, consideration will be given to installing products that can be maintained and the batteries that are consumables can be replaced.

Supply locations will be electrical outlets in operating rooms, ICU, HDU, and procedure rooms (red). In addition, backup for X-ray equipment is anticipated.

The specifications of the equipment shall be similar to those of the current hospital.

Outline Specifications

- Storage battery: 150 KVA
- Discharge time: 10 minutes (automatically switched to generator power after the generator starts transmitting power)

The assumed capacity of the storage batteries shall be the total capacity calculated according to the table below.

**Table 2-20 Assumed Load Capacity Calculation Table (Uninterruptible Power Supply)**

Room Name	Load capacity (kVA)	Number of Rooms	Total (kVA)
Treatment room (red)	5	4	20
ICU	5	10	50
HDU	3	6	18
Operating room	7	3	21
CT, MRI, Angiography room, General radiography room	50	4	200
Total amount			311
Demand rate 50			≒ 150

Source: JICA Survey Team

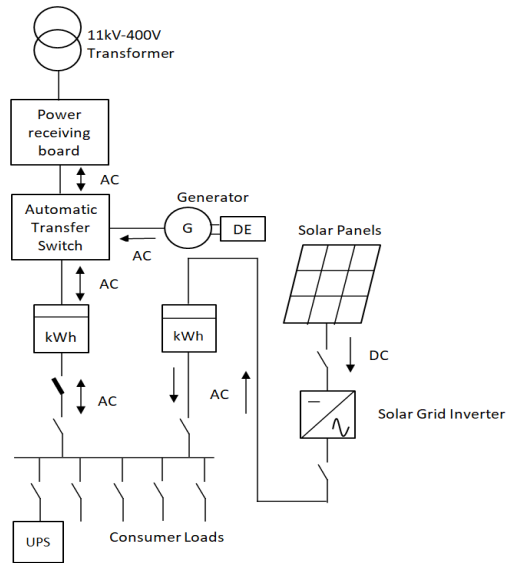
**d) Solar Power Generation Equipment**

Photovoltaic power generation equipment and solar panels (24 kW) will be installed on the roof, and the generated power will be connected to the commercial power supply circuit and the storage battery circuit. The solar arrays will be installed after considering the surrounding conditions, orientation, slope, etc.

- Panel specifications: 270W × 88 23.7kW

A schematic diagram of the photovoltaic facility is shown below.





Source: JICA Survey Team

**Figure 2-19 Schematic Diagram of Photovoltaic Power Generation System**

**e) Trunk Line Equipment**

The power shall be distributed from the rooftop electrical room to each location via distribution boards using 3-phase, 4-wire 400/230V 50Hz systems, taking into consideration the load application and facility classification. The trunk line capacity shall be set to satisfy the appropriate voltage drop and allowable current value according to the capacity of the connected facilities.

In principle, cable racks should be used for wiring in the shafts, and piped wiring should be used for other areas. Since voltage fluctuations may exceed the generally acceptable range of  $\pm 10\%$ , it is planned to prevent malfunctions and failures of equipment due to abnormal voltage fluctuations by installing trunk lines from the low-voltage distribution panel at the facility to the power supply system through an automatic voltage regulator (AVR).

**f) Lighting Equipment**

Lighting facilities should be planned mainly using LED equipment in consideration of maintenance and running costs. The lighting plan shall be as shown in Table 2-21 based on the IS standard as the illuminance standard.

**Table 2-21 Design Standard Illuminance**

Room Name	Average Illuminance (Lx)		Remarks
	IS3646:1992	Planned Illuminance	
Waiting room	100-150-200	150	
Corridor	100-150-200	150	
Examining room	200-300-500	300	
Treatment room	-	500	
Inspection room	200-300-500	300	
General radiography room	150-200-300	200	
Operating room	300-500-750	750	
Administrative division	300-500-750	500	
Hospital room	200-300-500	300	
ICU/HDU	200-300-500	300	
Emergency department	-	500	
Staff station	200-300-500	300	
Toilet	-	100	Photosensors

Source: IS.3646.1.1992

The lighting flashing method is based on individual switches for each room, with separate flashing circuits for each necessary compartment. Toilets are controlled by motion sensors to prevent forgetting to turn off the lights and to save energy.

**g) Electrical Outlet Facilities**

The generator circuit will be used as the basic circuit, and C-type outlets will be used. Four outlets are planned at the bedside of general patient rooms, and an uninterruptible power supply circuit with four more outlets is planned for critical care beds.

**h) Telephone Equipment**

The telephone line to the new center will be connected to the MDF in the server room from the line located outside on the road in front of the site

The extension line will be connected to the existing hospital PAEBX with optical cable, piped and wired to all necessary locations.

**i) Information Facilities**

An optical cable from the front road to the new center runs to connect it to the media converter in the server room. A hub in the EPS, piping, and LAN wiring will be installed to all necessary locations.

**j) TV Communicating Equipment**

TV terminals will be installed in the office for gathering information and in the waiting room for patient amenities. Television will be cable TV and converted with a media converter.

**k) Elevator Intercom System**

An intercom system shall be installed in the elevator to allow communication during emergencies. The intercom system should enable calls to the guardhouse.

**l) Nurse Call Facilities**

Emergency nurse call buttons shall be installed in each bed and toilet. Receivers shall be installed at staff stations.

**m) Surveillance Camera Equipment**

Surveillance cameras will be installed for security purposes at prime positions such as exterior entrances and exits, elevator halls, etc. A control unit will be located in the server room at B3F. External output monitors will be installed in the guardhouse for monitoring purposes.

**n) Access Control Facilities**

For security purposes, electric locks will be installed in the surgical area, ICU/HDU, Director's office, and examination area. The specifications comprised of a card key and card reader with input key.

**o) Fire Alarm System**

A fire alarm system in accordance with Labor Rules.2050 (1993) will be installed. A fire alarm receiver shall be installed in the server room. A repeater panel will be installed in the guardhouse.

**p) Broadcasting Equipment Construction**

An in-building broadcasting system for both business broadcasting and evacuation guidance in case of fire will be installed. Amplifiers shall be installed in the server room.

**q) Lightning Protection Equipment**

In accordance with NBC 207:2003, a butt-needle shall be installed on the rooftop and the grounding wire shall be buried underground to prevent damage to buildings and equipment caused by lightning strikes. The lightning protection equipment shall be Protection Level III based on JIS A 4201:2003 (IEC 61024-1:1990).

**2-2-2-2 Equipment Outline Design**

Discussions on equipment plan began with the initial request of 108 items, and the necessity and appropriateness of the equipment were examined. As a result, 51 equipment were selected as described in the Minutes of Discussion in September 2021. Subsequently, due to changes in the equipment budget affected by the rapid depreciation of Japanese yen and rising material cost and transportation prices, 51 equipment was re-prioritized into A-1 to A-3 as stated in the Minutes of Discussion in September 2022 (Table 2-22). The plan is to procure equipment that fall under priority A-1: CT, C-

arm, X-ray, Anesthesia machines, Operating lump, Operating tables, Beds, ICU beds, and Autoclaves, and some equipment under priority A-2. If the budget for equipment procurement is increased, equipment to be procured will be considered in the order of A-2 and A-3 within the budget.

**Table 2-22 Equipment List**

No.	Name of the equipment	Total Q'ty	Priority
1	CT	1	A-1
2	C-arm	2	A-1
3	X-ray	1	A-1
4	Anesthesia machine	3	A-1
5	Operating light	3	A-1
6	Operating table	3	A-1
7	Bed	84	A-1
8	ICU bed	16	A-1
9	Autoclave B	1	A-1
10	MRI	1	A-2
11	Angiography	1	A-2
12	Ultrasound machine	2	A-2
13	Hemodialysis machine	2	A-2
14	Blood gas analyzer	1	A-2
15	Biochemistry analyzer	2	A-2
16	Hematology analyzer	1	A-2
17	Blood bank refrigerator	2	A-2
18	Ventilator	5	A-2
19	Portable X-ray	2	A-3
20	Portable ultrasound machine	1	A-3
21	Portable ventilator	2	A-3
22	ECG machine	2	A-3
23	Patient monitor A	39	A-3
24	Defibrillator	4	A-3
25	Suction machine	18	A-3
26	ENT work station	1	A-3
27	Ottoscope	1	A-3
28	Ophthalmoscope	2	A-3
29	Stretcher	10	A-3
30	Doppler	3	A-3
31	Refrigerator	2	A-3
32	Electro surgical cautery unit	3	A-3
33	Operating light mobile	2	A-3
34	Orthopedic surgical instrument set	2	A-3
35	Neuro surgical instrument set	2	A-3
36	Surgical microscope	1	A-3
37	Patient monitor B	10	A-3
38	Infusion Pump	7	A-3
39	Syringe Pump	10	A-3
40	Radiant warmer	1	A-3
41	Autoclave A	2	A-3
42	Colorimeter	2	A-3
43	Microscope	2	A-3
44	Incubator	2	A-3
45	Hot air oven	2	A-3
46	Blood mixer	3	A-3
47	Blood collection bed	2	A-3
48	Defreeze Refrigerator	1	A-3
49	Oxygen concentrator	2	A-3
50	CPAP/BiPAP machine	6	A-3
51	Bed side cabinet	100	A-3

Source: JICA Survey Team

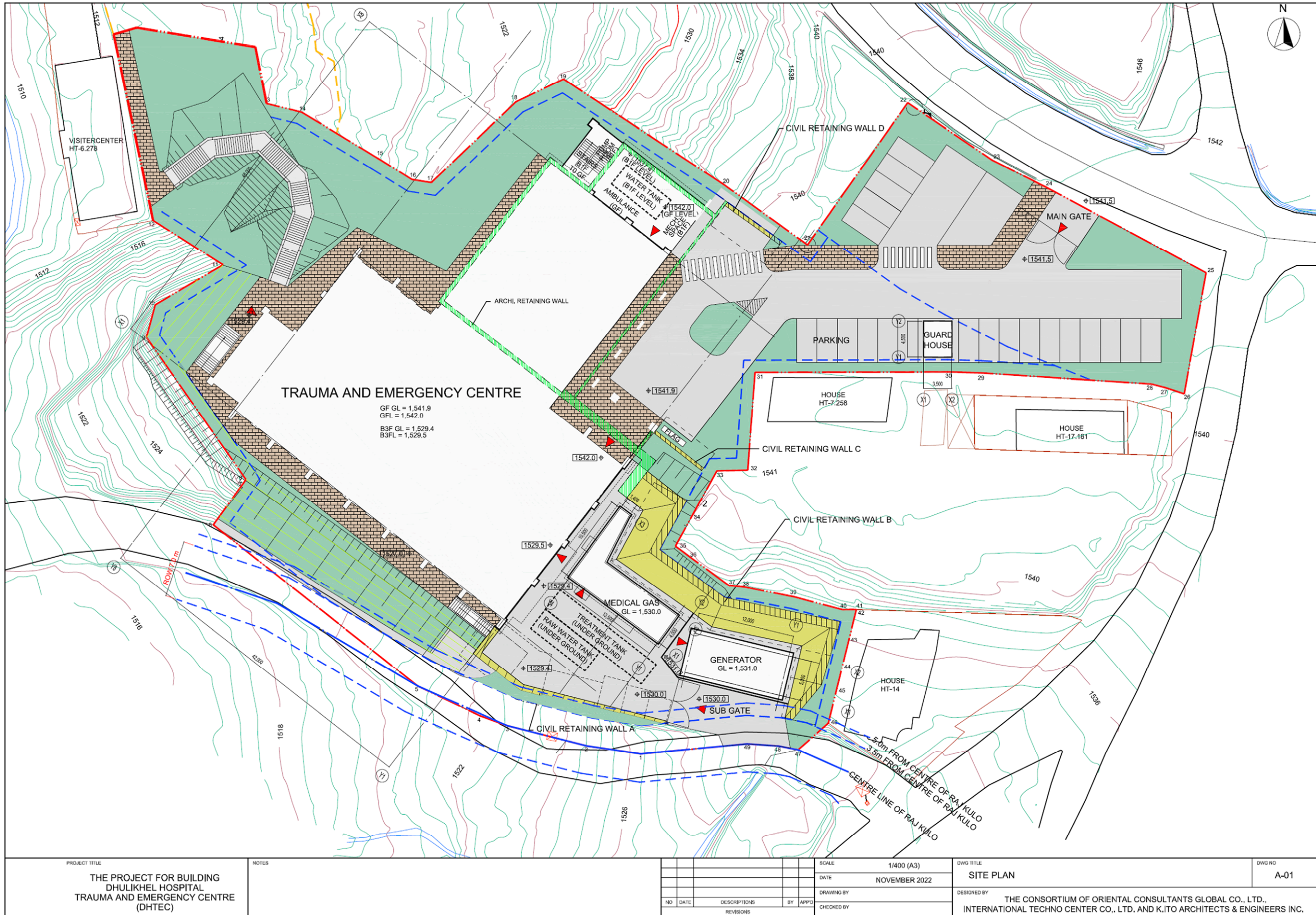
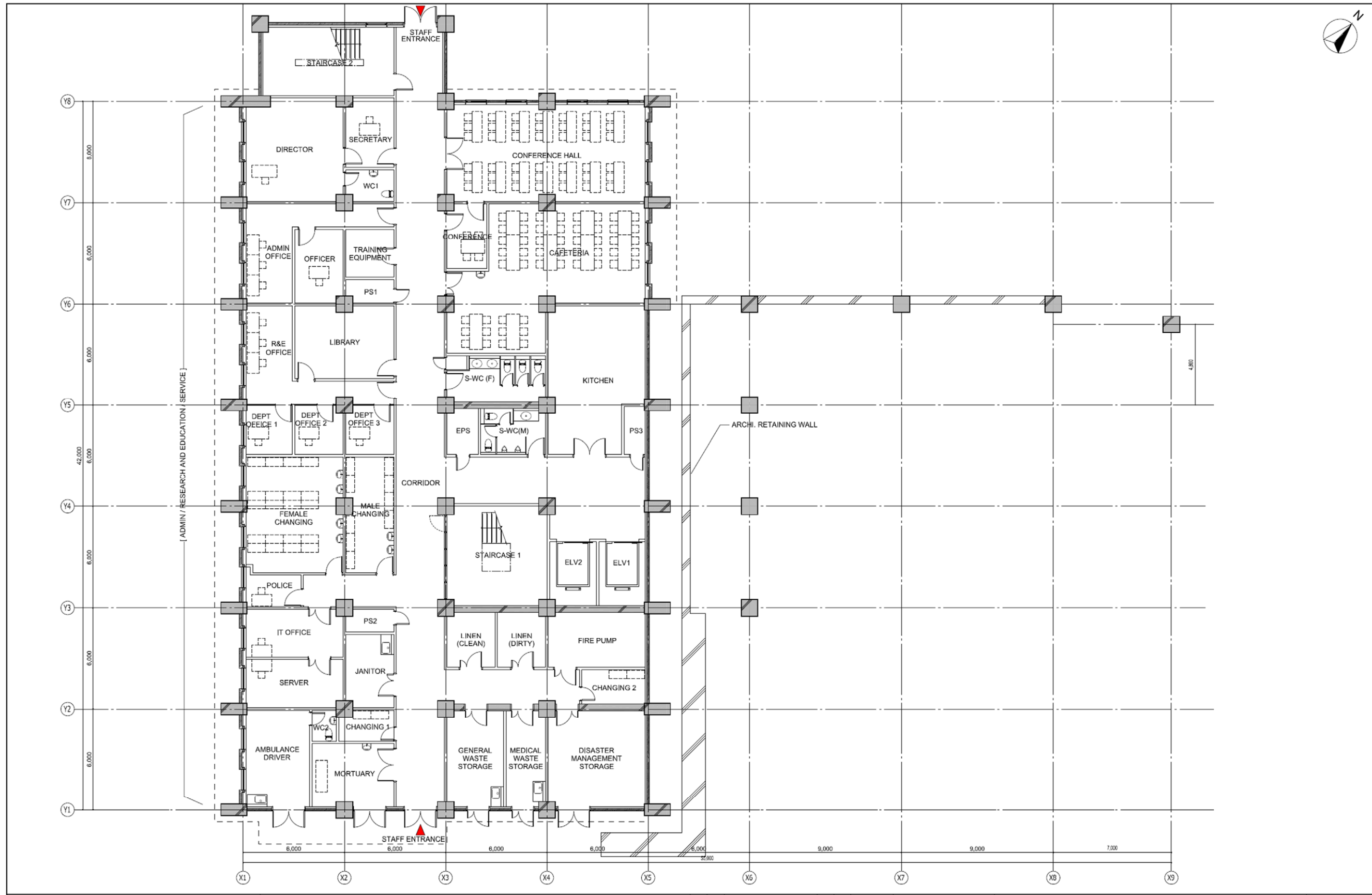


Figure 2-20 Site Plan





PROJECT TITLE		NOTES		SCALE		DWG TITLE		DWG NO	
THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTRE (DHTEC)				1/200 (A3)		BASEMENT 3RD FLOOR PLAN		A-21	
				DATE		DESIGNED BY			
				NOVEMBER 2022		THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO. LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.			
				DRAWING BY					
				CHECKED BY					
				REVISIONS					

Figure 2-21 3<sup>rd</sup> Basement Floor Plan

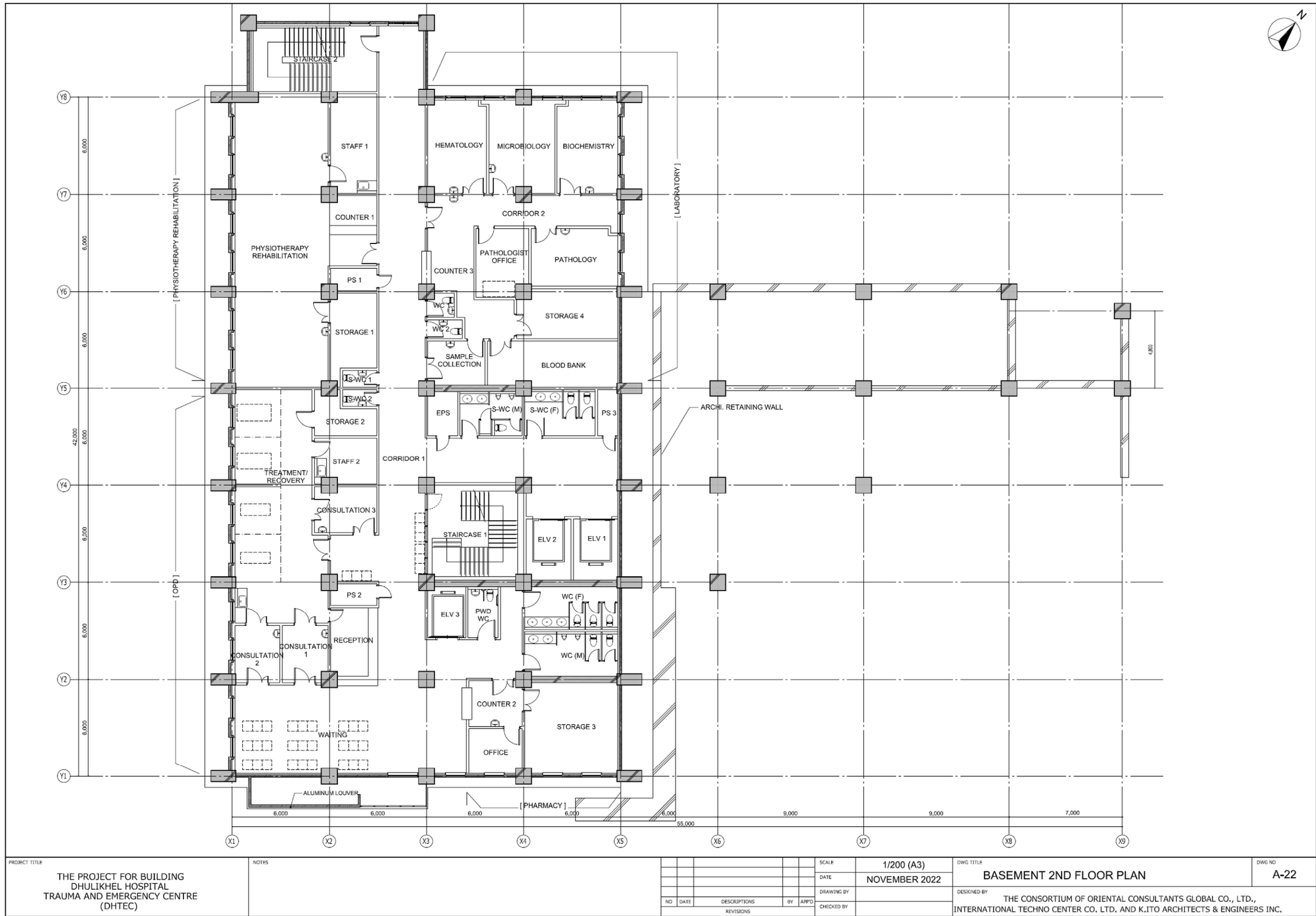
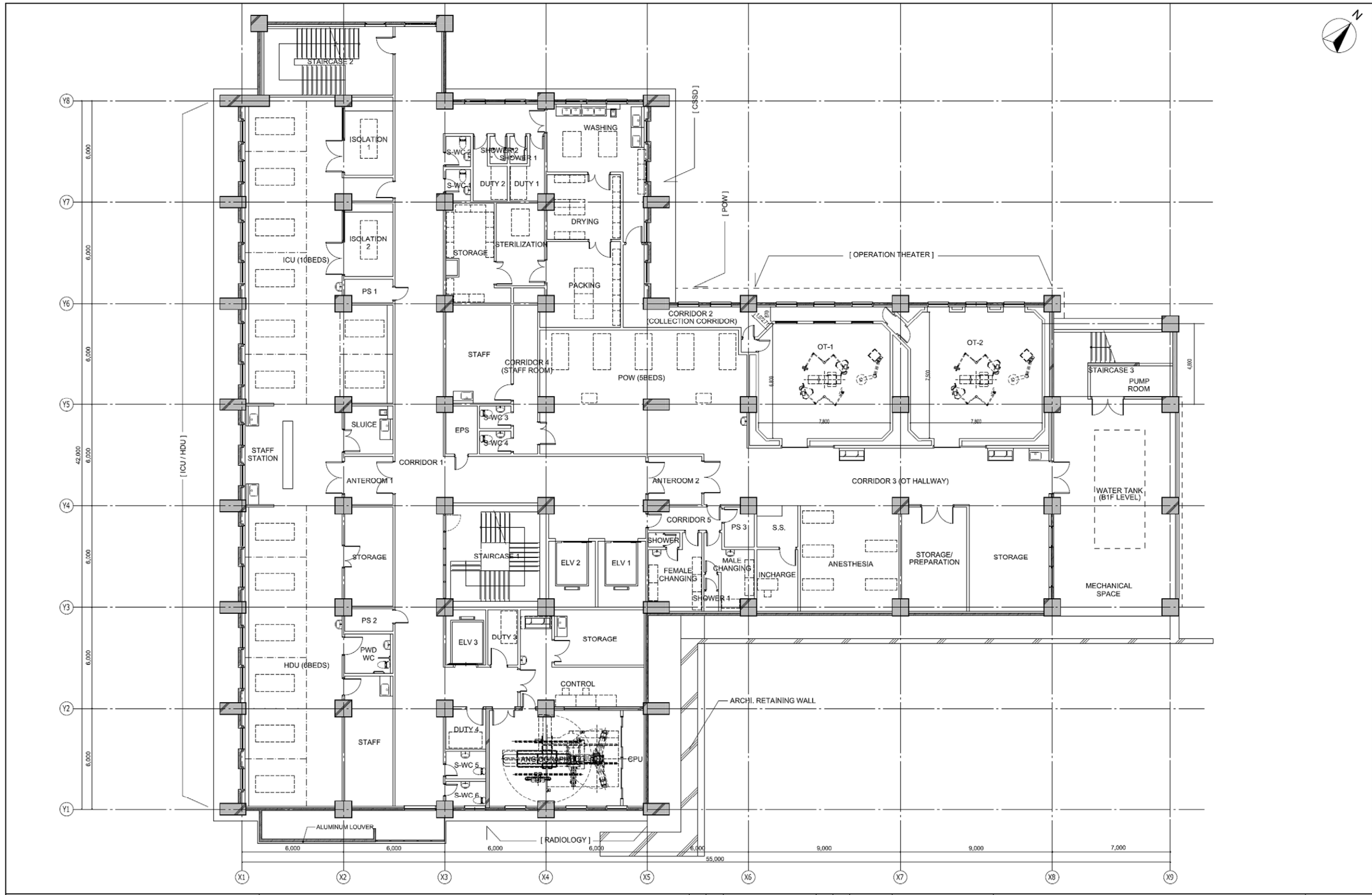


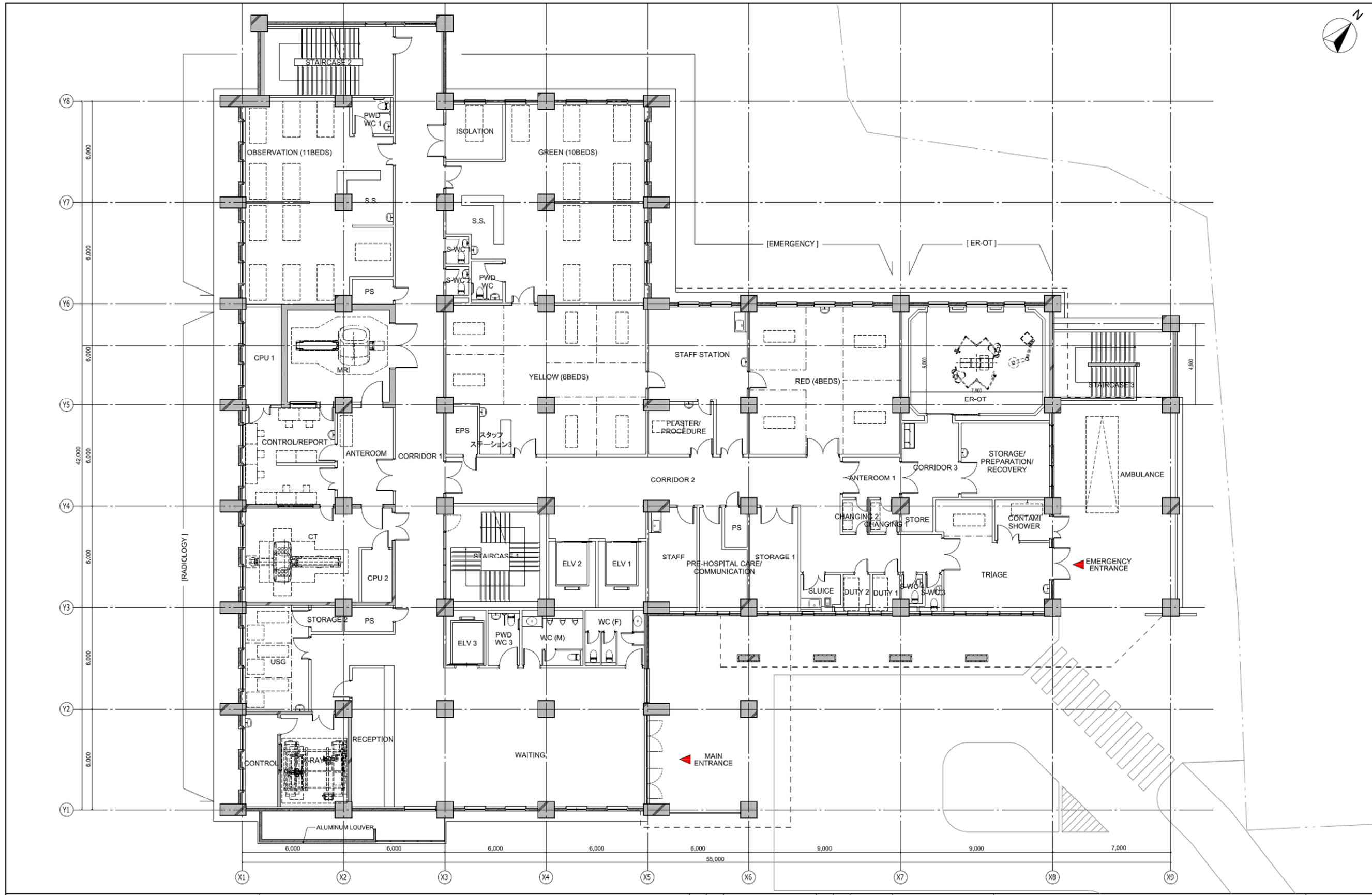
Figure 2-22 2<sup>nd</sup> Basement Floor Plan



PROJECT TITLE		NOTES		SCALE		DWG TITLE		DWG NO.	
THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTRE (DHTEC)				1/200 (A3)		BASEMENT 1ST FLOOR PLAN		A-23	
				DATE		DESIGNED BY		THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO. LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	
				NOVEMBER 2022		DRAWING BY			
				CHECKED BY					
				NO		DATE		REVISIONS	

Figure 2-23 1<sup>st</sup> Basement Floor Plan





PROJECT TITLE		NOTES		SCALE		DWG TITLE		DWG NO	
THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTRE (DHTEC)				1/200 (A3)		GROUND FLOOR PLAN		A-24	
				DATE		DESIGNED BY		THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO. LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	
				DRAWING BY					
				CHECKED BY					
				NO		DATE		REVISIONS	

Figure 2-24 Ground Floor Plan



PROJECT TITLE THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTRE (DHTEC)	NOTES	NO	DATE	DESCRIPTIONS	BY	APPD	SCALE	1/200 (A3)	DWG TITLE	FIRST FLOOR PLAN	DWG NO	A-25
							DATE	NOVEMBER 2022	DESIGNED BY	THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO. LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.		
							CHECKED BY					

Figure 2-25 1<sup>st</sup> Floor Plan

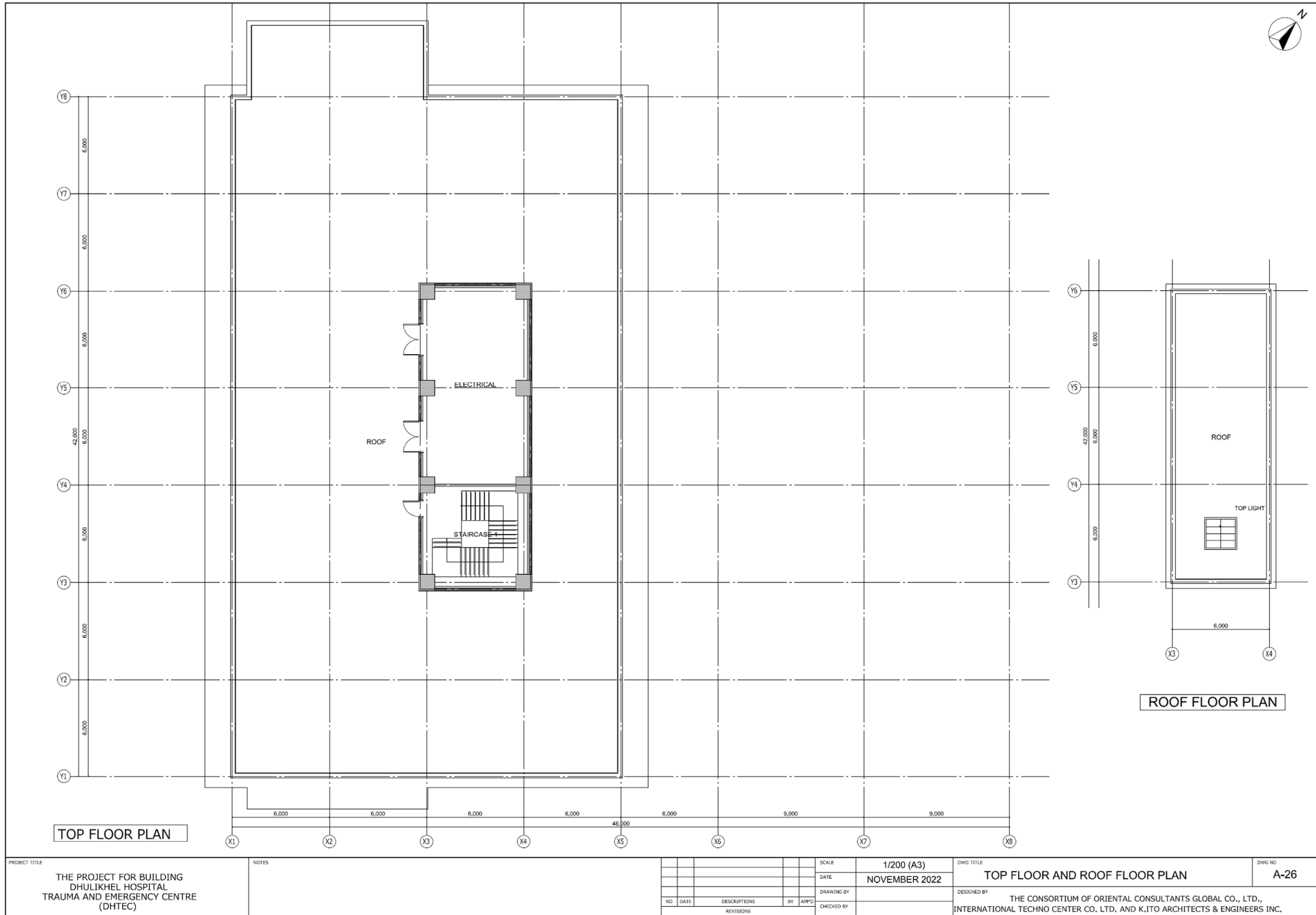
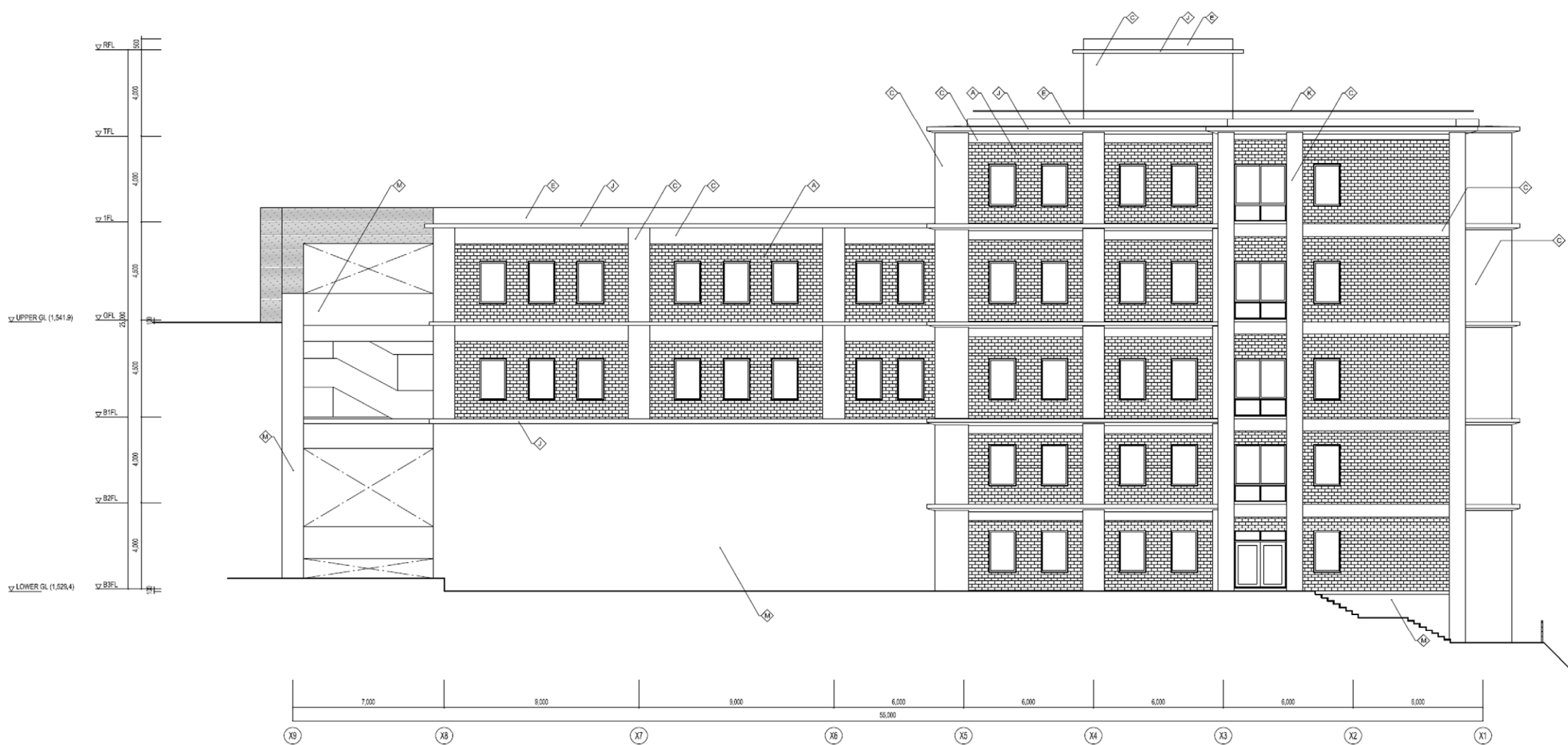


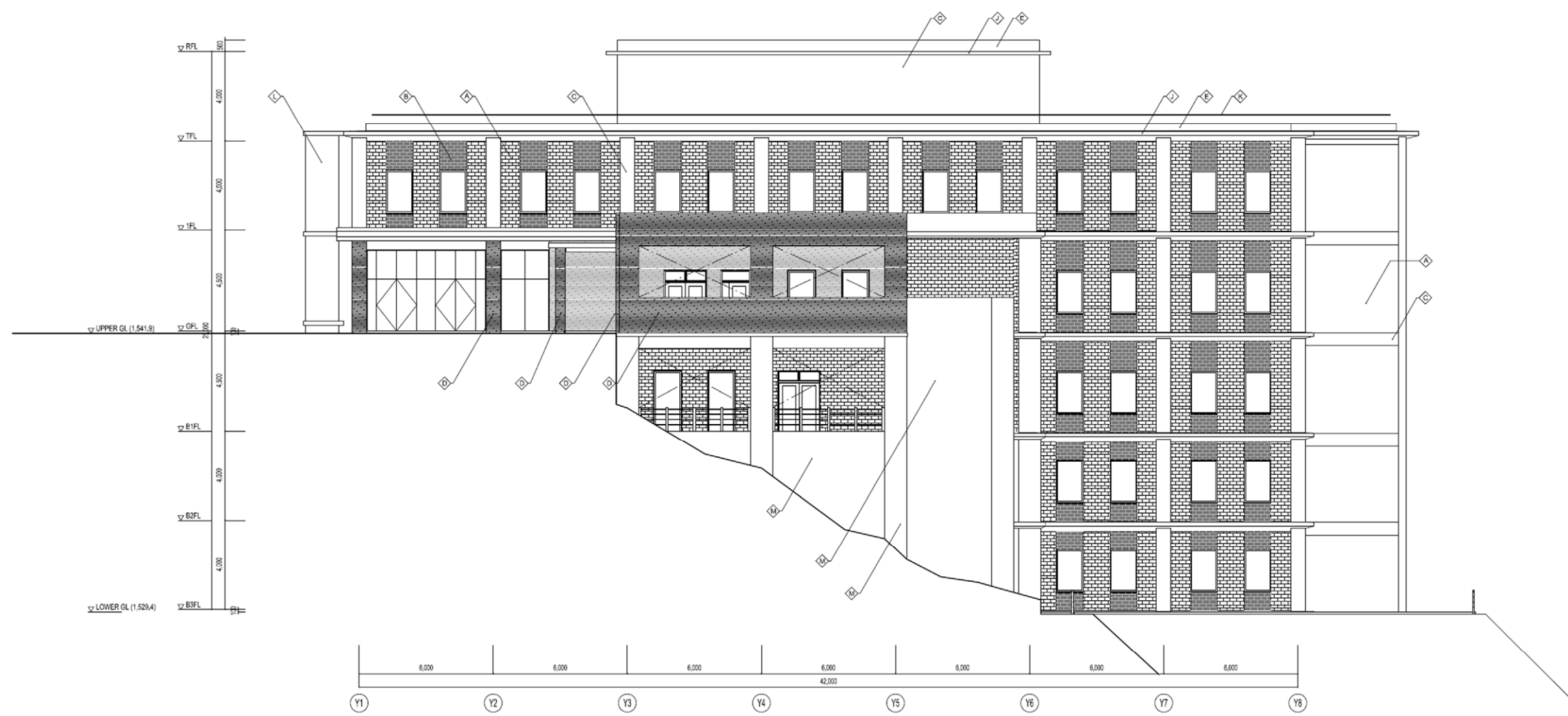
Figure 2-26 Roof and Penthouse Floor Plan



- LEGEND
- ◇ BRICK+SILICONE PAINT (CLEAR)
  - ◇ BRICK+SILICONE PAINT (BLACK)
  - ◇ RC+POLYMER CEMENT MORTAR+ML-COAT
  - ◇ SLATE STONE CLADDING
  - ◇ UWP
  - ◇ EAVES: ML-COAT w/ GRN DRIP CAP
  - ◇ HANDRAIL: SUS-HL
  - ◇ LOUVER: ALUM+POWDER COAT
  - ◇ RC+SILICONE PAINT (CLEAR)

PROJECT TITLE <b>THE PROJECT FOR BUILDING          DHULIKHEL HOSPITAL          TRAUMA AND EMERGENCY CENTRE          (DHTEC)</b>	NOTES	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO</th> <th>DATE</th> <th>DESCRIPTIONS</th> <th>BY</th> <th>APPD</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td colspan="5" style="text-align: center;">REVISIONS</td> </tr> </tbody> </table>	NO	DATE	DESCRIPTIONS	BY	APPD						REVISIONS					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SCALE</td> <td>1/200 (A3)</td> </tr> <tr> <td>DATE</td> <td>NOVEMBER 2022</td> </tr> <tr> <td>DRAWING BY</td> <td> </td> </tr> <tr> <td>CHECKED BY</td> <td> </td> </tr> </table>	SCALE	1/200 (A3)	DATE	NOVEMBER 2022	DRAWING BY		CHECKED BY		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DWG TITLE</td> <td><b>ELEVATION-3 (NORTH)</b></td> <td>DWG NO</td> <td>A-33</td> </tr> <tr> <td>DESIGNED BY</td> <td colspan="3">THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS &amp; ENGINEERS INC.</td> </tr> </table>	DWG TITLE	<b>ELEVATION-3 (NORTH)</b>	DWG NO	A-33	DESIGNED BY	THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.		
NO	DATE	DESCRIPTIONS	BY	APPD																															
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DWG TITLE	<b>ELEVATION-3 (NORTH)</b>	DWG NO	A-33																																
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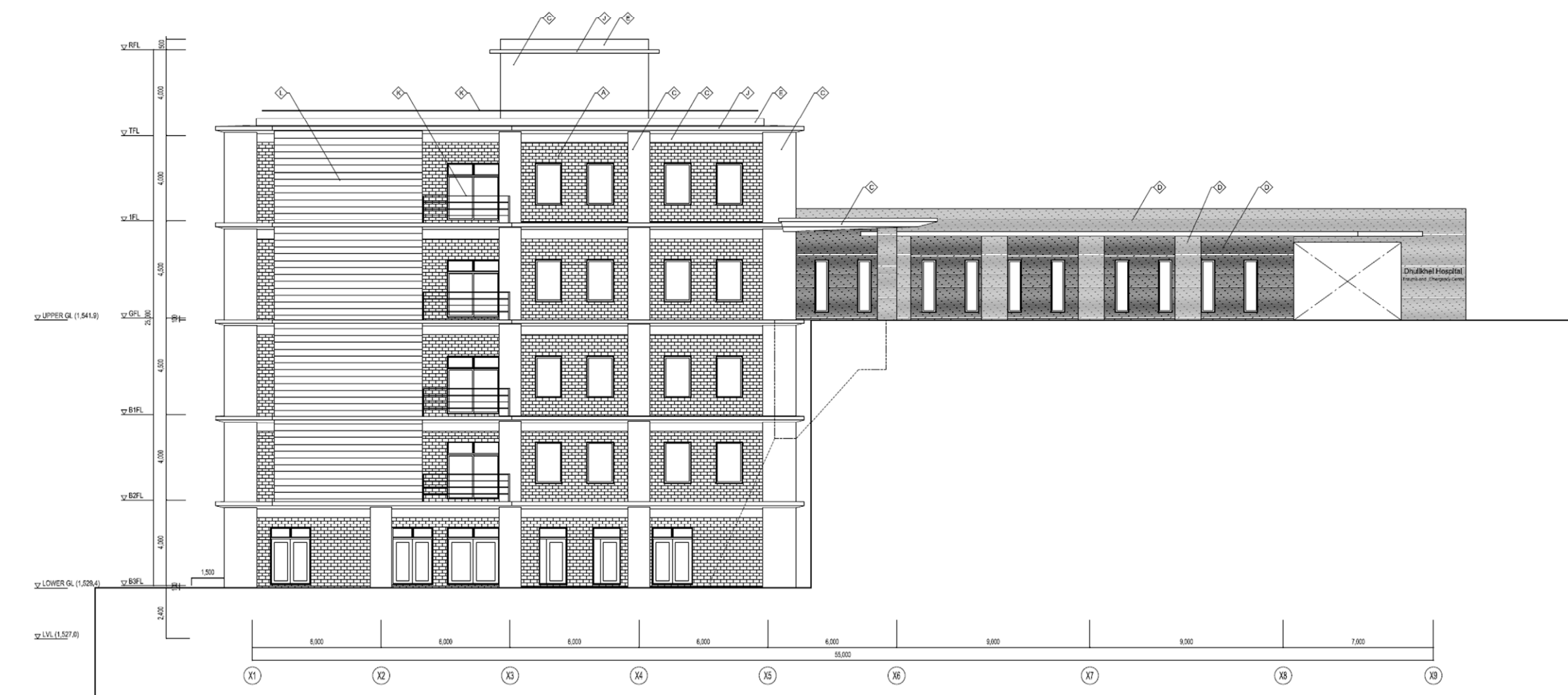
Figure 2-27 Elevation – 1 (North)



- LEGEND
- ⊠ BRICK-SILICONE PAINT (CLEAR)
  - ⊠ BRICK-SILICONE PAINT (BLACK)
  - ⊠ RC-POLYMER CEMENT MORTAR+ML-COAT
  - ⊠ SLATE STONE CLADDING
  - ⊠ U-WP
  - ⊠ EAVES: ML-COAT w/ GRN DRIP CAP
  - ⊠ HANDRAIL: SUS-HL
  - ⊠ LOUVER: ALUM+POWDER COAT
  - ⊠ RC-SILICONE PAINT (CLEAR)

PROJECT TITLE <b>THE PROJECT FOR BUILDING          DHULIKHEL HOSPITAL          TRAUMA AND EMERGENCY CENTRE          (DHTEC)</b>	NOTES	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">NO</td> <td style="width: 10%;">DATE</td> <td style="width: 45%;">DESCRIPTIONS</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">APPD</td> </tr> <tr> <td colspan="5" style="text-align: center;">REVISIONS</td> </tr> </table>	NO	DATE	DESCRIPTIONS	BY	APPD	REVISIONS					SCALE 1/200 (A3) DATE NOVEMBER 2022 DRAWING BY CHECKED BY	DWG TITLE <b>ELEVATION-2 (EAST)</b> DESIGNED BY THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	DWG NO <b>A-32</b>
NO	DATE	DESCRIPTIONS	BY	APPD											
REVISIONS															

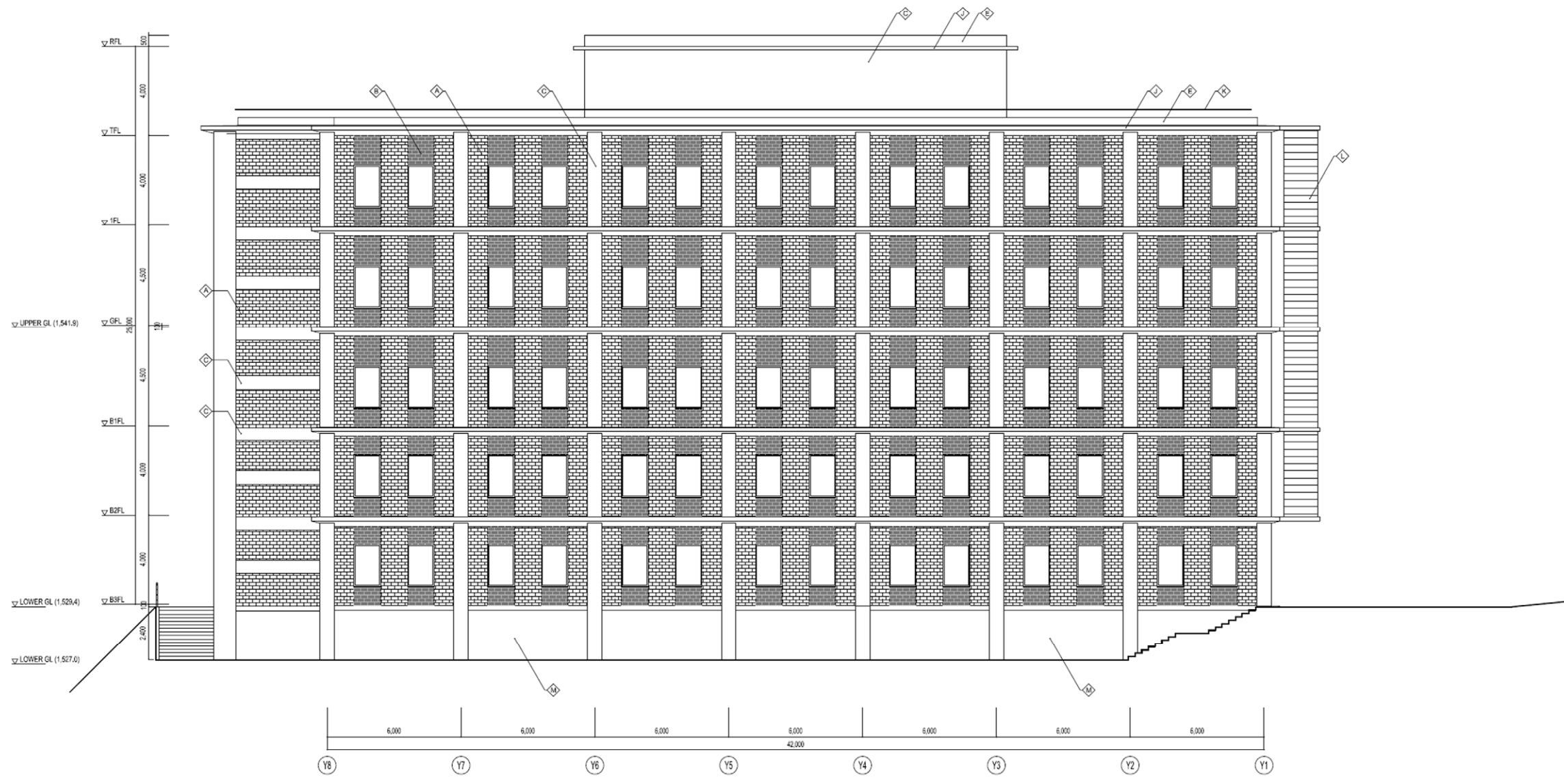
Figure 2-28 Elevation – 2 (East)



- LEGEND
- ◊ BRICK+SILICONE PAINT (CLEAR)
  - ◊ BRICK+SILICONE PAINT (BLACK)
  - ◊ RC+POLYMER CEMENT MORTAR+ML-COAT
  - ◊ SLATE STONE CLADDING
  - ◊ UWP
  - ◊ EAVES: ML-COAT w/ GRN DRIP CAP
  - ◊ HANDRAIL: SUS-HL
  - ◊ LOUVER: ALUM+POWDER COAT
  - ◊ RC-SILICONE PAINT (CLEAR)

PROJECT TITLE <b>THE PROJECT FOR BUILDING          DHULIKHEL HOSPITAL          TRAUMA AND EMERGENCY CENTRE          (DHTEC)</b>	NOTES	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SCALE</td> <td>1/200 (A3)</td> </tr> <tr> <td>DATE</td> <td>NOVEMBER 2022</td> </tr> <tr> <td>DRAWING BY</td> <td></td> </tr> <tr> <td>CHECKED BY</td> <td></td> </tr> <tr> <td>NO</td> <td>DATE</td> <td>DESCRIPTIONS</td> <td>BY</td> <td>APP'D</td> </tr> <tr> <td colspan="5" style="text-align: center;">REVISIONS</td> </tr> </table>	SCALE	1/200 (A3)	DATE	NOVEMBER 2022	DRAWING BY		CHECKED BY		NO	DATE	DESCRIPTIONS	BY	APP'D	REVISIONS					DWG TITLE <b>ELEVATION-1 (SOUTH)</b> DESIGNED BY THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	DWG NO <b>A-31</b>
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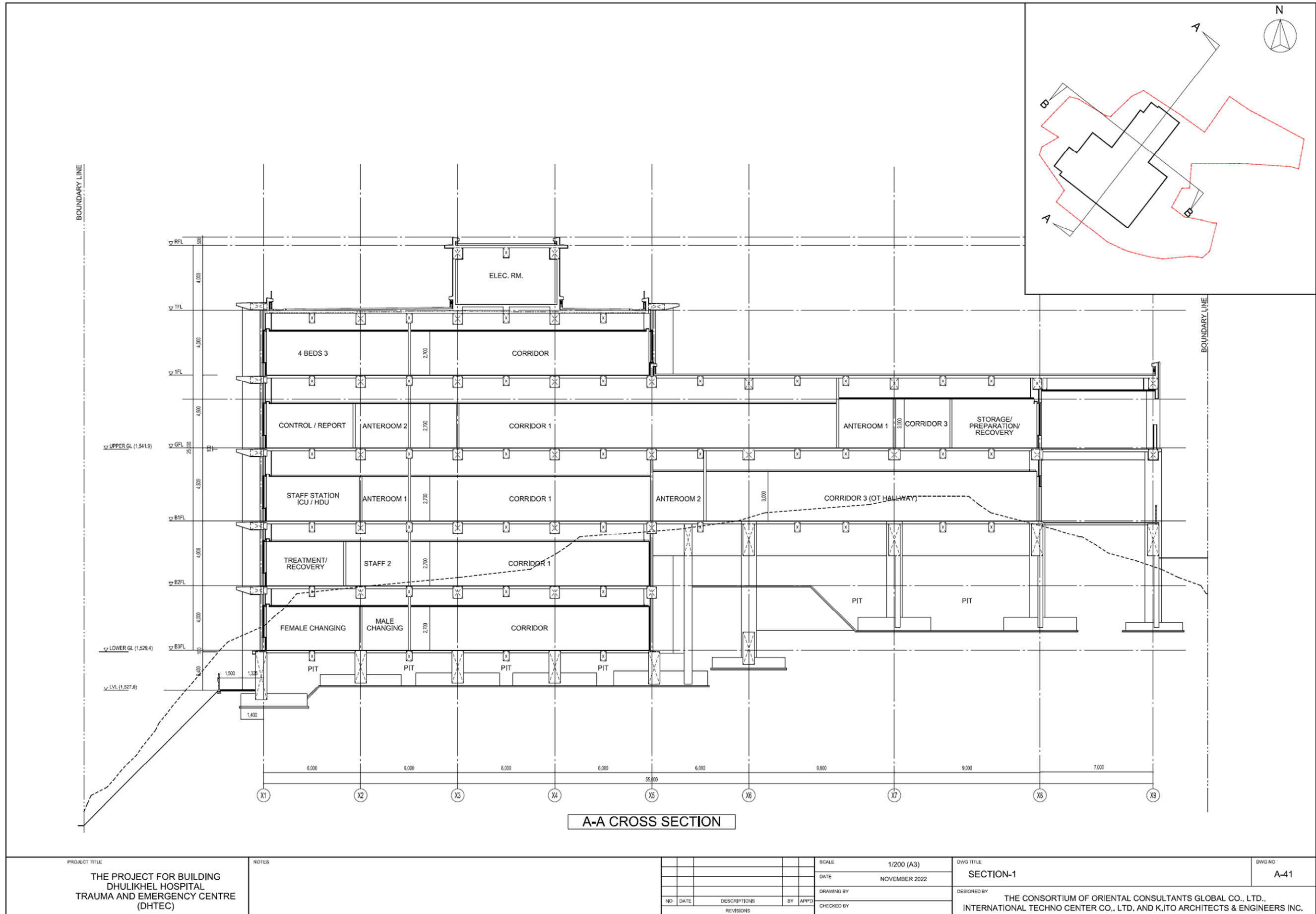
Figure 2-29 Elevation – 3 (South)



- LEGEND
- ◊ BRICK-SILICONE PAINT (CLEAR)
  - ◊ BRICK-SILICONE PAINT (BLACK)
  - ◊ RC-POLYMER CEMENT MORTAR+ML-COAT
  - ◊ SLATE STONE CLADDING
  - ◊ LWFP
  - ◊ EAVES: ML-COAT w/ GRN DRIP CAP
  - ◊ HANDRAIL: SUS-HL
  - ◊ LOUVER: ALUM+POWDER COAT
  - ◊ RC-SILICONE PAINT (CLEAR)

<p>PROJECT TITLE</p> <p style="text-align: center;"><b>THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTRE (DHTEC)</b></p>	<p>NOTES</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;">NO</td> <td style="width: 15%;">DATE</td> <td style="width: 40%;">DESCRIPTIONS</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">APPD</td> </tr> <tr> <td colspan="5" style="text-align: center;">REVISIONS</td> </tr> </table>	NO	DATE	DESCRIPTIONS	BY	APPD	REVISIONS					<p>SCALE</p> <p style="text-align: center;">1/200 (A3)</p> <p>DATE</p> <p style="text-align: center;">NOVEMBER 2022</p> <p>DRAWING BY</p> <p>CHECKED BY</p>	<p>DWG TITLE</p> <p style="text-align: center;"><b>ELEVATION-4 (WEST)</b></p> <p>DESIGNED BY</p> <p style="text-align: center;">THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K,ITO ARCHITECTS &amp; ENGINEERS INC.</p>	<p>DWG NO</p> <p style="text-align: center;">A-34</p>
NO	DATE	DESCRIPTIONS	BY	APPD											
REVISIONS															

**Figure 2-30 Elevation – 4 (West)**



A-A CROSS SECTION

PROJECT TITLE  
 THE PROJECT FOR BUILDING  
 DHULIKHEL HOSPITAL  
 TRAUMA AND EMERGENCY CENTRE  
 (DHTEC)

NOTES

NO	DATE	DESCRIPTIONS	BY	APPD
REVISIONS				

SCALE	1/200 (A3)
DATE	NOVEMBER 2022
DRAWING BY	
CHECKED BY	

DWG TITLE	SECTION-1	DWG NO	A-41
DESIGNED BY	THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.		

Figure 2-31 Section – 1



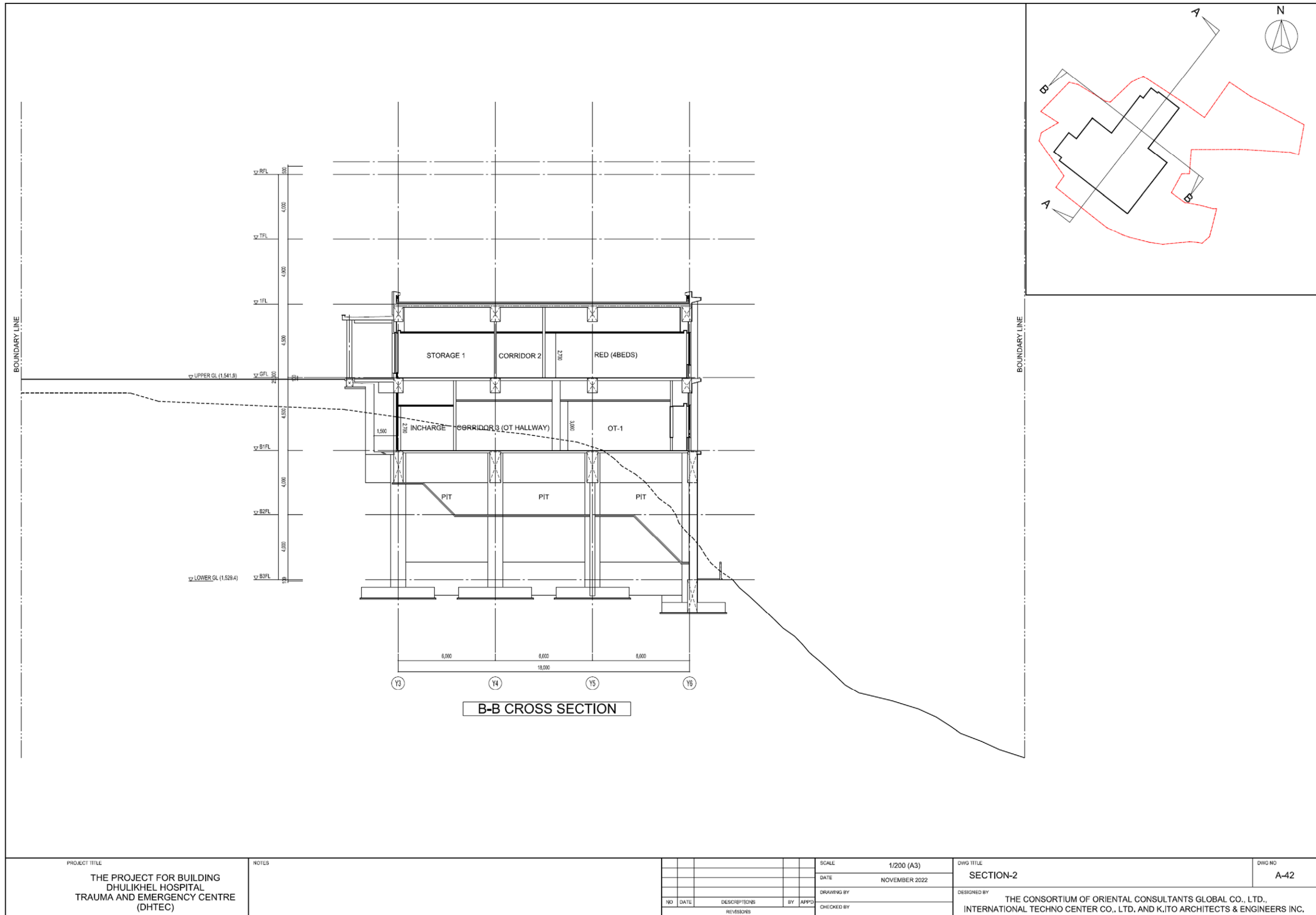
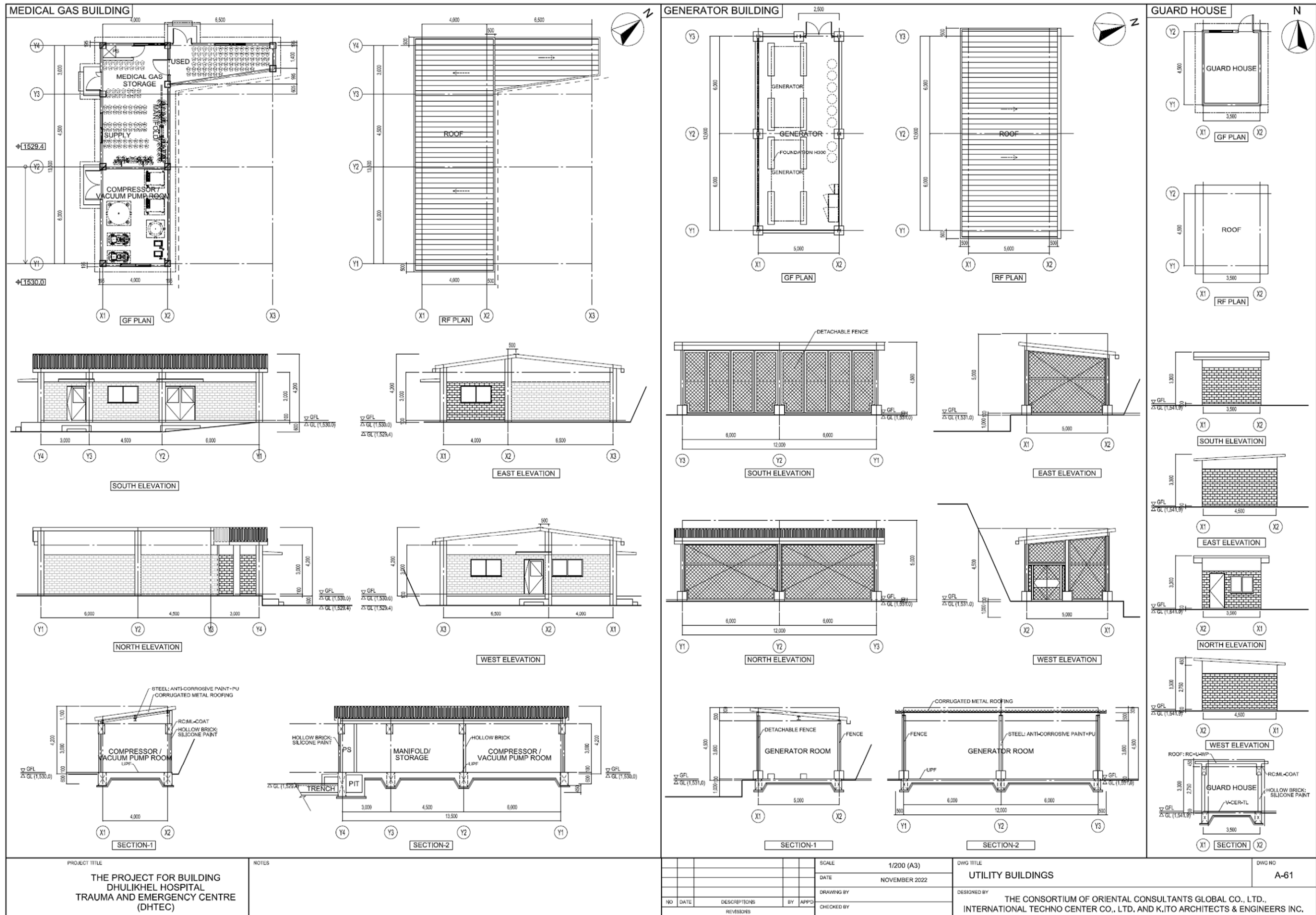


Figure 2-32 Section – 2



PROJECT TITLE  
**THE PROJECT FOR BUILDING  
 DHULIKHEL HOSPITAL  
 TRAUMA AND EMERGENCY CENTRE  
 (DHTEC)**

NOTES

SCALE  
 1/200 (A3)  
 DATE  
 NOVEMBER 2022  
 DRAWING BY  
 CHECKED BY

DWG TITLE  
**UTILITY BUILDINGS**  
 DESIGNED BY  
**THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD.,  
 INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.**  
 DWG NO  
**A-61**

**Figure 2-33 Utility Building**

## **2-2-4 Implementation Plan**

### **2-2-4-1 Implementation Policy**

#### **(1) Basic Procedure**

The Exchange of Notes (E/N) for the Grant-Aid Project will be concluded between the Government of Japan and the Government of Nepal after the cabinet meeting and decision by the Government of Japan.

After the signing of E/N, Grant Agreement (G/A) will be entered into between JICA and the recipient country. On the basis of the G/A, JICA will make payments to the recipient country as the Project progresses.

The signing of E/N and G/A will mark Japan's official commitment to provide the aid and its practical implementation.

Following conclusion of G/A, consultants of Japanese nationality and the Government of Nepal will conclude an execution design and supervision contract, and immediately start detailed design work.

#### **(2) Detailed Design Stage**

For the detailed design, full details of facilities and equipment in the Outline Design shall be carefully confirmed and discussed with the implementing agency. The Consultant will discuss the technical issues through meetings with the relevant authorities in Japan and Nepal during the detailed design stage of four-and-a-half months.

#### **(3) Tender**

Tender will be conducted in accordance with *Procurement Guidelines for the Japanese Grants*.

There are three possible methods for the tender, (a) a blanket contract with a Japanese construction company for facility construction and equipment procurement, (b) separate contracts with a Japanese construction company for facilities and a Japanese trading company for equipment, or (c) a blanket contract with a consortium of Japanese construction company and trading company for facility construction and equipment procurement. Method (b) is appropriate for the Project considering its volume and characteristics.

The tender will be conducted by the implementing agency with sufficient support by the Consultant and witness by JICA.

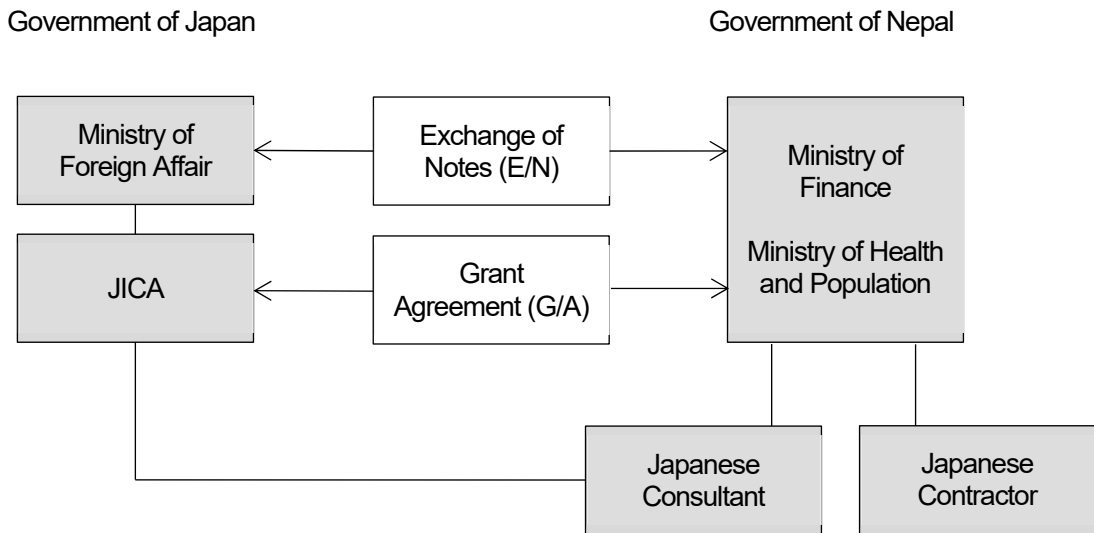
#### **(4) Construction**

According to the result of the Preparatory Survey in Nepal, local construction materials which are of sufficient in quality and quantity should be used for the Project as much as possible for cost reduction and easy maintenance.

For the management of construction labor, the quality level of local Contractor and skilled / semi-skilled workers will be taken into consideration. But it is important to keep construction quality through the supervision of a Japanese Contractor, as the prime contractor, of the local contractor and its laborers.

**(5) Executing Agency**

The Ministry of Health and Population will be the executing agency for the Project. The following diagram shows the relationship between the executing agency, Japanese consultant and contractor.



Source: JICA Survey Team

**Figure 2-34 Executing Agency**

**2-2-4-2 Implementation Conditions**

The rainy season at Dhulikhel is generally from June to September. Therefore, it is necessary to consider the change in the groundwater level, protection of works from rainfall, treatment of rainwater in the construction site, construction of basement floor, etc.

The standards and regulations related to construction will be based on Nepal standards. However, Japanese standards also will be referred.

Regarding installation of medical equipment, close coordination between construction work and equipment installation schedule is necessary.

Since the construction site is within the compound of Dhulikhel Hospital, the following considerations shall be taken for the surrounding environment.

- Construction methods that minimize the negative impacts on the existing facility shall be adopted specially to prevent noise during construction.
- It is important to take safety measures to control construction traffic to protect pedestrians, and protection measures for existing roads and surrounding area from damages.

- Since construction material and equipment will be stored and temporary building will be constructed in the construction site, proper safety plan shall be made not to pose problems for operation of the existing facilities.

### 2-2-4-3 Scope of Works

The responsibilities of Japanese and Nepalese sides for the implementation of Japan Grant-Aid Project are shown below.

**Table 2-23 Scope of Works for Japanese and Nepalese Sides**

Japanese Side	Nepalese Side
(1) Building works Structure works, finishing works, parking, etc.	(1) Site preparation a) Site preparation works: Site preparation, removal of items (including floors, walls, roofs, foundations, etc., and removal of left-over materials) b) Temporary electricity supply and water for construction works
(2) Electrical works Wiring work from the arrival panel in the electrical room (including the arrival panel), lightning protection equipment, lighting /socket, communication equipment	(2) Incidental facilities a) Water supply Installation and preparation of the water supply pipe from the city water system to the connection point at the boundary of the site b) General drainage Piping work from the last catch basin in the site to the existing public drainage c) Rainwater drainage Piping work from the last catch basin in the site to the existing public drainage d) Electrical power installation Installation and preparation of the electrical power supply from the commercial power network to the connection point at the boundary of the site e) Telephone and internet Installation and preparation of the telephone and telecommunication line from the city network to the connection point at the boundary of the site
(3) Plumbing works a) Water supply works Water equipment works b) Drainage works Piping work from building to the last catch basin in the site c) Water treatment facility d) Water reservoir, water tank tower e) Fire hydrant, etc.	(3) Other procedures Building permit, environmental and social considerations, utility connection, and exemption from customs clearance of materials and equipment, etc. (4) Operation and maintenance cost for new facilities (5) Exemption from customs duties, internal taxes, and other charges for Japanese and third-country nationals involved in the Project (6) Facilitation for Japanese technicians during their entry and departure from Nepal (7) All works other than those supported by the Japanese side (8) Payment to the B/A (Banking Arrangement) and A/P (Authorization to Pay) (9) Tax exemption for imported equipment (10) Participation in the explanation of the instructions for use of the equipment (11) Assignment of maintenance staff and participation in technical training (12) Issuance of certificate of completion after acceptance of equipment
(4) External works in Project site Driveway, Parking	
(5) Equipment works a) Equipment procurement b) Drainage works c) Delivery and installation of equipment d) Trial test and explanation of the instructions for use	
(6) Compliance with the environmental management plan stipulated by Nepal	
(7) Basic technical assistance for maintenance of facility, utility, and equipment (including initial operation training)	

Source: JICA Survey Team

## 2-2-4-4 Consultant Supervision

### (1) Basic Policy

A resident engineer who specializes in architecture will be dispatched to supervise the entire construction in order to thoroughly carry out proper quality control of construction work on site. In addition, specialized supervisors shall perform on the spot supervision at appropriate times according to the progress of various stages of construction (structural, electrical and mechanical works, equipment installation, etc.). The Project Manager shall undertake on-site supervision and inspection at specified milestones such as commencement of works, completion of concrete works, final completion of works, and after-defect liability period.

**Table 2-24 Assignment of Engineers for Construction and Procurement Supervision**

Supervisor (Expertise)	Period (Nepal / Japan)
Resident engineer	
• Resident construction supervision engineer	22.50 months (Nepal)
Nonresident engineer (Construction)	
• Project manager / Construction supervision engineer 1 (Architectural work)	1.50 months (Nepal)
• Construction supervision engineer 2 (Architectural work and defect inspection)	0.70 months (Nepal)
• Construction supervision engineer 3 (Structural work)	0.25 months (Nepal)
• Construction supervision engineer 4 (Electrical work)	1.00 months (Nepal)
• Construction supervision engineer 5 (Plumbing and HVAC work)	1.00 months (Nepal)
Nonresident engineer (Equipment)	
• Procurement supervision engineer 1 (Confirmation and handover)	0.33 months (Nepal)
• Procurement supervision engineer 2 (Installation and initial operation instruction)	2.26 months (Nepal)
• Inspection engineer 1 (Examination of shop drawings)	0.10 months (Japan)
• Inspection engineer 2 (Inspection at factory)	0.45 months (Japan)
• Inspection engineer 3 (Pre-shipment inspection)	0.10 months (Japan)
• Inspection engineer 4 (Defect inspection)	0.33 months (Nepal) 0.25 months (Japan)

Source: JICA Survey Team

The Consultant will supervise construction and procurement works to complete within the contract period with acceptable quality and safety by proper cost. Also, the Consultant will control construction and procurement schedule considering selection of construction method, status of labor and construction equipment, order and delivery of construction materials and safety measures, etc. In case work of Nepalese side affects the schedule, the Consultant will coordinate with concerned counterparts to accelerate the work.

### (2) Scope of Works

The Resident Engineer will be mainly in charge of schedule control of construction works and equipment procurement and installation, and review and approval of construction documents such as relevant construction plans and construction drawings. In Japan, the Consultant will be responsible for quality management by report from the Resident Engineer, reporting work progress to JICA, and inspection of equipment at factory and pre-shipment.

The Equipment Procurement Supervision Engineer 1 performs final check prior to handover and obtain an approval letter from the Client. While the Equipment Procurement Supervision Engineer 2

shall witness delivery and unpacking, installation work, commissioning and operation instruction of the equipment to be procured by the supplier, and check the inspection reports. The Equipment Inspection Engineer 1 checks and verifies the equipment installation drawings submitted by the supplier. Meanwhile, the Equipment Inspection Engineer 2 shall conduct an inspection at factory, and the Equipment Inspection Engineer 3 shall witness pre-shipment inspections. On the other hand, the Equipment Inspector 4 performs a pre-expiration inspection of the warranty to be conducted within one year after handover of the equipment.

**(3) Issuance of Certificates**

The Consultant will issue necessary certificates for the export of construction materials and equipment, payment to the Contractor, and completion of defect liability period, etc.

**(4) Submission of Reports**

The Consultant will examine monthly reports, final reports, and photos prepared by the Contractor and submit them to the Government of Nepal and JICA. After completion of work, the Consultant will prepare and submit the completion report in accordance with *Procurement Guidelines for the Japanese Grants*.

**(5) Others**

The Consultant will coordinate with concerned counterparts to address technical issues related to Nepalese side work schedule.

**2-2-4-5 Quality Control Plan**

**(1) Basic Policy**

Detailed design drawings shall be developed based on the outline design drawings considering construction conditions, construction method, local construction materials and maintenance cost in Nepal. Specifications shall comply with *Japanese Architectural Standard Specification (JASS)* to ensure construction quality.

During construction period, the Consultant will review construction plan, construction schedule, shop drawings prepared by the Contractor for conformance to the specifications and approve them.

Regarding equipment, the Consultant will assume countries of origin of equipment to the extent that does not impede competition and fairness. The Consultant will review the assumed countries of origin of equipment and main manufactures during detailed design before bidding. When selecting a supplier, the country of origin and manufactures should be checked again to ensure an appropriate quality.

**(2) Quality Inspection (Construction)**

The Consultant will examine construction plan submitted by the Contractor prior to the commencement of each stage of the works and approve it if construction materials and work quality conform to the specifications. During construction, the Consultant will inspect necessary portions of

work based on the construction plan and specifications. Important inspection items will be determined on the basis of the construction plan, and inspections will be carried out properly.

Most of the construction materials can be purchased locally. Besides the manufacturers' warranty on the products, random quality inspections shall be carried out to assure quality.

### 1) Earthwork

Work schedule and plan shall be developed on the assumption that the open cut method and shoring with metal lath and steel pipe as sheeting are adopted based on the result of the geotechnical survey conducted during the outline design survey. Also, underground water level, rainy season, disposal of excavated soil and quality of soil for backfill shall be carefully considered.

### 2) Reinforcing Work

The Consultant will confirm mill test reports and bar markings submitted by the Contractor, and conduct random tensile tests to ensure reinforcing bar quality.

### 3) Concrete Work

Concrete will be procured from a concrete batching plant in Jagati area located thirty to forty minutes away by car from the site. Before casting concrete, concrete mix ratio design shall be made and concrete compressive strength shall be confirmed. Concrete will be poured by concrete pump truck. Main inspection items and methods of concrete work are as follows:

#### a) Materials

Materials	Inspection Items	Inspection Method
Cement	<ul style="list-style-type: none"> <li>Hydration heat</li> </ul>	<ul style="list-style-type: none"> <li>Dissolution test</li> </ul>
Sand, coarse aggregate and crushed stone	<ul style="list-style-type: none"> <li>Grading</li> <li>Specific gravity</li> <li>Alkali reactivity</li> </ul>	<ul style="list-style-type: none"> <li>Sieve analysis</li> <li>Specific gravity test</li> <li>Alkali-silica test</li> </ul>
Water	<ul style="list-style-type: none"> <li>Organic impurity</li> </ul>	<ul style="list-style-type: none"> <li>Water quality test</li> </ul>

#### b) Trial Mix

Inspection Items	Inspection Method
<ul style="list-style-type: none"> <li>Concrete strength</li> </ul>	<ul style="list-style-type: none"> <li>Concrete compression test</li> </ul>
<ul style="list-style-type: none"> <li>Slump</li> </ul>	<ul style="list-style-type: none"> <li>Concrete slump test</li> </ul>
<ul style="list-style-type: none"> <li>Temperature</li> </ul>	<ul style="list-style-type: none"> <li>Thermometer</li> </ul>
<ul style="list-style-type: none"> <li>Air content</li> </ul>	<ul style="list-style-type: none"> <li>Air content test</li> </ul>
<ul style="list-style-type: none"> <li>Chloride content</li> </ul>	<ul style="list-style-type: none"> <li>Chloride content test</li> </ul>

#### c) Before Casting

Inspection Items	Inspection Method
<ul style="list-style-type: none"> <li>Time from mixing to casting</li> </ul>	<ul style="list-style-type: none"> <li>Confirmation of mixing completion time</li> </ul>
<ul style="list-style-type: none"> <li>Slump</li> </ul>	<ul style="list-style-type: none"> <li>Concrete slump test</li> </ul>
<ul style="list-style-type: none"> <li>Temperature</li> </ul>	<ul style="list-style-type: none"> <li>Thermometer</li> </ul>
<ul style="list-style-type: none"> <li>Air content</li> </ul>	<ul style="list-style-type: none"> <li>Air content test</li> </ul>
<ul style="list-style-type: none"> <li>Chloride content</li> </ul>	<ul style="list-style-type: none"> <li>Chloride content test</li> </ul>



**d) After Casting**

Inspection Items	Inspection Method
• Concrete strength	• Concrete compression test
• Vertical accuracy	• Measurement
• Horizontal Accuracy	• Measurement
• Finishing	• Visual inspection

**(3) Quality Inspection (Equipment)**

During the procurement of equipment and supervision of installation, the Consultant will hold meetings with Nepalese side and the suppliers regarding the schedule, progress, equipment installation plan, etc., and formulate the most appropriate procurement plan for the project. The Consultant will closely coordinate with the construction plan to ensure the smooth progress of the overall work. The following points are to be considered for procurement management:

- Confirm the equipment contents, layout plan, country of manufacture, and eligible source of countries with other consultant member in charge of construction, the Client staff in charge of construction and supplier.
- The supplier, under the supervision of the Consultant, will conduct product inspections at the manufacturer's fabrication factory and pre-shipment inspections prior to export packing.
- For products shipped from overseas, a pre-shipment equipment verification inspection shall be conducted under the supervision of a third-party inspection agency.
- For equipment installation work, the Consultant will dispatch a procurement supervisor to witness the on-site work and coordinate with the facilities and equipment based on the layout plan.
- The number of contracted equipment and materials, any discrepancies, required specifications and functions, and handling instructions will be checked during the inspection prior to handover.

**2-2-4-6 Procurement Plan**

**(1) Construction Materials and Equipment**

Major construction materials necessary can be procured in Nepal. In addition to products produced in Nepal, construction materials from neighboring countries are widely distributed and readily available in the local market. There are no problems with local procurement of cement, aggregate, rebar and formwork materials, including imported materials. A concrete batching plant near the site will be used. Interior and exterior finishing materials such as tiles, paints, aluminum products, lighting fixtures, switches, ceiling fans, wires, cables, piping materials, sanitary fixtures, pumps, water storage tanks, and switchboards for facility construction, which are both locally produced and imported, are widely available in the market. Construction equipment will be procured in the capital city of Kathmandu.

**Table 2-25 Countries of Origin of Construction Materials**

Materials	Procured at			Country of Origin
	Nepal	Japan	Third Countries	
Portland Cement	✓			Nepal, India, Pakistan
Sand	✓			Nepal
Coarse Aggregate	✓			Nepal
Deformed Bar	✓			Nepal, India, Pakistan, South Africa
Steel	✓			Nepal, India
Form	✓			Nepal
Brick	✓			Nepal
Timber	✓			Nepal
Metal	✓			Nepal, India, Pakistan
Aluminum Door and Window	✓			Materials are imported from Malaysia and Singapore, and products are manufactured in Nepal
Glass	✓			Nepal
Paint	✓			Nepal
Waterproofing	✓			Neighboring Countries
Power Distribution Board	✓			Nepal
Electric Cable	✓			Nepal
Outlet, Switch	✓			Nepal
Conduit Pipe	✓			Nepal
Lighting Fixture	✓			Nepal, Neighboring Countries
Air-Conditioner	✓			Neighboring Countries
Ventilator	✓			Nepal
Water Tank	✓			Nepal
Sanitary Fixture	✓			Neighboring Countries
Pipe	✓			Nepal
Valve	✓			Nepal
Generator	✓			USA, UK, Japan
Construction Equipment	✓			USA, UK, Japan
Furniture	✓			Nepal

Source: JICA Survey Team

## (2) Medical Equipment

Since the equipment to be procured in the Project is not manufactured in Nepal, in principle, Japanese products are to be procured in accordance with the scheme of a Grant-Aid project. However, if competition in the bidding process is not expected due to the limited number of manufacturers, products from third countries shall also be considered for procurement.

**Table 2-26 Countries of Origin of Medical Equipment**

No.	Equipment	Country of Origin			Remarks
		Nepal	Japan	Third Countries	
1	CT		✓	✓	
2	C-arm		✓	✓	
3	X-ray		✓	✓	
4	Anesthesia machine		✓	✓	
5	Operating light		✓	✓	
6	Operating table		✓	✓	
7	Bed		✓	✓	
8	ICU bed		✓	✓	
9	Autoclave		✓	✓	

Source: JICA Survey Team

**2-2-4-7 Operational Guidance Plan**

**(1) Facility Initial Operation Training**

For the initial operation of the facility, the engineers and technicians from the building contractor will conduct trainings related to building, mechanical, and electrical functions by the time of handover. The trainings are intended for facility users to be able to operate and maintain the facility safely and properly.

**(2) Equipment Initial Operation Training**

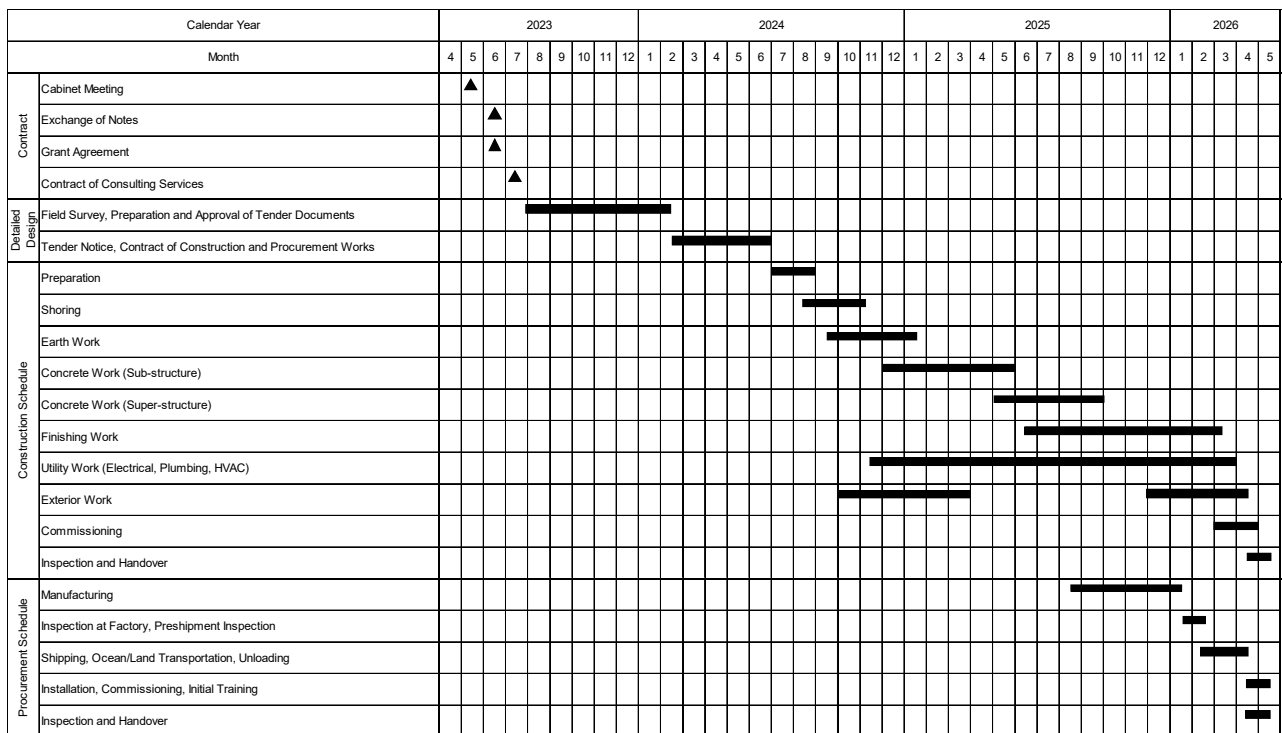
After the equipment is installed, the adjustment and trial operation shall include setting, procurement work, operation check, trial operation, and performance and function inspection. For initial operation guidance, engineers from each equipment manufacturer plan to provide guidance to medical personnel at the cooperating facilities on the basic operation, replacement of consumables, and daily inspections.

**2-2-4-8 Soft Component (Technical Assistance)**

Technical assistance as a soft component is not planned.

**2-2-4-9 Implementation Schedule**

The tentative implementation schedule is as follows.



Source: JICA Survey Team

**Figure 2-35 Tentative Implementation Schedule**

### **2-3 Security Plan**

Three guards will be assigned for 24 hours a day to monitor the overall safety of the site of this project, manage access to the site, prevent theft of equipment in storage, prevent occupational accidents associated with machine work, etc.

### **2-4 Obligations of Recipient Country**

The major items of the obligations of Nepalese side are shown in Table 2-23.

#### **2-4-1 Before Implementation of the Project**

- Clearing the site, such as demolishing and removing equipment, trees and roots, etc., shall be completed before the construction starts.
- Temporary electric power for construction work and temporary water supply pipes shall be secured.
- Mandated procedures related to the building permit shall be completed and the related license and approval shall be acquired.
- Mandated procedures related to the environmental impact assessment shall be completed and related license and approval shall be obtained.
- Utility services such as water supply, electric power, communication, etc., necessary for implementation of the Project shall be provided to the Project site.
- Facilitation of visa procedure for Japanese consultants during the detailed design and tender.

#### **2-4-2 During Implementation of the Project**

- Permits and licenses, etc., necessary for the implementation of the Project shall be issued without delay.
- Necessary environmental monitoring activities, etc., shall be carried out according to the contents of the environment-related license and approval.
- General furniture, curtains, and carpets, etc., for the new building facility shall be purchased and furnished, if necessary.
- If necessary, landscaping work and tree planting work in the project site shall be carried out.
- Support for voucher acquisition procedures (issue of invitation letter, etc.) for Japanese engineers and third-country engineers of consultants, construction, and equipment suppliers, etc., during the construction period.

#### **2-4-3 After Implementation of the Project**

- Necessary environmental monitoring activities, etc., shall be carried out according to the contents of environment-related license and approval.

- Implementation organization for the operation and maintenance of the facility and equipment shall be set up.
- Budget of expenses for the operation and maintenance of the new building facility and equipment shall be allocated.

In order to carry out the Project smoothly, the Consultant will make sufficient explanation of the contents, schedule, etc., of obligations to the Nepalese side.

The budget for the obligations allocated to the Nepalese side is planned to be secured by the Ministry of Health and Population (MoHP). In order to complete the construction in accordance with the schedule, the Nepalese side must complete its scope of works on schedule, and coordinate the works with the Japanese side. The JICA survey team has also explained the importance of this. It is necessary for the Japanese side to monitor work progress with regards to this matter.

## 2-5 Project Operation Plan

### 2-5-1 Operation and Maintenance Policy

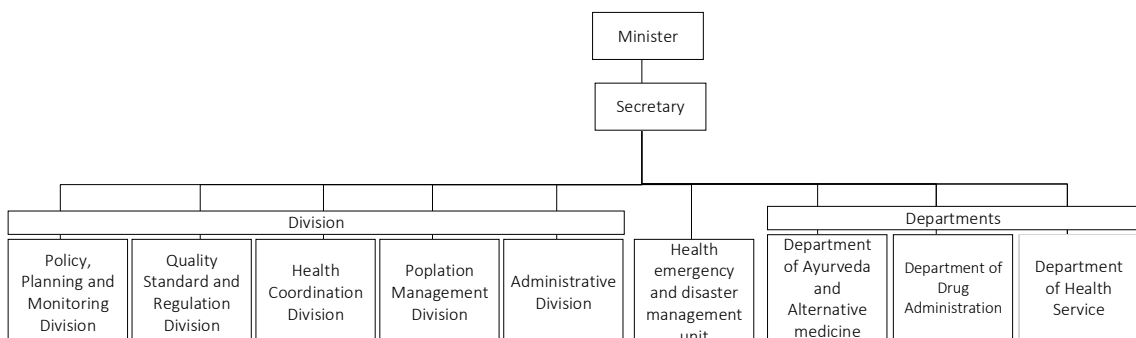
#### 2-5-1-1 Organization

The responsible ministry and its division for this project is the Health Coordination Division of the Ministry of Health and Population of Nepal. However, Dhulikhel Hospital itself is under the jurisdiction of all five divisions of the Ministry of Health and Population of Nepal.

The operating budget is allocated to the health sector budget for the Ministry of Health and Population, the Provincial Department of Health, the Rural Health Department, and other ministries involved in providing health-related expenditures.

The health-related expenditures will be added to the budget of the Ministry of Health and Population, the Provincial Department of Health, and the Rural Health Department.

The budget for this project will be provided by the Ministry of Health and Population of Nepal.



Source: Annual Report and Questionnaire

**Figure 2-36 Organizational Chart of the Ministry of Health and Population**

### 2-5-1-2 Staffing

As of 2021, Dhulikhel Hospital has 231 doctors, 318 nurses, and 1,302 co-medical and other staff. Of the 231 doctors, 126 have specialist qualifications, and the breakdown is shown in Table 2-27.

There is a maintenance department for the maintenance of the building and equipment, and an electrical engineer is assigned to facility management. A clinical engineer is assigned to equipment.

Upon establishment of the Trauma and Emergency Center, Dhulikhel Hospital is planning to increase the number of current doctors and co-medicals by 10%, and handle the operation and maintenance of the new facility.

**Table 2-27 Number of Specialists at Dhulikhel Hospital**

Specialties	Number	Specialties	Number
Surgeon	14	Dermatologist	4
General Physician	12	Psychiatrist	4
Obstetrics and Gynecology	8	Anesthesiologist	10
Pediatrician	8	Radiologist	7
Orthopedic Surgeon	8	Forensic Medicine	3
Cardiologist	2	General Practitioner	6
Dentist	18	Pathologist	5
ENT	6	Microbiologist	4
Ophthalmologist	4	Biochemist	3

Source: Dhulikhel Hospital

Table 2-28 shows the personnel assigned to the Trauma and Emergency Center. Physicians and nurses from existing emergency departments, trauma, and orthopedic departments will be located at the center. In addition, in the initial stage after the center starts operation, it plans to share some staff members such as doctors and nurses with the main building. Depending on the type of diseases, medical treatment by other specialists may be necessary. In that case, the hospital will ask for the cooperation of specialists in each department assigned to the main building.

**Table 2-28 Staffing of Trauma and Emergency Center**

Occupations	Number
Orthopedic Surgeons	5
Trauma Surgeons	5
Surgeons	5
Brain Surgeons	2
Cardio Surgeons	1
Physicians	4
Anesthesiologists	8
Medical Officers	20
Nurses	118
Assistant Nurses	10
Laboratory Technicians	6
Radiologists	3
Physical Therapists	2
Pharmacists	3
Biomedical Engineers	1
Paramedics	6
Ambulance Drivers	3
Other Staff	18
<b>Total</b>	<b>220</b>

Source: Dhulikhel Hospital

### 2-5-1-3 Budget and Finances

Dhulikhel Hospital is operated with subsidies from the Ministry of Health and Population (MoHP) and Ministry of Education, Science and Technology (MoEST), donations from donors, medical fees from patients, and tuition fees from medical school students.

The annual budget for 2019/2020 was about 2.8 billion Nepalese rupees (about 3.1 billion yen). In addition, as shown in Table 2-29, Kathmandu University receives a separate university subsidy from the Ministry of Education, and part of this university subsidy is used for the operation of Dhulikhel Hospital.

**Table 2-29 Annual Proposed Budget 2018/2019 -2019/2020 (Unit : In Thousand NRs)**

ITEM	2018/2019	2019/2020	Increased Rate
<b>Operational Income</b>			
Income from Student Fees (Academic Program)	641,910	579,153	90%
Income from Clinical Service (Hospital Services)	829,100	929,100	112%
Community Programs-Outreach	12,434	16,016	129%
Research Activities	95,987	172,949	180%
<b>Total Operational Revenue</b>	<b>1,579,431</b>	<b>1,697,218</b>	<b>107%</b>
<b>B. Non-Operational Revenue</b>			
Community Programs	15,965	14,188	89%
Affiliation Fees	53,230	53,230	100%
Grant and contributions	40,818	46,640	114%
Interest	15,000	18,000	120%
<b>Total Non-Operational Revenue</b>	<b>125,013</b>	<b>132,058</b>	<b>106%</b>
<b>C. Capital Revenue</b>			
Grant & Contribution-Foreign Institute	242,163	373,080	154%
Grant & Contribution-Government	105,000	194,498	185%
Grant & Contribution-Foreign Institute (Previous Year)	207,363	76,484	37%
Grant & Contribution-Foreign Institute	45,000	50,000	111%
<b>Total Capital Revenue</b>	<b>599,555</b>	<b>694,062</b>	<b>116%</b>
<b>Total Revenue (A+B+C)</b>	<b>2,304,000</b>	<b>2,523,337</b>	<b>110%</b>
<b>D. Expenditure</b>			
Salary & Benefits-Academic Programs	390,920	411,783	105%
Salary & Benefits-Hospital Services	455,359	526,323	116%
Variable Operating Expenditure (Clinical)	536,610	585,450	109%
Variable Operating Expenditure (Academic)	132,799	140,221	106%
Administrative Expenditure	73,743	69,093	94%
Provision for Corpus Fund	53,230	53,230	100%
Provision for Gratuity and Leave Encashment	19,000	21,000	111%
<b>Total Recurring Expenditure</b>	<b>1,661,660</b>	<b>1,807,099</b>	<b>109%</b>
<b>E. Non-Operational Expenses</b>			
Community Support Expenditure	69,257	37,082	54%
Research Activities Expenditure	62,103	69,179	111%
<b>Total Non-Operational Expenses</b>	<b>131,360</b>	<b>106,261</b>	<b>81%</b>
<b>F. Capital Expenditure</b>			
Land and Land Development	50,000	30,000	60%
Building Construction	111,780	86,400	77%
Building Construction-Foreign Institute	111,343	100,224	
Building Construction-from Previous year	65,016	146,880	
Building Construction-Government	95,001	150,998	104%
Medical/Teaching Equipment	145,978	286,006	196%
Other Assets	50,000	50,214	100%
Vehicle- Foreign Institute	10,000	6,000	60%
Furniture	2,644	4,000	151%
Computer and Accessories	1,892	5,016	265%
<b>Total Capital Expenditures</b>	<b>643,654</b>	<b>865,828</b>	<b>135%</b>
<b>Total Expenditures</b>	<b>2,436,674</b>	<b>2,779,189</b>	<b>114%</b>
Surplus (Deficit)	(132,674)	(255,852)	-193%

Source: Dhulikhel Hospital (2022)

## **2-5-2 Facility and Equipment Maintenance Plan**

### **2-5-2-1 Facility**

The facilities and equipment of Dhulikhel Hospital are maintained and managed on a daily basis by the Facility Maintenance and Management Department, which consists of specialists in architecture, air-conditioning, electricity, and plumbing and hygiene. Emergency power generator and medical gas system will be installed in the new Trauma and Emergency Center, but the existing facilities have similar facilities and equipment and are properly maintained. There is no need for technical assistance.

### **2-5-2-2 Equipment**

All of the equipment to be procured under this project is widely used in Nepal, and Dhulikhel Hospital also has existing equipment with similar specifications, so it is considered that there will be no technical problems with the operation of the equipment. Imaging diagnostic equipment, such as MRI, CT, and general X-ray equipment, requires the involvement of radiologists and radiographers in performing examinations and making diagnoses. Dhulikhel Hospital has 7 radiologists and 3 radiological technologists, and plans to further increase the number of staff as equipment is procured in this project. It is considered that there will be no problem in operation after equipment procurement.

Normally, in Nepal, for medical equipment with high maintenance and management costs (e. g., CT and X-ray equipment), it includes a comprehensive maintenance contract (CMC) or an annual maintenance contract (AMC) at the time of purchase which is included in the supply contract.

Based on the maintenance contract, local agents provide maintenance services in cooperation with the maintenance department of the medical facility.

Dhulikhel Hospital has maintenance contracts with manufacturers for existing equipment, and clinical engineers are responsible for contacting and coordinating with manufacturers in case of equipment problems. In 2022, the hospital has maintenance contracts for MRI, CT, and angiography equipment that include periodic inspections and on-call support from the manufacturers. At the time of the survey, there were no problems in securing the necessary budget for the maintenance contracts, and the clinical engineers are taking the lead in reviewing the contracts every year. The Project does not include maintenance contracts for equipment by the Japanese Side.

## **2-6 Project Cost Estimation**

### **2-6-1 Initial Cost Estimation**

The breakdown of the project cost required to implement this project, for both Japanese and Nepalese sides based on their obligations, is estimated below. However, this does not indicate the budget in the Exchange of Notes. The ratio for contingencies shall be 5%.

#### **2-6-1-1 Cost to be borne by Japanese Side**

Not disclosed until construction / equipment contract certification
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## 2-6-1-2 Cost to Be Borne by Nepalese Side

Items	Estimated Cost (NPR)	Remarks
(1) Site Preparation		
1) Site Preparation (Demolition, relocation, land levelling)	1,146,000	8,460m <sup>2</sup> × NPR135.51
2) Water Connection	500,000	Water Pipe 50A x 10 m
3) Electricity Connection	2,500,000	Cable Connection 3 φ 4W11KV50Hz x 80 m
4) Telephone Connection	1,500,000	CPEV0.65-30P (PVC50 φ) x 120 m
5) Internet Connection	1,200,000	Optical Cable SM-24C (PVC50 φ) x 120 m
(2) Building Permit	1,401,000	Total Floor Area 6,486 m <sup>2</sup> x NPR216
(3) EIA Processing Fee	2,682,000	EIA Monitoring (after construction) USD 21,000
(4) Furniture	8,063,000	Table, Chair, Cabinet, Beds for Nap
(5) Advising and Payment of Commission Based on Banking Arrangement	2,803,000 59,000	Advising Commission: 0.1% of project cost Payment Commission: 0.1% of payment and maximum JPY 4,500(Payment for consultant, 7 times; contractor, 4 times; and supplier, 3 times)
Total	21,854,000 (JPY 20,420,000)	Exchange Rate NPR1=JPY1.0702 USD1=JPY136.72

## 2-6-1-3 Conditions of Cost Estimation

Date of Estimation: September 2022

Exchange rate: Average three-month rate from 1st June 2022 to 31st August 2022

NPR 1 = JPY 1.0702

USD 1 = JPY 136.27

Construction Period: 22.5months

Others: The Project shall be implemented in compliance with Japan Grant-Aid Scheme.

## 2-6-2 Operation and Maintenance Cost

### 2-6-2-1 Utility Cost

Running cost (utilities, etc.) for the new building is estimated as follows:

#### (1) Electricity Charge

Conditions

Maximum power demand	350	kW
Load rate	0.3	

Nepal Electricity Company NEA Tariff (11KV Receiving Electricity)

Usage charge		
5 P.M. – 11 P.M. (Peak Time)	13.50	NPR /kWh
5 A.M. – 5 P.M. (Normal Time)	12.25	NPR /kWh
11 P.M. – 5 A.M. (Nighttime)	7.25	NPR /kWh
Charges Electricity kWh	× 180	NPR/KVA

### Monthly electricity charge

Usage charge	$350 \text{ kW} \times 0.3 \times 180 \text{ hours/month} \times 13.50 \text{ NPR /kWh}$	=	255,150 NPR /月
	$350 \text{ kW} \times 0.3 \times 360 \text{ hours/month} \times 12.25 \text{ NPR /kWh}$	=	463,050 NPR /月
	$350 \text{ kW} \times 0.3 \times 180 \text{ hours/month} \times 7.25 \text{ NPR /kWh}$	=	137,025 NPR /月
Charges	500 KVA (350x1.2= 420 ∞ 500)	×	180 = 90,000 NPR
Total	945,225 NPR /month	⇒	946,000 NPR / month

### Annual electricity charge

946,000 NPR /month	×	12	month / year	=	11,352,000 NPR /year
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### (2) Telephone and Information Charges

Cell phone usage charges	30,000 NPR / month
Landline phone usage charges	20,000 NPR / month
Annual phone charges	$50,000 \text{ NPR / month} \times 12 \text{ months} =$ Annual phone charges

### (3) Water Supply Charge

#### Maximum daily water usage

Maximum daily water usage	50	m <sup>3</sup> /day
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#### Tariffs (according to Dhulikhel Drinking Water Supply System, Water Department)

Water charges	91	NPR /m <sup>3</sup>
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#### Annual water charge

$50 \text{ m}^3/\text{day} \times 365 \text{ day/year} \times 91 \text{ NPR /m}^3$	≐	1,661,000 NPR /year
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### (4) Sewage Charges

#### Tariffs (according to Sewerage Authority of Dhulikhel Municipality)

Sewerage charges	2,500	NPR /day
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#### Annual sewerage charges

$2,500 \text{ NPR /day} \times 365 \text{ day/year}$	≐	913,000 NPR /year
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### (5) Generator Fuel Charges

Generator Specifications	Output 350 KVA x 2 units, 3-phase 4-wire 400V 50HZ (Diesel light oil) Fuel consumption	
Assumed usage	Assumed monthly operating hours	Assumed usage
Diesel unit price		Diesel unit price
Annual Fuel Cost	$72.77 \text{ L / hour} \times 1.3 \text{ hours / month} \times 12 \text{ months / year}$	Annual Fuel Cost
	$\times 178.00 \text{ NPR /L}$	

## 2-6-2-2 Facility Operation and Maintenance Cost

The maintenance and management costs for this facility are estimated as follows:

### (1) Facility Repair Costs

	Annual repair cost (NPR)
Lighting fixtures	1,500,000
General air conditioning equipment	400,000
Sanitary equipment	1,500,000
Interior and Exterior Repair	5,200,000
Total	8,600,000 NPR / year

### (2) Septic Tank Maintenance

Periodic inspections and troubleshooting	525,000 NPR / year
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### (3) Elevator Maintenance

Periodic inspections and troubleshooting	525,000 NPR / year
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### (4) Generator Maintenance

Periodic inspections and troubleshooting	400,000 NPR / year
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## 2-6-2-3 Equipment Operation and Maintenance Cost

Equipment operation and maintenance cost is shown in Table 2-30. Equipment maintenance services contract cost including periodic inspection, on-call services, repair parts, etc. is shown in Table 2-31 which depends on manufactures.

**Table 2-30 Equipment Operation and Maintenance Cost**

No	Equipment	Consumable Cost	No.	Total
1	CT	Contrast agent, Syringe: JPY 300,000 Dry film: JPY 100,000	1	JPY 400,000
8	Autoclave	Gasket: JPY 55,000 Ink ribbon: JPY 10,000 Record paper: JPY 45,000 Softener: JPY 10,000 Resin: JPY 45,000 Packing: JPY 50,000	1	JPY 215,000
9	Anesthesia machine	Electrode: JPY 30,000 Valve, Chamber: JPY 60,000	3	JPY 270,000
10	MRI	Contrast agent, Syringe: JPY 300,000	1	JPY 300,000
Total				JPY 1,095,000 / year
Exchange Rate: NPR1=JPY1.0702				NPR1,023,000 / year

Source: JICA Survey Team

**Table 2-31 Equipment Maintenance Services Contract (in Case of Japanese Equipment)**

Equipment		Amount/year	Equipment		Amount/year
Japanese	CT	15,000,000 JPY	Third countries	CT	5,000,000JPY
	C-arm	2,500,000 JPY		C-arm	1,000,000 JPY
	X-ray	2,500,000 JPY		X-ray	1,000,000 JPY
	MRI	12,000,000 JPY		MRI	5,000,000 JPY
Total		32,000,000 JPY	Total		12,000,000 JPY
Rate : NPR1=JPY1.0702		NPR29,900,000	Rate : NPR1=JPY1.0702		NPR11,212,000

Source: JICA Survey Team

**2-6-2-4 Yearly Operation and Maintenance Cost**

Total yearly operation and maintenance cost is assumed as follows.

**Table 2-32 Yearly Operation and Maintenance Cost**

Items	Yearly Cost (NPR)	VAT (13%) (NPR)	Total (NPR)
<b>(1) Utility Cost</b>			
1) Electricity Charge	11,352,000	1,475,760	12,827,760
2) Telephone and Information Charge	600,000	78,000	678,000
3) Water Supply Charge	1,661,000	215,930	1,876,930
4) Sewage Charge	913,000	118,690	1,031,690
5) Generator Fuel Charge	203,000	26,390	229,390
		<b>Subtotal (1)</b>	<b>16,643,770</b>
<b>(2) Facility Operation and Maintenance Cost</b>			
1) Facility Repair	8,600,000	1,118,000	9,718,000
2) Septic Maintenance	525,000	68,250	593,250
3) Elevator	525,000	68,250	593,250
4) Generator	400,000	52,000	452,000
		<b>Subtotal (2)</b>	<b>11,356,500</b>
<b>(3) Equipment Operation and Maintenance Cost</b>			
1) Equipment Operation and Maintenance Cost	1,023,000	132,990	1,155,990
2) Equipment Maintenance Services Contract Cost	29,900,000	3,887,000	33,787,000
		<b>Subtotal (3)</b>	<b>34,942,990</b>
		<b>Total (1)+(2)+(3)</b>	<b>62,943,260</b>

Source: JICA Survey Team

## **Chapter 3 Project Evaluation**

### **3-1 Preconditions**

To proceed with the Project smoothly, it is important to ensure that the obligations of the Nepalese side as described in 2-4 are implemented at the appropriate time before and during the construction of the Project.

### **3-2 Necessary Inputs by Recipient Country**

The Trauma and Emergency Center including emergency department, radiology department, surgical department, and intensive care unit will be built, and related medical equipment will be installed through the implementation of the Project. To strengthen medical services for trauma and emergency medical patients and completely fulfill its role as a tertiary hospital by utilizing inputs by the Japanese side, following matters are to be undertaken by the Nepalese side.

#### **3-2-1 Staffing for the Trauma and Emergency Center**

The new center will be operated by existing personnel and new personnel to be employed by Dhulikhel Hospital in the future. A director who is directly responsible for the management of the center will be appointed. Maintenance will also be handled by the Facility Maintenance and Management Department. Detailed staffing plans for existing personnel to be concurrently assigned or reassigned, as well as qualification requirements, number, and allocation of new staff, need to be made and certainly implemented.

#### **3-2-2 Budget Preparation for Operation and Maintenance of Facility and Equipment**

The operation and maintenance budget for the facility and equipment will be secured by Dhulikhel Hospital. The hospital's operating budget consists of subsidies from the Ministry of Health and Population (MoHP) and the Ministry of Education, Science and Technology (MoEST); donation from donors; medical service fees from patients; and tuition fees from medical school students. According to the annual financial statements for CY2018/2019 and CY2019/2020 presented by the Nepalese side during the preparatory survey, it was confirmed that the hospital will secure enough budget necessary for operation and maintenance of new facility and equipment. Sufficient budgetary arrangements should continue beyond 2026, the year of completion of the Project.

#### **3-2-3 Operation and Maintenance of Facility and Equipment**

The Facility Maintenance and Management Department properly conducts daily check and maintenance of facility. The department is assumed to be able to manage operation and maintenance of new facility.

The department will conduct equipment maintenance by its own daily check and outsourced maintenance services. General medical equipment requires daily check by medical staff and the department, in accordance with operation manuals and periodic inspections and parts replacement by

outsourced service providers to keep it in good condition. As needed, equipment maintenance service contract should be made for safe and efficient equipment operation.

### 3-2-4 Implementation of Environmental Monitoring

Based on the environmental impact assessment and its environmental management plan developed by the Nepalese side, environmental monitoring is required to be conducted continuously and reported to JICA periodically. The monitoring will be conducted in accordance with the impact items, monitoring items, measurement methods, and confirmation details that conform to *JICA Guidelines for Environmental and Social Considerations*, to confirm that the new facility and equipment are being used appropriately and do not become a significant environmental pollution threat to the surrounding area.

### 3-3 Important Assumptions

The important assumptions for the development and sustainability of the Project's effects are considered as follows:

#### 3-3-1 No Significant Change in Health Sector Policies / Strategies

As shown in Table 3-1, improving quality and access to trauma and emergency medical services is one of the priority areas of the Nepalese national health policy. Based on these policies, the Ministry of Health and Population (MoHP) is currently planning to upgrade about 10 existing hospitals nationwide to function as trauma centers by equipping them with the necessary medical equipment for trauma and emergency care.

The framework of the Project is designed according to these development plans and health policy requirements. Therefore, the continuation of these policies is important to achieve the goal of the Project.

**Table 3-1 Health Sector Plans and Policies**

Plans and Policies	Contents
15 <sup>th</sup> Five-Year Plan (2019/20–2023/24)	The goal of health and nutrition sector is “To <b>ensure access to quality health services at the people's level</b> by developing and expanding a strong health system at all levels.”
National Health Policy 2019	The goal is “To develop and expand a health system for all citizens in the federal structure based on social justice and good governance, and ensure access to and utilization of quality health services.” One of the policies is “ <b>Access to basic emergency health services</b> shall be ensured for all citizens.” One of the strategies is “Targeting possible road accidents <b>in the main highways, trauma service centers shall be built</b> and made operational for immediate treatment services.”
National Health Sector Strategy (2015-2020)	Outcome 8 is “ <b>Strengthened Management of Public Health Emergencies.</b> ” Key interventions are “Establish trauma management capacity in hospitals near highways and in major urban centers” and “Establish regional level health emergency management centers.”
Nepal Budget Speech (2020/21) No. 46	Finance Minister mentioned the necessity of trauma centers along the highway where incidents take place.

Source: JICA Survey Team

### **3-3-2 No Extreme and prolonged Price Hikes throughout the World**

At this point, it is undeniable that there are factors that could cause a sharp rise in the price of crude oil and other commodities due to the unstable global situation, and such a situation could have an impact on the implementation of the project. In addition, an extreme depreciation of the Japanese yen could also result in a shortfall in the project budget.

### **3-3-3 No Extreme Deterioration in Nepal's Political and Economic Situation**

Nepal is a federal democratic republic with stable political and social conditions. The second election since the issuance of the new constitution took place in November 2022, and any deterioration in security would have an undeniable impact on the implementation of the project. On the economic front, it is necessary that the economic situation in Nepal does not deteriorate to an extreme degree in line with the above-mentioned changes in the global economic situation.

## **3-4 Project Evaluation**

### **3-4-1 Relevance**

According to the reasons presented below, the implementation of the Project through Japanese grant-aid cooperation is relevant.

#### **3-4-1-1 Wide Medical Service Area**

Dhulikhel Hospital mainly covers six eastern districts of Bagmati Province (population: about 1.6 million). In addition, patients have come from 10 districts in the southern Terai region (population approx. 6.3 million) and 5 districts in western Bagmati province (population approx. 3.25 million). Due to the lack of sufficient human resources and well-equipped medical facilities to treat trauma and emergency patients on the roads from the hospital to the northeast near the border with China and to the south to Janakpur, the hospital is located in the eastern part of Bagmati province as the cornerstone of emergency medical care. The establishment of the Trauma and Emergency Center at the hospital, which has a wide medical service area, will enable the provision of high-quality trauma and emergency services, and is expected to provide support that benefits a wide range of residents.

#### **3-4-1-2 Role as a Teaching Hospital**

The hospital also plays a role as a teaching hospital to educate students of Kathmandu University Medical School. After the establishment of Trauma and Emergency Center, the plan is to use this to educate students on trauma and emergency services. It is expected to expand the scope of education for students and contribute to the development of scarce specialists in trauma and emergency medicine.

Based on these facts, it can be judged that the implementation of the target project by Japanese grant aid is appropriate.

### 3-4-1-3 Consistency with Nepalese Health Policy

As mentioned in 3-3-1, this project is consistent with the country's upper-level plans and health policy, and is expected to contribute to improving access to high-quality trauma and emergency services for the people.

### 3-4-1-4 Consistency with Japanese Development Policy

In the Country Assistance Policy for Nepal (September 2021), Japan has set (1) Economic growth and poverty reduction, (2) Disaster prevention and climate change measures, and (3) Enhancement of governance and democratization as priority areas (medium goals). In the Rolling Plan (September 2021), Health sector enhancement is listed as Development Issue 1-5 of Priority Area 1 Economic growth and poverty reduction, and the development of an emergency medical care system and the training and securing of medical human resources are urgent priorities. The enhancement of medical services at Dhulikhel Hospital, which is expected through the implementation of this project, is consistent with Japan's aid policy.

## 3-4-2 Effectiveness

The effect indicators related to the direct effects (outputs) of the implementation of the cooperation target projects and the effects (outcomes) expected to be achieved in the future through the implementation of the overall project plan are described below. Quantitative and qualitative indicators are proposed with 2021 as the base year for the indicators and 2029 as the target year, which is three years after 2026 when the construction of facilities and provision of equipment are scheduled to be completed.

### 3-4-2-1 Quantitative Effect Indicators

Quantitative indicators are the number of trauma and emergency outpatients (persons/year), the number of trauma and emergency inpatients (persons/year), and the number of CT examinations (cases/year), and set the baseline values and target values as shown in Table 3-2.

**Table 3-2 Quantitative Effect Indicator**

Quantitative Indicator	Baseline Value (2021)	Target Value (Achieved figures after 3 years)
Out-patients for Trauma and Emergency	21,665	31,000
In-patients for Trauma and Emergency	2,847	4,000
Number of CT Examination	6,987	10,000

Source: JICA Survey Team

The evaluation index items were discussed with the other party, and the baseline data were collected that will serve as the baseline values. The target value is the figure assumed by Dhulikhel Hospital. The number of CT examinations was checked, including the number of examinations using existing equipment.



### 3-4-2-2 Qualitative Effect Indicators

- (1) High-quality trauma and emergency medical services will be provided through the development of specialized trauma and emergency medical facilities and medical equipment.**

It is believed that the quality of medical services will greatly improve through the development of an emergency department dedicated to trauma and emergency care, an imaging department, an operation department, and an intensive care unit through this project.

- (2) High-quality trauma and emergency medical training for medical students and professionals will be provided through the development of specialized trauma and emergency medical facilities and medical equipment.**

It is expected that human resource development for trauma and emergency medical care will be strengthened by conducting classroom training in the conference hall and library of the Trauma and Emergency Center, and clinical training in the ward department.

## Appendix-1 JICA Survey Team Member

Name	Assignment	Organization
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.
Kazuhiro MIYATAKE	Deputy Chief Consultant / Facility Planning 2	Oriental Consultants Global Co., Ltd.
Rui KATO	Architectural Design / Natural Conditions Survey (*predecessor)	K.ITO Architects & Engineers Inc.
Ikuya SAKURAI	Architectural Design / Natural Conditions Survey (*successor)	K.ITO Architects & Engineers Inc.
Tatsuya TAKUBO	Structural Design	K.ITO Architects & Engineers Inc.
Yoshio KASHIWAI	Slope Control Design (*predecessor)	Oriental Consultants Global Co., Ltd.
Takafumi KAMEDA	Slope Control Design (*successor)	Oriental Consultants Global Co., Ltd.
Hiroyuki KAISE	Utilities Design	K.ITO Architects & Engineers Inc.
Teruo JURI	Construction Planning / Cost Estimate (Facility)	Oriental Consultants Global Co., Ltd.
Kazuhiro ABE	Equipment Planning / Operation and Maintenance Planning	International Techno Center Co., Ltd.
Atsushi MATSUSUE	Equipment Procurement Planning / Cost Estimate (Equipment)	International Techno Center Co., Ltd.
Yuko SUZUKI	Health Care Planning (*predecessor)	International Techno Center Co., Ltd.
Kazunori IJIMA	Health Care Planning (*successor)	International Techno Center Co., Ltd.
Hironori KUROKI	Environmental and Social Considerations	Oriental Consultants Global Co., Ltd.
Eri KAKOI	Project Coordinator / Construction Planning and Cost Estimate Support (*predecessor)	Oriental Consultants Global Co., Ltd.
Toma MIYASHITA	Project Coordinator / Construction Planning and Cost Estimate Support (*successor)	Oriental Consultants Global Co., Ltd.
Shota UENO	Project Coordinator / Construction Planning and Cost Estimate Support (*2 <sup>nd</sup> successor)	Oriental Consultants Global Co., Ltd.
Kosei YANAGI	Architectural Design Support	K.ITO Architects & Engineers Inc.

## Appendix-2 Field Survey Itinerary

1<sup>st</sup> Field Survey: Wed. 7 April - Sun. 23 May 2021 (One member until 30 May)

Name	Assignment	Organization
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.
Kazuhiro MIYATAKE	Deputy Chief Consultant / Facility Planning 2	Oriental Consultants Global Co., Ltd.
Rui KATO	Architectural Design / Natural Conditions Survey	K.ITO Architects & Engineers Inc.
Yoshio KASHIWAI	Slope Control Design	Oriental Consultants Global Co., Ltd.
Hironori KUROKI	Environmental and Social Considerations	Oriental Consultants Global Co., Ltd.
Toma MIYASHITA	Project Coordinator / Construction Planning and Cost Estimate Support	Oriental Consultants Global Co., Ltd.

Day	Itinerary
7 Apr (Wed)	Departure from Narita, arrival in Kathmandu
8 Apr (Thu) -16 Apr (Fri)	Quarantine
17 Apr (Sat)	Organization of documents, Internal discussion
18 Apr (Sun)	Courtesy calls to Dhulikhel Hospital, Site condition survey
19 Apr (Mon)	Interviews with local contractors on construction conditions; Courtesy calls to the Ministry of Health and Population and the Ministry of Education, Science and Technology.
20 Apr (Tue)	Visits to existing hospitals (Paropakar Hospital, National Trauma Centre, Tribhuvan University Teaching Hospital)
21 Apr (Wed)	Interview with Dhulikhel Hospital on facility requirements.
22 Apr (Thu)	Interview with Dhulikhel Hospital on equipment requirements.
23 Apr (Fri)	Visits to existing hospitals (Medicity Hospital), Online meetings with JICA HQ
24 Apr (Sat)	Internal discussions, Online meeting with Dhulikhel Hospital.
25 Apr (Sun)	Interviews with local contractors on construction conditions; Online meetings with the Ministry of Health and Dhulikhel Hospital.
26 Apr (Mon)	Interviews with local builders on construction conditions; Online meetings with JICA HQ
27 Apr (Tue)	Existing hospital facilities (Bir Hospitals), Online meetings with JICA HQ, PCR testing
28 Apr (Wed)	M/D discussions and signing with Ministry of Health and JICA (online).
29 Apr (Thu)	Four of the six members of the survey team self-isolated due to positive PCR tests, and the remaining two self-isolated as close contacts.
30 Apr (Fri) - 21 May (Fri)	Standby due to suspension of international flights
22 May (Sat)	Departure from Kathmandu (one person who tested positive for PCR again on 21 May departed on 29 May)
23 May (Sun)	Arrival at Narita (one person who tested positive for PCR again arrived on 30 May)

2<sup>nd</sup> Field Survey: Wed. 8 September - Mon. 4 October 2021 (One member until 24 September, One member until 26 September, One member until 29 September)

Name	Assignment	Organization
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.
Rui KATO	Architectural Design / Natural Conditions Survey	K.ITO Architects & Engineers Inc.
Yoshio	Slope Control Design	Oriental Consultants Global Co., Ltd.

KASHIWAI		
Hiroyuki KAISE	Utilities Design	K.ITO Architects & Engineers Inc.
Teruo JURI	Construction Planning / Cost Estimate (Facility)	Oriental Consultants Global Co., Ltd.
Atsushi MATSUSUE	Equipment Procurement Planning / Cost Estimate (Equipment)	International Techno Center Co., Ltd.
Hironori KUROKI	Environmental and Social Considerations	Oriental Consultants Global Co., Ltd.
Toma MIYASHITA	Project Coordinator / Construction Planning and Cost Estimate Support	Oriental Consultants Global Co., Ltd.

Day	Itinerary
8 Sep. (Wed) - 9 Sep. (Thu)	Departure from Narita, (via Doha), Arrival at Kathmandu.
9 Sep. (Thu) - 18 Sep. (Sat)	Quarantine
19 Sep. (Sun)	Organization of documents, Internal discussions
20 Sep. (Mon)	Discussions with Dhulikhel Hospital related to facilities and equipment; Site condition survey; Interviews with local concrete plant on construction conditions
21 Sep. (Tue)	Interviews with the Ministry of Health and Population and the Ministry of Urban Development on permits and approvals; Interviews with local contractors on the state of construction
22 Sep. (Wed)	Checking the status of infrastructure supply at Dhulikhel Hospital; Discussions on the health plan; and Interviewing local contractors on the status of construction
23 Sep. (Thu)	Stakeholder meetings related to EIA implementation; Interviews with local building materials trading companies on the condition of construction
24 Sep. (Fri)	T/N discussions with Dhulikhel Hospital.
25 Sep. (Sat)	Online meetings with JICA HQ, Organization of documents, and Internal discussions
26 Sep. (Sun)	T/N discussions with Dhulikhel Hospital, Confirmation of well drilling site
27 Sep. (Mon)	M/D discussions and signing with Ministry of Health and JICA HQ
28 Sep. (Tue)	Online meeting with JICA HQ and Nepal Office; T/N discussions and signing with Dhulikhel Hospital
29 Sep. (Wed)	Online meetings with the Embassy of Japan in Nepal, JICA Headquarters and Nepal Office
30 Sep. (Thu)	Organization of documents, Self-quarantine (2 days before PCR testing)
1 Oct. (Fri)	Organization of documents, Self-quarantine (1 day before PCR testing)
2 Oct. (Sat)	Organization of documents, PCR testing
3 Oct. (Sun) - 4 Oct. (Mon)	Departure from Kathmandu, (via Doha), Arrival at Narita

3<sup>rd</sup> Field Survey: Sun. 11 September - Mon. 17 September 2022 (One member until 21 September)

Name	Assignment	Organization
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.
Rui KATO	Architectural Design / Natural Conditions Survey	K.ITO Architects & Engineers Inc.
Takafumi KAMEDA	Slope Control Design	Oriental Consultants Global Co., Ltd.
Hiroyuki KAISE	Utilities Design	K.ITO Architects & Engineers Inc.
Teruo JURI	Construction Planning / Cost Estimate	Oriental Consultants Global Co., Ltd.

	(Facility)	
Kazuhiro ABE	Equipment Planning / Operation and Maintenance Planning	International Techno Center Co., Ltd.
Shota UENO	Project Coordinator / Construction Planning and Cost Estimate Support	Oriental Consultants Global Co., Ltd.
Kosei YANAGI	Architectural Design Support	K.ITO Architects & Engineers Inc.

Day	Itinerary	
11 Sep. (Sun)	Departure from Narita, Arrival at Kathmandu	
12 Sep. (Mon)	Facility and equipment-related meetings with Dhulikhel Hospital, Site condition survey, Well condition confirmation	
13 Sep. (Tue)	Interviews with Ministry of Health and Population and local contractors, Site condition survey	
14 Sep. (Wed)	Interviews with Ministry of Health and Population and local contractors, Site condition survey	
15 Sep. (Thu)	M/D discussions and signing with Ministry of Health and JICA HQ.	
16 Sep. (Fri)	Departure from Kathmandu	Procurement situation survey
17 Sep. (Sat)	Arrival at Narita	Procurement situation survey
18 Sep. (Sun)		Procurement situation survey
19 Sep. (Mon)		Procurement situation survey
20 Sep. (Tue)		Departure from Kathmandu
21 Sep. (Wed)		Arrival at Narita

4<sup>th</sup> Field Survey: Sat. 18 February - Sun. 26 February 2023

Name	Assignment	Organization
Tomoya YOSHIDA	Team Leader	Japan International Corporation Agency
Anna INCLAN	Corporation Planning	Japan International Corporation Agency
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.
Kazuhiro ABE	Equipment Planning / Operation and Maintenance Planning	International Techno Center Co., Ltd.

Day	Itinerary	
18 Feb. (Sat)	Departure from Narita, Arrival at Kathmandu	
19 Feb. (Sun)	Organization of documents, Internal discussions	
20 Feb. (Mon)	Meeting with JICA Nepal office, Discussions and preparation of M/D	
21 Feb. (Tue)	Explanation of Draft Final Report to Dhulikhel Hospital	
22 Feb. (Wed)	M/D discussions with the Ministry of Health	
23 Feb. (Thu)	Report to JICA Nepal office	
24 Feb. (Fri)	M/D discussions and signing with Ministry of Health and JICA HQ.	
25 Feb. (Sat)	Departure from Kathmandu	
26 Feb. (Sun)	Arrival at Narita	

5<sup>th</sup> Field Survey: Sat. 17 June – Wed. 21 June 2023

Name	Assignment	Organization
Tomoki MIYANO	Chief Consultant / Facility Planning 1	Oriental Consultants Global Co., Ltd.

Ikuya SAKURAI	Architectural Design / Natural Conditions Survey	K.ITO Architects & Engineers Inc.
Tatsuya TAKUBO	Structural Design	K.ITO Architects & Engineers Inc.
Takafumi KAMEDA	Slope Control Design	Oriental Consultants Global Co., Ltd.
Teruo JURI	Construction Planning / Cost Estimate (Facility)	Oriental Consultants Global Co., Ltd.
Kosei YANAGI	Architectural Design Support	K.ITO Architects & Engineers Inc.

Day	Itinerary
17 June (Sat)	Departure from Narita, Arrival at Kathmandu
18 June (Sun)	Site condition survey
19 June (Mon)	Site condition survey
20 June (Tue)	Report to JICA Nepal office, Departure from Kathmandu.
21 June (Wed)	Arrival at Narita

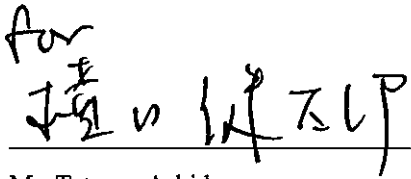
## Appendix-3 List of Relevant Parties

1. Dhulikhel Hospital
  - Prof. Dr. Ram Kantha Makaju Shrestha : Chairperson, Hospital Committee
  - Prof. Dr. Rajendra Kaju : Dean, School of Medical Sciences, Kathmandu University
  - Prof. Dr. Ramesh Makaju : Administrative Director, Dhulikhel Hospital Professor, School of Medical Sciences, Kathmandu University
  - Prof. Dr. Dipak Shrestha : Professor, School of Medical Sciences, Kathmandu University
  - Prof. Bim Prasad Shrestha : Professor, School of Engineering, Kathmandu University
  - Mr. Maniram Takhachhe : Finance Administrator
  - Mr. Rajaram Parajuli : Civil Engineer
  - Dr. Rohit Shrestha : Doctor
2. Ministry of Health and Population
  - Prof. Dr. Jageshwar Gautam : Chief Health Coordination Division
  - Ms. Rita Bhandari Joshi : Chief Health Coordination Division
  - Dr. Sanjay Kumar Thakur : Chief Health Coordination Division
  - Mr. Bhim Prasad Sapkota : Senior Public Health Administrator
  - Ms. Yeshoda Aryal : Sr. Public Health Administrator
3. Ministry of Education, Science and Technology
  - Dr. Tulashi Prasad Thapaliya : Director General

**Minutes of Discussion**  
**on the Preparatory Survey for the Project for**  
**Building Trauma and Emergency Medical Centre at Dhulikhel Hospital**

Based on the several preliminary discussions between the Government of Nepal (hereinafter referred to as “Nepal”) and Japan International Cooperation Agency (hereinafter referred to as “JICA”), JICA dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Building Trauma and Emergency Medical Centre at Dhulikhel Hospital (hereinafter referred to as “the Project”) to Nepal. The Team held a series of discussions with the officials of the Government of Nepal and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Ramshapath, Kathmandu, Nepal, 28<sup>th</sup> April 2021



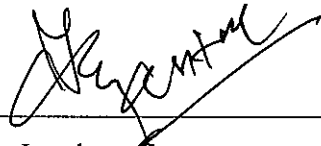
Mr. Tatsuya Ashida

Leader

Preparatory Survey Team

Japan International Cooperation Agency

Japan



Prof. Dr. Jageshwar Gautam

Chief

Health Coordination Division

Ministry of Health and Population

Nepal

Witnessed by



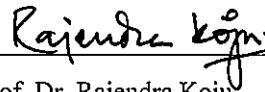
Prof. Dr. Ramesh Makaju

Administrative Director

Dhulikhel Hospital

Nepal

Witnessed by



Prof. Dr. Rajendra Koju

Dean

School of Medical Sciences

Kathmandu University

Nepal



## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to strengthen the medical service for sharply increasing trauma and emergency medical patients by building the Trauma and Emergency Medical Center at Dhulikhel Hospital with medical equipment, thereby contributing to improve quality of health care in Nepal.

### 2. Title of the project

Because the official name of facility will be Dhulikhel Hospital Trauma and Emergency Center (DHTEC), Nepal side proposed to change the title of the project from the Project for Building Trauma and Emergency Medical Center at Dhulikhel Hospital to the Project for Building Dhulikhel Hospital Trauma and Emergency Center (DHTEC). The Title of the project will be changed after the approval of the Government of Japan.

### 3. Project site

Both sides confirmed that the site of the Project is in Dhulikhel Hospital, which is shown in Annex 1.

### 4. Responsible authority for the Project

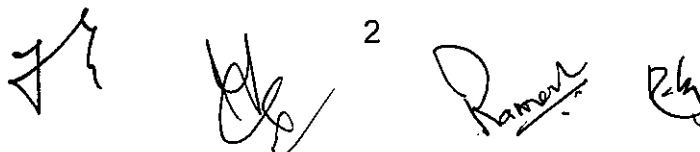
Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Ministry of Health and Population will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

### 5. Items requested by the Government of Nepal

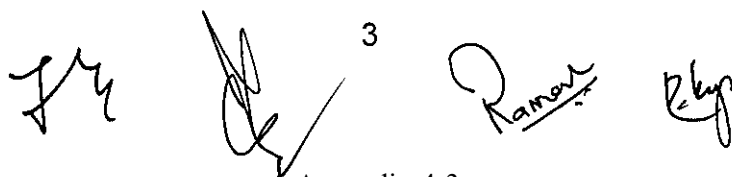
5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Nepal as shown in Annex 3 and 4

5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

The image shows four handwritten signatures or initials in black ink. From left to right: a stylized signature, a signature with a large 'D' and 'E', a signature that appears to be 'Ramon', and a signature that appears to be 'Ry'. A small number '2' is written above the second signature.

- 5-3. The Government of Nepal shall submit an official request to the Government of Japan through a diplomatic channel before the appraisal of the Project, which is scheduled in May 2021.
6. Procedures and Basic Principles of Japanese Grant
- 6-1. The Nepal side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 5 shall be applied to the Project.
- As for the monitoring of the implementation of the Project, JICA requires Nepal side to submit the Project Monitoring Report, the form of which is attached as Annex 6.
- 6-2. The Nepal side agreed to take the necessary measures, as described in Annex 7, for smooth implementation of the Project. The contents of the Annex 7 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report. The contents of Annex 7 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.
7. Schedule of the Survey
- 7-1. The Team will proceed with further survey in Nepal until 29<sup>th</sup> April 2021.
- 7-2. An official request to the Government of Japan will be submitted before May 2021.
- 7-3. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Nepal in order to explain its contents around February 2022.
- 7-4. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Nepal side, JICA will finalize the Preparatory Survey Report and send it to Nepal around June 2022.
- 7-5. The above schedule is tentative and subject to change.
8. Environmental and Social Considerations
- 8-1. The Nepal side confirmed to give due environmental and social considerations before and during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).
- 8-2. The Project is categorized as “B” from the following considerations:  
The project is not located in a sensitive area, nor has sensitive characteristics,

3

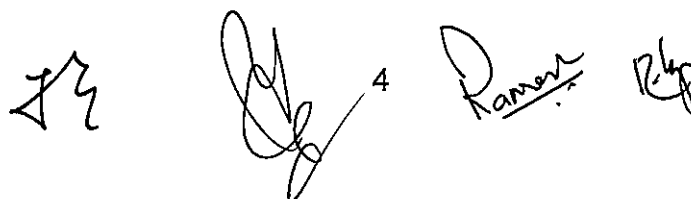


nor falls into sensitive sectors under the JICA Guidelines for Environmental and Social Considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.

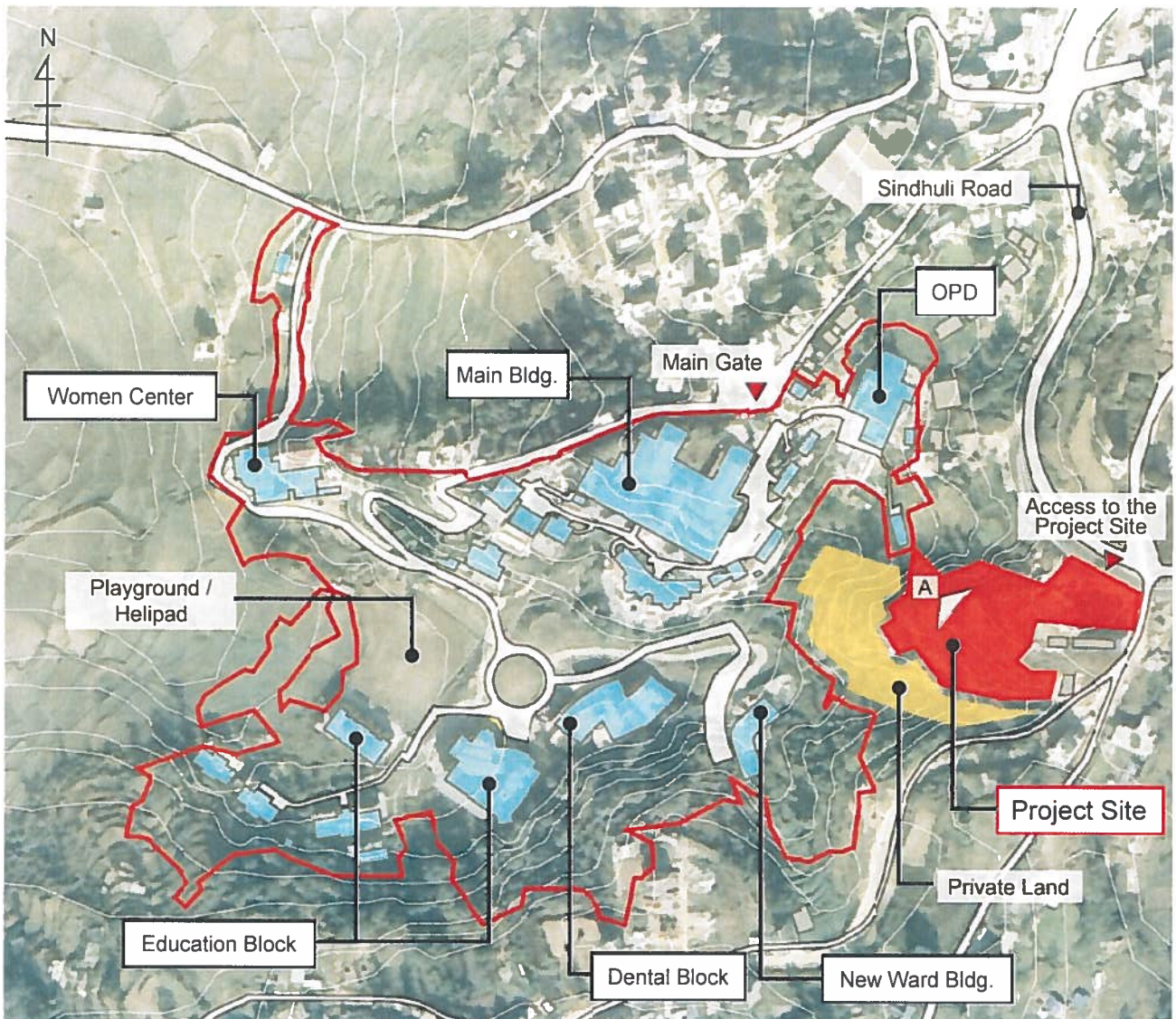
The Nepal side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure, etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by May 2022.

- 8-3. For the Project that will result in involuntary resettlement, the Nepal side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Nepal side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is consistent with JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

- Annex 1: Project Site
- Annex 2: Organization Chart
- Annex 3: Requested Facility
- Annex 4: Requested Equipment
- Annex 5: Japanese Grant
- Annex 6: Project Monitoring Report (template)
- Annex 7: Major Undertakings to be taken by the Government of Nepal



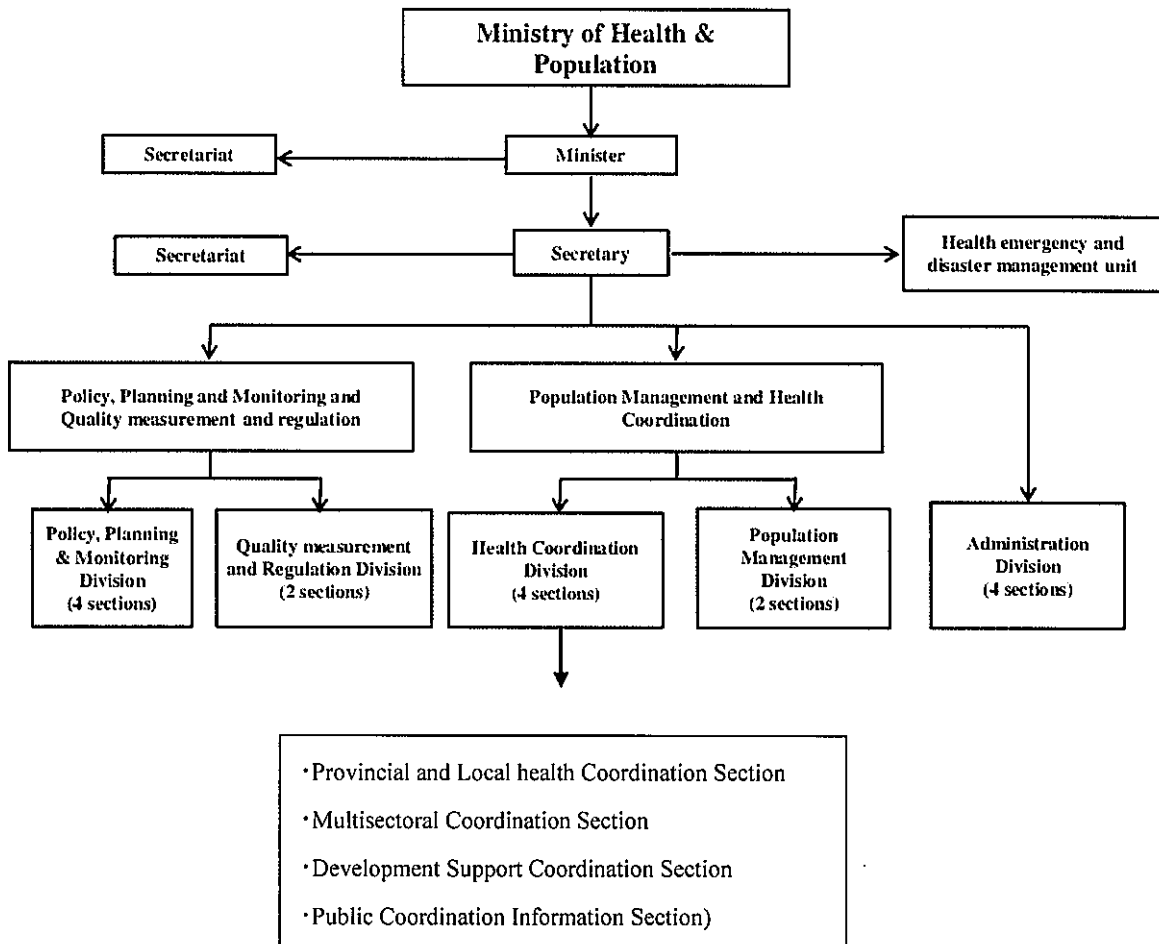
Project Site



Project Site view from point A

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Organization Chart  
Ministry of Health and Population



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## Requested Facilities

Room	Capacities
<b>■ OPD</b>	
Consultation Room	3
Injection, Dressing, Plaster Room	1
Recovery Room	1
<b>■ Emergency (31 Beds)</b>	
Triage Area	1
Treatment and Diagnosis Room	20 Beds
Observation Ward	11 Beds
Nurse Station	1
Communication Room	1
<b>■ Emergency Operation Theatre</b>	
Operation Room	1
Scrub Area	1
Preparation Room	1
<b>■ Operation Theatre</b>	
Operation Room	2
Scrub Area	1
Changing Room	2
Autoclave	1
Anesthesia	1
<b>■ Post-Operative Ward (5Beds)</b>	
Post-Operative Ward (PACU)	5 Beds
Nurse Station	1
<b>■ Radiology</b>	
X-Ray (Digital)	1

Room	Capacities
CT Scan	1
MRI	1
<b>■ Laboratory</b>	
DSA	1
Control Room	1
Ultrasonography	1
Radiologist Room	1
<b>■ Laboratory</b>	
Sample collection and report distribution	1
Hematology, Biochemistry, Microbiology	1
Pathologist Office	1
Blood Bank	1
<b>■ Pharmacy</b>	
Counter	1
Store Room	1
Office	1
<b>■ Physiotherapy and Rehabilitation</b>	
Physiotherapy and Rehabilitation	1
Store Room	1
<b>■ ICU / HDU (16 Beds)</b>	
ICU	10 Beds
HDU	6 Beds
Nurse Station	1
Medical Store	1
Equipment Store	1
Doctor's Duty Room	1
Changing Room	2
<b>■ Cafeteria</b>	

Cafeteria	1
Kitchen	1
Room	Capacities
<b>■ In-Patient Ward (48 Beds)</b>	
4 Bed with attached toilet	10 (40 Beds)
Double bed with attached toilet	2 (4 Beds)
Single bed with attached toilet	4 (4 Beds)
Nurse Station	1
Nursing In-charge Office	1
Physiotherapy and Rehabilitation	1
Doctor's Duty Room	1
Medical Store	1
Equipment Store	1
<b>■ Administration</b>	
Administrative Office	1
Director's Office with Secretary	1
Administrative Officer with Secretary	1
IT Division	1
<b>■ Research and Education</b>	
Research and Education Office	1
Department Office	5
Library	1
Conference Hall / Workshop	1
Conference Room	1
<b>■ Service</b>	
Laundry (Clean and Dirty Storage)	1
CSSD	1
Kitchen	1
Changing Room for Staff	1
Waste management	1




## Requested Equipment

Name of the equipment	Total Q'ty	Priority
Fluid Warmer	3	A
Spinal board	10	B
Stretcher	10	A
Bed side monitor	18	A
ENT Set	2	A
Otoscope	2	A
Ophthalmoscope	2	A
Compartment Pressure Monitor	2	B
Tray	5	D
ECG machine	4	A
Patient Monitor	19	A
Suction machine	26	A
Fluid pump	5	A
Chemical proof medical suit	2	D
X- ray view box	10	D
Blood warmer	3	A
Portable USG	2	A
Chairs	10	C
Ambu bags diferent sizes adult and paediatric	12	A
Defibrillator (Biphagic)	4	A
Portable Pulse Oximeter	6	C
Doppler	3	A
Portable Digital x-ray machine	3	A
Combi tube	1	B
LMA	2	B
Bougie	1	B

Name of the equipment	Total Q'ty	Priority
ABG machine	5	A
Wheel chair	11	B
Portable ventilator	2	A
Refrigerator	2	A
Computer	1	D
Hemodalysis machine	2	A
Syringe pump	10	A
Microscope	2	A
Full Auto Analyser	2	A
CBC counter/ Culter	1	A
Colorimeter	2	A
Auto clave	4	A
Incubator	2	A
Hot air oven	2	A
Blood mixer	3	A
Water bath	2	B
Blood Bank Refrigerator	2	A
Blood Warmer	2	A
Freeze 165 cc	2	B
Blood collection Bed	2	A
Defreeze Refrigerator	1	A
Micro pippette Set	14	D
Light Table	2	D
Chairs	8	D
PCR machine	1	A
X-ray (Digital)	1	A
Mobile DR	1	A
Ultrasonography	2	A
CT Scan 256 slice	1	A
C-arm	4	A



Name of the equipment	Total Q'ty	Priority
MRI	1	A
DEXA Scan	1	C
Digital subtraction angiography	1	A
Adult and Paediatric circuits and Ventilator with its parts	3	A
Adult and Paediatric circuits anaesthesia and Ventilator with its parts	3	A
Bed Warmer	5	B
Cautery machine and Cautery Stand	3	A
Defibrillator	3	A
ECG Monitors with NIBP, SPO2, A-line, Etco2, CVP	3	A
Glucometer with its stripes	3	C
Infusion Pump	7	A
Intravenous Stand	3	C
Laryngoscope set different sizes	3	C
Manual blood pressure cuffs and stethoscopes	3	D
Mobile chair for surgery	3	D
OT beds for pre-operative and post operative	3	A
OT Lamp mobile	3	A
OT light Fixed	3	A
OT mayo tray for instruments setup	3	C
OT table	3	A
OT trolley for instruments setup	5	A

Name of the equipment	Total Q'ty	Priority
Radiant warmer	5	A
suction machine mobile	10	B
Weighing machine	3	Delete
Additional Ortho surgical equipment	2	A
Additional Neuro surgical equipment including Neuro Monitoring equipments	2	A
Neuronavigation and per operative CT scan	1	A
Cervical Collars e.g. Philadelphia	1	D
Spinal Braces Different Sizes	1	B
Splinting material	1	D
Bandages	1	D
Ergo material, Thermoplastic material, Vetcro	1	D
Knee Braces/ Knee immobilizers Different sizes	1	D
Arm sling	1	D
Crutcher	1	D
Walkers	1	D
Different orthosis	1	D
foot drop/ Wrist drop splints/slab	1	D
Suction Apparatus	1	A
Oxygen Therapy unit	1	Delete
Mechanical Chest vibrator	1	C
Portnal Drainage Table	1	D
Ventilator	5	A

Name of the equipment	Total Q'ty	Priority
Fluid Warmer	1	B
Hydraulic bed	8	A
Portable Spo2 and o2	5	C
Glucometer	3	C
Laryngoscope different Size	3	B
Bed	5	A
Auto clave	1	A
Oxygen concentrator	10	A
CPAP/BiPAP machine	20	A

*FE* *AS*

*Ramon*

*Riley*

## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

#### (1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

#### (2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

#### (3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

#### (4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

## (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

## (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

## 3. Basic Principles of Project Grants

### (1) Implementation Stage

#### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

#### 2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
- b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an

Authorization to Pay (A/P) issued by the Recipient.

### 3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

### 4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

### 5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

### 6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

### 7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

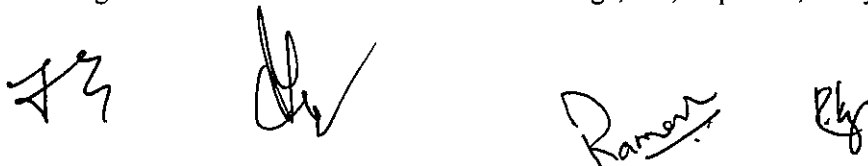
### 8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

### 9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control



and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.





**Project Monitoring Report**  
on  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	<p>Person in Charge (Designation) _____</p> <p>Contacts                      Address: _____</p> <p>   Phone/FAX: _____</p> <p>   Email: _____</p>
<b>Executing Agency</b>	<p>Person in Charge (Designation) _____</p> <p>Contacts                      Address: _____</p> <p>   Phone/FAX: _____</p> <p>   Email: _____</p>
<b>Line Ministry</b>	<p>Person in Charge (Designation) _____</p> <p>Contacts                      Address: _____</p> <p>   Phone/FAX: _____</p> <p>   Email: _____</p>

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

**1: Project Description**

**1-1 Project Objective**

--

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

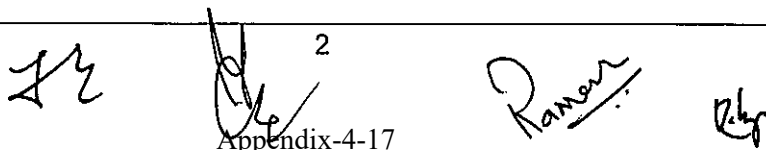
Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------





**2-3 Implementation Schedule**

Items	Original		Actual
	(proposed in the outline design)	(at the time of signing the Grant Agreement)	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components	Cost (Million Yen)			
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
1.				
Total				

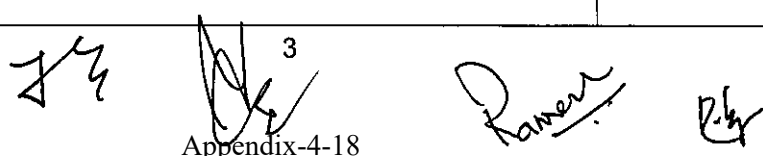
Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components	Cost (1,000 Taka)			
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
1.				

3

Appendix-4-18



- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

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FZ, [Signature], 4, Ramon, [Signature]

Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**





Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final )only)
  8. Pictures (by JPEG style by CD-R) (PMR (final)only)
  9. Equipment List (PMR (final )only)
  10. Drawing (PMR (final )only)
  11. Report on RD (After project)



Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C-D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1	Item 1	●	●	●			
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)

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. .

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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## Major Undertakings to be taken by the Government of Nepal

**1. Specific obligations of the Government of Nepal which will not be funded with the Grant**

## (1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To bear the following commissions paid to the Japanese bank for banking services based upon the banking arrangement (B/A) (1) Advising commission of authorization to pay (A/P) (2) Payment commission				
2	To give due environmental and social consideration in the implementation of the Project				
3	To secure the following land necessary for the implementation of the Project (1) Project sites for the Trauma and Emergency Medical Center. (2) Temporary stock yard for construction near the Project area				
4	To clear, level and reclaim the project site (1) Demolition of unnecessary existing buildings (2) Removal of unnecessary existing trees (3) Leveling and reclaiming the sites				
5	To obtain the building permission				

## (2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the banking arrangement (B/A) (1) Advising commission of authorization to pay (A/P) (2) Payment commission for authorization to pay (A/P)				
2	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products (1) Tax exemption and customs clearance of the products at the port of disembarkation				
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work				



4	To exempt Japanese nationals from/To bear, without using the Grant, customs duties, internal taxes and other fiscal levies such as VAT (Value Added Tax), Personal Income Tax, Corporate Income Tax, Remittance Tax, NBT (Nation Building Tax), Economic Service Charge, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract				
5	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment				
6	Construct temporary access road for the construction work.				
7	To construct the following facilities: (1) The gates and fences in and around the site (2) The road outside the site				
8	To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site (1) Electricity 1) The distribution power line to the site (2) Water Supply 1) The city water distribution main to the site (3) Drainage 1) The city drainage to the site (for storm sewer and others to the site) (4) Gas Supply 1) The city gas to the site (5) Telephone System 1) The telephone trunk line to the main distribution frame/panel (MDF) of the building (6) Furniture and Equipment 1) General furniture				

## (3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To ensure that facilities and the products be maintained and used properly and effectively				
2	To bear all the expenses, other than those covered by the Grant, necessary for operation				
3	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. (1) Allocation of maintenance cost (2) Operation and maintenance organization and staff (3) Routine check/periodical maintenance				

**Minutes of Discussions  
on the Preparatory Survey for the Project for  
Building Trauma and Emergency Medical Centre at Dhulikhel Hospital**

In response to the request from the Government of Nepal (hereinafter referred to as “Nepal”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Building Trauma and Emergency Medical Centre at Dhulikhel Hospital (hereinafter referred to as “the Project”) to Nepal. The Team held a series of discussions with the officials of the Government of Nepal and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Ramshapath, Kathmandu, Nepal, 27<sup>th</sup> September 2021

*For*

大久保 晶光

Mr. Tatsuya Ashida  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Ms. Rita Bhandari Joshi  
Chief  
Health Coordination Division  
Ministry of Health and Population  
Nepal

Witnessed by

R. Koju

Prof. Dr. Rajendra Koju  
Dean  
School of Medical Sciences  
Kathmandu University  
Nepal

Witnessed by

Ramesh Makaju

Prof. Dr. Ramesh Makaju  
Administrative Director  
Dhulikhel Hospital  
Nepal

Witnessed by

Yeshoda Aryal

Ms. Yeshoda Aryal  
Sr. Public Health Administrator  
Health Coordination Division  
Ministry of Health and Population  
Nepal

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to strengthen the medical service and response capacity for trauma and emergency medical patients by building the Trauma and Emergency Medical Center at Dhulikhel Hospital with medical equipment, thereby contributing to improve quality of trauma and emergency care in Nepal, especially eastern part of Nepal.

### 2. Title of the Preparatory Survey

Because the official name of facility will be Dhulikhel Hospital Trauma and Emergency Center (DHTEC), Nepal side proposed to change the title of the project from the Project for Building Trauma and Emergency Medical Center at Dhulikhel Hospital to the Project for Building Dhulikhel Hospital Trauma and Emergency Center. The Title of the project will be changed after the approval of the Government of Japan.

### 3. Project site

Both sides confirmed that the site of the Project is in Dhulikhel Hospital, which is shown in Annex 1.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:  
The Ministry of Health and Population will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

### 5. Items requested by the Government of Nepal

5-1. As a result of discussions, both sides confirmed that the items agreed by the Government of Nepal as shown in Annex 3 and 4

5-2. JICA will assess the feasibility of the above requested items through the survey. The result of the feasibility survey will be in the Draft Preparatory Survey Report shared at the mission scheduled in March 2022.

6. Procedures and Basic Principles of Japanese Grant

6-1. The Nepal side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 5 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Nepal side to submit the Project Monitoring Report that the form is attached as Annex 6.

6-2. The Nepal side agreed to take the necessary measures, as described in Annex 7, for smooth implementation of the Project. The contents of the Annex 7 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 7 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Nepal until 2<sup>nd</sup> October.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Nepal in order to explain its contents around March 2022.

7-4. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Nepal side, JICA will finalize the Preparatory Survey Report and send it to Nepal around June 2022.

7-5. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Nepal side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations:

The project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010)), and its potential adverse impacts on the environment are not likely to be significant.

The Nepal side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) and information disclosure, etc.) and make EIA report of the Project. The EIA approval shall be received from the responsible authorities and submitted to JICA by May 2022.

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8-3. For the Project that will result in involuntary resettlement, the Nepal side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Nepal side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is based on JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

## 9. Other Relevant Issues

### 9-1. Project components

Items requested by Government of Nepal, which are described in Annex 3 and 4, subject to further discussion between the relevant authorities and the survey team. The final components of facility and equipment for the Project will be defined through further analysis considering the budget and priorities.

### 9-2. Operation and Maintenance of the Equipment

#### a) Importance of Operation and Maintenance

The Team explained the importance of operation and maintenance of the equipment under the Project considering that proper asset management is necessary to secure the life-span of the equipment and to reduce its maintenance cost. The Nepal side agreed to secure enough budgets necessary for appropriate operation and maintenance of the equipment including the additional purchase of the consumables and spare parts.

#### b) Maintenance Contracts on Major Equipment

The Team explained that the importance of the routine maintenance and maintenance service of major equipment such as MRI and CT. Keeping this in view, the Nepal side and the Team understand the necessity of covering maintenance service contracts to the major equipment within components of the Grant Aid based on the assessment by JICA. The Team will inform the result at the explanation of draft Preparatory Survey Report. The Nepal side and the team will eventually agree the target equipment covered by this project on the major undertakings attached to Grant Agreement. The Nepal side will keep to contract after expiry of maintenance contracts by Japanese grant.

### 9-3. Demolition of the Existing Structure

The Nepal side confirmed the demolition of the existing one cottage and two residences shown in Annex 8 including removal of underground structures before the reconstruction work in accordance with ARAP which is based on JICA

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Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

Existing facilities, landscaping, garbage, wastes, soils, and unnecessary existing trees within the construction site should also be removed, and the ground conditions should be reclaimed for reconstruction work.

#### 9-4. Land Acquisition

The Nepal side confirmed the acquisition of the land between the Project site and the existing Outpatient Department building (plot No. 230) by the end of December 2021 for connecting the Dhulikhel Hospital Trauma and Emergency Center and the Outpatient Department building in accordance with ARAP.

#### 9-5. Land tenancy

The Nepal side confirmed Kathmandu University is tenanted the land of Project site until 2044 for the exclusive use of Dhulikhel Hospital Trauma and Emergency Center. Nepal side will make the necessary effort to use this land after this period.

#### 9-6. Setback from Raj Kulo (public sewage)

The Nepal side confirmed to assure that the setback from Raj Kulo (public sewage) located at the southern side of the Project site shown in Annex 9 does not affect the location of the Dhulikhel Hospital Trauma and Emergency Center by the end of December 2021. The assurance shall be made in an official document confirmed by the Dhulikhel Municipality and/or the concerned government organizations.

#### 9-7. Allocation of Human Resources for Utilization

The Nepal side agreed to secure sufficient personnel for the utilization of the medical equipment to be provided.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 List of Facilities (tentative)

Annex 4 List of Equipment (tentative)

Annex 5 Japanese Grant

Annex 6 Project Monitoring Report (template)

Annex 7 Major Undertakings to be taken by the Government of Nepal

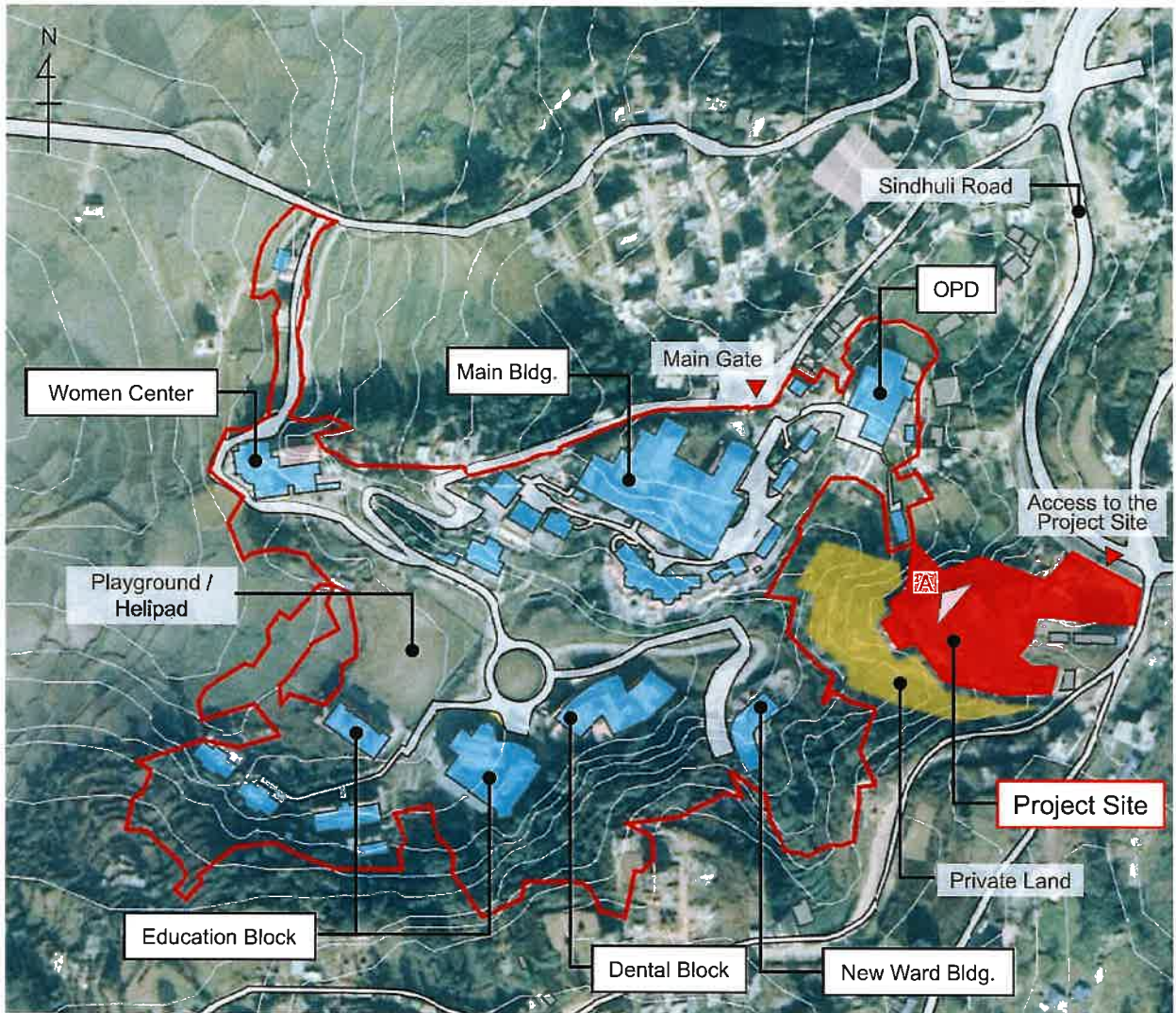
Annex 8 Existing Structures

Annex 9 Location of Raj Kulo (public sewage)

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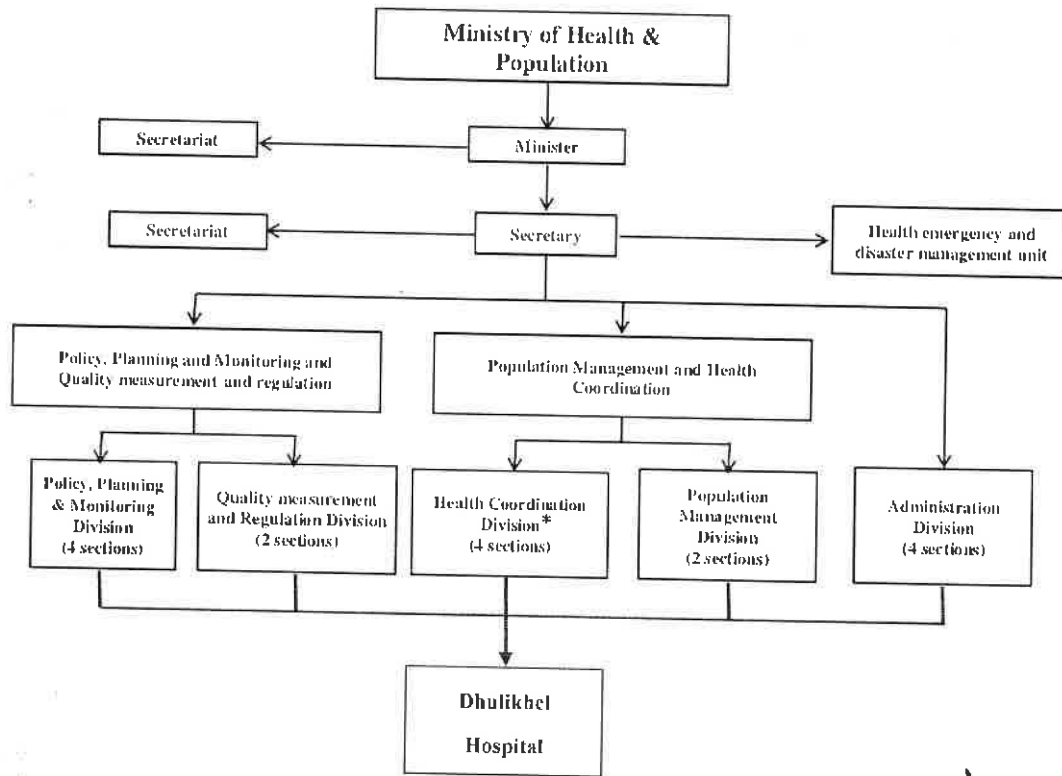
Project Site



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Organization Chart  
Ministry of Health and Population



\*Project Coordination Division

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## List of Facilities (tentative)

Department	Major Room
OPD	Consultation Room, Treatment/Recovery Room
Emergency (31 Beds)	Triage Area, Red zone (Shock Room) (4 Beds), Yellow Zone (6 Beds), Green Zone (10 Beds), Observation Ward (11 Beds), Staff Station, Plaster/Procedure Room, Communication Room
Emergency Operation Theatre	Operation Room, Scrub Area, Storage/Preparation/ Recovery Room
Operation Theatre (5 Beds)	Operation Room, Scrub Area, Anesthesia, Storage, Preparation Room, Changing Room, Post-Operative Ward (POW) (5 Beds)
CSSD	Washing Room, Drying Room, Packing Room, Sterilization Room, Storage
Radiology	X-Ray Room, CT Scan Room, MRI Room, Angiography Room, Ultrasonography Room, Control / Reporting Room
Laboratory	Sample Collection Room, Hematology Room, Biochemistry Room, Microbiology Room, Pathology Room, Pathologist Office, Storage, Blood Bank
Pharmacy	Counter, Office, Storage
Physiotherapy and Rehabilitation	Physiotherapy and Rehabilitation Room, Storage
ICU / HDU (16 Beds)	ICU (10 Beds), HDU (6 Beds), Staff Station, Storage
In-Patient Ward (46 Beds)	1 Bed Room (4 Rooms), 4 Beds Room (5 Rooms), 5 Beds Room (2 Rooms), 6 Beds Rooms (2 Rooms), Staff Station, Drug Preparation Room, Treatment Room, Counseling Room, Storage
Administration	Administration Office, Director's Office, IT Room
Research and Education	Research and Education Office, Department Office, Library, Conference Hall/Workshop, Conference Room
Service	Linen Storage, Changing Room, Waste Management Room
Cafeteria	Cafeteria, Kitchen (Including Kitchen for inpatient)

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List of Equipment (tentative) As of 24th September 2021

No.	Name of the equipment	Total Q'ty	Priority
1	MRI	1	A
2	CT	1	A
3	Angiography	1	A
4	C-arm	2	A
5	X-ray	1	A
6	Portable X-ray	2	A
7	Ultrasound machine	2	A
8	Portable ultrasound machine	1	A
9	Portable ventilator	2	A
10	ECG machine	2	A
11	Patient monitor A	46	A
12	Defibrillator	4	A
13	Suction machine	18	A
14	ENT work station	1	A
15	Otoscope	1	A
16	Ophthalmoscope	2	A
17	Haemodialysis machine	2	A
18	Stretcher	10	A
19	Doppler	3	A
20	Refrigerator	2	A
21	Blood gas analyzer	1	A
22	Anesthesia machine	3	A
23	Electro surgical cautery unit	3	A
24	Operating light	3	A
25	Operating light mobile	2	A
26	Operating table	3	A
27	Orthopaedic surgical instrument set	2	A
28	Neuro surgical instrument set	2	A
29	Surgical microscope	1	A
30	Patient monitor B	3	A
31	Infusion Pump	7	A
32	Syringe Pump	10	A
33	Bed	84	A
34	Radiant warmer	1	A
35	Autoclave A	2	A
36	Biochemistry analyzer	2	A
37	Hematology analyzer	1	A
38	Colorimeter	2	A
39	Microscope	2	A
40	Incubator	2	A
41	Hot air oven	2	A
42	Blood mixer	3	A

No.	Name of the equipment	Total Q'ty	Priority
43	Blood bank refrigerator	2	A
44	Blood collection bed	2	A
45	Defreeze Refrigerator	1	A
46	Ventilator	5	A
47	ICU bed	16	A
48	Autoclave B	1	A
49	Oxygen concentrator	2	A
50	CPAP/BiPAP machine	6	A
51	Bed side cabinet	100	A
52	Ambu bag	6	B
53	Fluid pump	5	B
54	Fluid warmer	3	B
55	Blood warmer	3	B
56	Neuronavigation and CT	1	B
57	Operating trolley	5	B
58	PCR machine	1	B
59	Blood warmer	2	B
60	Suction apparatus	1	B
61	Spinal board	10	B
62	Compartment pressure monitor	2	B
63	Combi tube	1	B
64	LMA	2	B
65	Bougie	1	B
66	Wheel chair	11	B
67	Water bath	2	B
68	Freeze 165 cc	2	B
69	Bed Warmer	5	B
70	suction machine mobile	10	B
71	Spinal Braces Different Sizes	1	B
72	Fluid Warmer	1	B
73	Laryngoscope different size	3	B
74	Chairs	10	C
75	Portable Pulse Oximeter	6	C
76	DEXA Scan	1	C
77	Glucometer with its stripes	3	C
78	Intravenous Stand	100	C
79	Laryngoscope set different sizes	3	C
80	OT mayo tray for instruments setup	3	C
81	Mechanical Chest vibrator	1	C
82	Portable Spo2 and O2	5	C
83	Glucometer	3	C

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## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.

- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

### 3. Basic Principles of Project Grants

#### (1) Implementation Stage

##### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

##### 2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an



Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control



and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.



**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ _____ Contacts                      Address: _____ Phone/FAX: _____ Email: _____

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

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<b>1: Project Description</b>	
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**1-1 Project Objective**

**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr      )	Target (Yr      )
Qualitative indicators to measure the attainment of project objectives		

<b>2: Details of the Project</b>
----------------------------------

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

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**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**

See Attachment 2.

**2-4-2 Activities**

See Attachment 3.

**2-4-3 Report on RD**

See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			
Total				

Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			

*AG*

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- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

### 2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (PMR)

### 2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

## 3: Operation and Maintenance (O&M)

### 3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

### 3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

<b>Original</b> (at the time of outline design)
---

Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

## 5: Evaluation and Monitoring Plan (after the work completion)

### 5-1 Overall evaluation

Please describe your overall evaluation on the project.

--

### 5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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### 5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
  2. Specific obligations of the Recipient which will not be funded with the Grant
  3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
  5. Environmental Monitoring Form / Social Monitoring Form
  6. Monitoring sheet on price of specified materials (Quarterly)
  7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
  8. Pictures (by JPEG style by CD-R) (PMR (final) only)
  9. Equipment List (PMR (final) only)
  10. Drawing (PMR (final) only)
  11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
					Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●●		●	●
Item 2	●●t	●	●●			
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1	●	●	●			
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

*A. S.*

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## Major Undertakings to be taken by the Government of Nepal

## 1. Specific obligations of the Government of Nepal which will not be funded with the Grant

## (1) Before the Tender

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MoF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MoF		
3	To bear the following commissions paid to the Japanese bank for banking services based upon the banking arrangement (B/A)		MoF / MoHP		
	(1) Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)			
	(2) Payment commission	every payment			
4	To approve EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	MoFE		
5	To secure the following land necessary for the implementation of the Project (1) Project sites for the Trauma and Emergency Medical Center. (2) Temporary stock yard for construction near the Project area	Before the notice of tender	MoHP / Dhulikhel Hospital		
6	To clear, level and reclaim the project site (1) Demolition of unnecessary existing buildings (2) Removal of unnecessary existing trees (3) Leveling and reclaiming the sites	Before the notice of tender	MoHP / Dhulikhel Hospital		

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7	To obtain the building permission	Before the notice of tender	MoHP / Dhulikhel Hospital		
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MoHP / Dhulikhel Hospital		

## (2) During the Project Implementation

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MoF		
2	To bear the following commissions to a bank of Japan for the banking services based upon the banking arrangement (B/A)				
	(1) Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)	MoHP		
	(2) Payment commission for authorization to pay (A/P)	every payment	MoF		
3	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products (1) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	MoHP		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOHP / Dhulikhel Hospital		

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5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	MoHP / Dhulikhel Hospital		
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	MoF / MoHP / Dhulikhel Hospital		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	MoHP / Dhulikhel Hospital		
8	To submit Project Monitoring Report	every month	MoHP / Dhulikhel Hospital		
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MoHP / Dhulikhel Hospital		
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MoHP / Dhulikhel Hospital		
11	To construct the following facilities: - The gates and fences in and around the site	before start of the construction	MoHP / Dhulikhel Hospital		

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12	To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site (1) Electricity 1) The distribution power line to the site (2) Water Supply 1) The city water distribution main to the site (3) Drainage 1) The city drainage to the site (for storm sewer and others to the site) (4) Gas Supply 1) The city gas to the site (5) Telephone System 1) The telephone trunk line to the main distribution frame/panel (MDF) of the building (6) Furniture and Equipment 1) General furniture	before start of the construction	MoHP / Dhulikhel Hospital		
13	To ensure the safety of persons engaged in the implementation of the Project	during the Project	MoHP / Dhulikhel Hospital		
14	To implement EMP and EMoP	during the construction	MoHP / Dhulikhel Hospital		
15	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MoHP / Dhulikhel Hospital		
16	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MoHP and JICA.	for 2 years after land acquisition and resettlement complete	MoHP / Dhulikhel Hospital		

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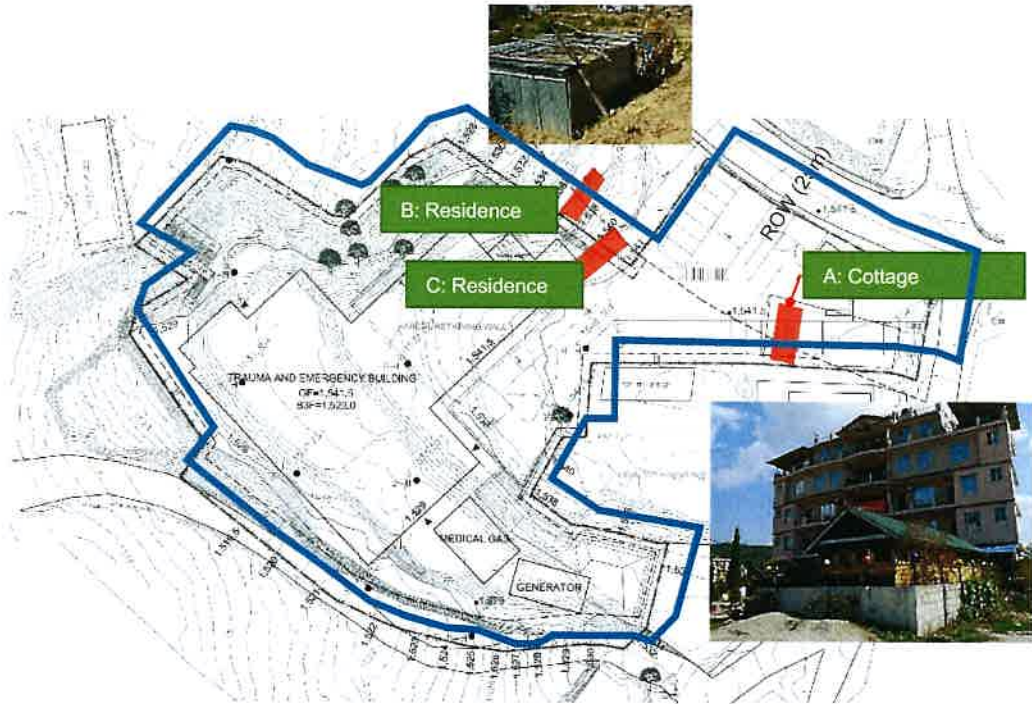
## (3) After the Project

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MoHP / Dhulikhel Hospital		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MoHP and JICA.	for 3 years after the Project	MoHP / Dhulikhel Hospital		
3	To ensure that facilities and the products be maintained and used properly and effectively	After completion of the construction	MoHP / Dhulikhel Hospital		
4	To bear all the expenses, other than those covered by the Grant, necessary for operation	After completion of the construction	MoHP / Dhulikhel Hospital		
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. (1) Allocation of maintenance cost (2) Operation and maintenance organization and staff (3) Routine check/periodical maintenance	After completion of the construction	MoHP / Dhulikhel Hospital		

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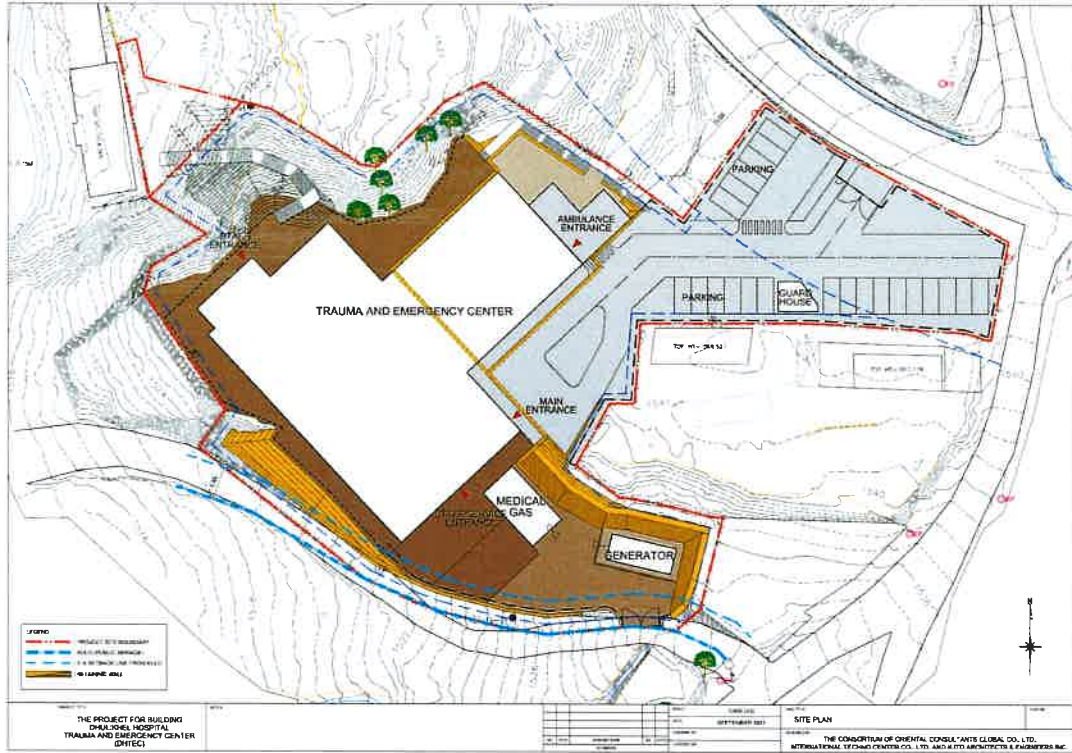
Existing Structures



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Location of Raj Kulo (public sewage)



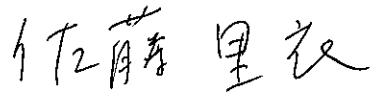
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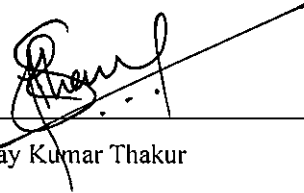
**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Building Trauma and Emergency Medical Centre at Dhulikhel Hospital**

In response to the request from the Government of Nepal (hereinafter referred to as “Nepal”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) dispatched the Preparatory Survey Team for the Outline Design (hereinafter referred to as “the Team”) of the Project for Building Trauma and Emergency Medical Centre at Dhulikhel Hospital (hereinafter referred to as “the Project”) to Nepal. The Team held a series of discussions with the officials of the Government of Nepal and conducted a field survey. In the course of the discussions, both sides have confirmed the main items described in the attached sheets.

Ramshahpath, Kathmandu, Nepal, 15<sup>th</sup> September 2022

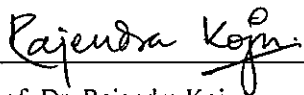


Ms. Rie Sato  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Dr. Sanjay Kumar Thakur  
Chief  
Health Coordination Division  
Ministry of Health and Population  
Nepal

Witnessed by



Prof. Dr. Rajendra Koju  
Dean  
School of Medical Sciences  
Kathmandu University  
Nepal

Witnessed by



Prof. Dr. Ramesh Makaju  
Administrative Director  
Dhulikhel Hospital  
Nepal

Witnessed by



Mr. Bhim Prasad Sapkota  
Sr. Public Health Administrator  
Health Coordination Division  
Ministry of Health and Population  
Nepal

## ATTACHMENT

### 1. Objective of the Project

The objective of the Project is to strengthen the medical service and response capacity for trauma and emergency medical patients by building the Trauma and Emergency Medical Center at Dhulikhel Hospital with medical equipment, thereby contributing to improve quality of trauma and emergency care in Nepal, especially eastern part of Nepal.

### 2. Title of the Preparatory Survey

Because the official name of facility will be Dhulikhel Hospital Trauma and Emergency Center (DHTEC), Nepal side proposed to change the title of the project from the Project for Building Trauma and Emergency Medical Center at Dhulikhel Hospital to the Project for Building Dhulikhel Hospital Trauma and Emergency Center. The Title of the project will be changed after the approval of the Government of Japan.

### 3. Project site

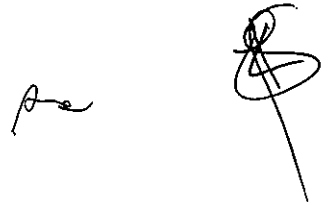
Both sides confirmed that the site of the Project is in Dhulikhel Hospital, which is shown in Annex 1.

### 4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:  
The Ministry of Health and Population will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

### 5. Items requested by the Government of Nepal

- 5-1. As a result of discussions, both sides confirmed that the items agreed by the Government of Nepal as shown in Annex 3 and 4
- 5-2. JICA will assess the feasibility of the above requested items through the survey and will report the findings to the Government of Japan. The final scope of the Project will be decided by the Government of Japan.

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5-3. The Priority among the items requested by Government of Nepal is described in Annex 4. The equipment list is subject to further discussions according to cost estimation and budget.

## 6. Procedures and Basic Principles of Japanese Grant

6-1. The Nepal side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as “the Grant”) as described in Annex 5 shall be applied to the Project.

As for the monitoring of the implementation of the Project, JICA requires Nepal side to submit the Project Monitoring Report that the form is attached as Annex 6.

6-2. The Nepal side agreed to take the necessary measures, as described in Annex 7, for smooth implementation of the Project. The contents of the Annex 7 will be elaborated and refined during the Preparatory Survey and be agreed in the mission dispatched for explanation of the Draft Preparatory Survey Report.

The contents of Annex 7 will be updated as the Preparatory Survey progresses, and eventually, will be used as an attachment to the Grant Agreement.

## 7. Schedule of the Survey

7-1. The Team will proceed with further survey in Nepal until 16<sup>th</sup> September 2022.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Nepal in order to explain its contents around February 2023.

7-3. If the contents of the draft Preparatory Survey Report is accepted and the undertakings for the Project are fully agreed by the Nepal side, JICA will finalize the Preparatory Survey Report and send it to Nepal around June 2023.

7-4. The above schedule is tentative and subject to change.


## 8. Environmental and Social Considerations

8-1. The Nepal side confirmed to give due environmental and social considerations during implementation, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as “B” from the following considerations:

The project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010)), and its potential adverse impacts on the environment are not likely to be significant.

The Nepal side confirmed to conduct the necessary procedures concerning the



environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) and information disclosure, etc.) and make EIA report of the Project. The EIA approval shall be received from the responsible authorities and submitted to JICA by March 2023.

8-3. For the Project that will result in involuntary resettlement, the Nepal side confirmed to prepare a Resettlement Action Plan (RAP)/Abbreviated Resettlement Action Plan (ARAP) and make it available to the public. In addition, the Nepal side confirmed to provide the affected people with sufficient compensation and/or support in accordance with RAP/ARAP, which is based on JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

## 9. Other Relevant Issues

### 9-1. Operation and Maintenance of the Equipment

#### a) Importance of Operation and Maintenance

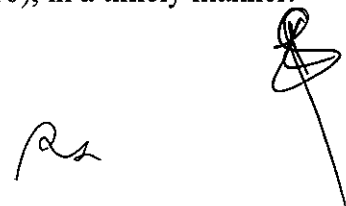
The Team explained the importance of operation and maintenance of the equipment under the Project considering that proper asset management is necessary to secure the life-span of the equipment and to reduce its maintenance cost. The Nepal side agreed to secure enough budgets necessary for appropriate operation and maintenance of the equipment including the additional purchase of the consumables and spare parts.

#### b) Maintenance Contracts on Major Equipment

The Team explained that the importance of the routine maintenance and maintenance service of major equipment such as MRI and CT. Keeping this in view, the Nepal side and the Team understand the necessity of covering maintenance service contracts to the major equipment within components of the Grant Aid based on the assessment by JICA. The Team will inform the result at the explanation of draft Preparatory Survey Report. The Nepal side and the team will eventually agree the target equipment covered by this project on the major undertakings attached to Grant Agreement. The Nepal side will keep to contract after expiry of maintenance contracts by Japanese grant.

### 9-2. Demolition of the Existing Structure

The Nepal side confirmed the demolition of the existing one cottage and two residences shown in Annex 8 including removal of underground structures before the construction work in accordance with ARAP which is based on JICA Guidelines for Environmental and Social Considerations (April, 2010), in a timely manner.

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Existing facilities, landscaping, garbage, wastes, soils, and unnecessary existing trees within the construction site should also be removed, and the ground conditions should be reclaimed for reconstruction work.

#### 9-3. Land Acquisition

The Nepal side confirmed the acquisition of the land between the Project site and the existing Outpatient Department building (plot No. 230) by the end of December 2021 for connecting the Dhulikhel Hospital Trauma and Emergency Center and the Outpatient Department building in accordance with ARAP based on JICA Guidelines for Environmental and Social Considerations 2010.

#### 9-4. Land tenancy

The Nepal side confirmed Kathmandu University is tenanted the land of Project site until 2044 for the exclusive use of Dhulikhel Hospital Trauma and Emergency Center. Nepal side will make the necessary effort to use this land after this period.

#### 9-5. Allocation of Human Resources for Utilization

The Nepal side agreed to secure sufficient personnel for the utilization of the medical equipment to be provided.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 List of Facilities (tentative)

Annex 4 List of Equipment (tentative)

Annex 5 Japanese Grant

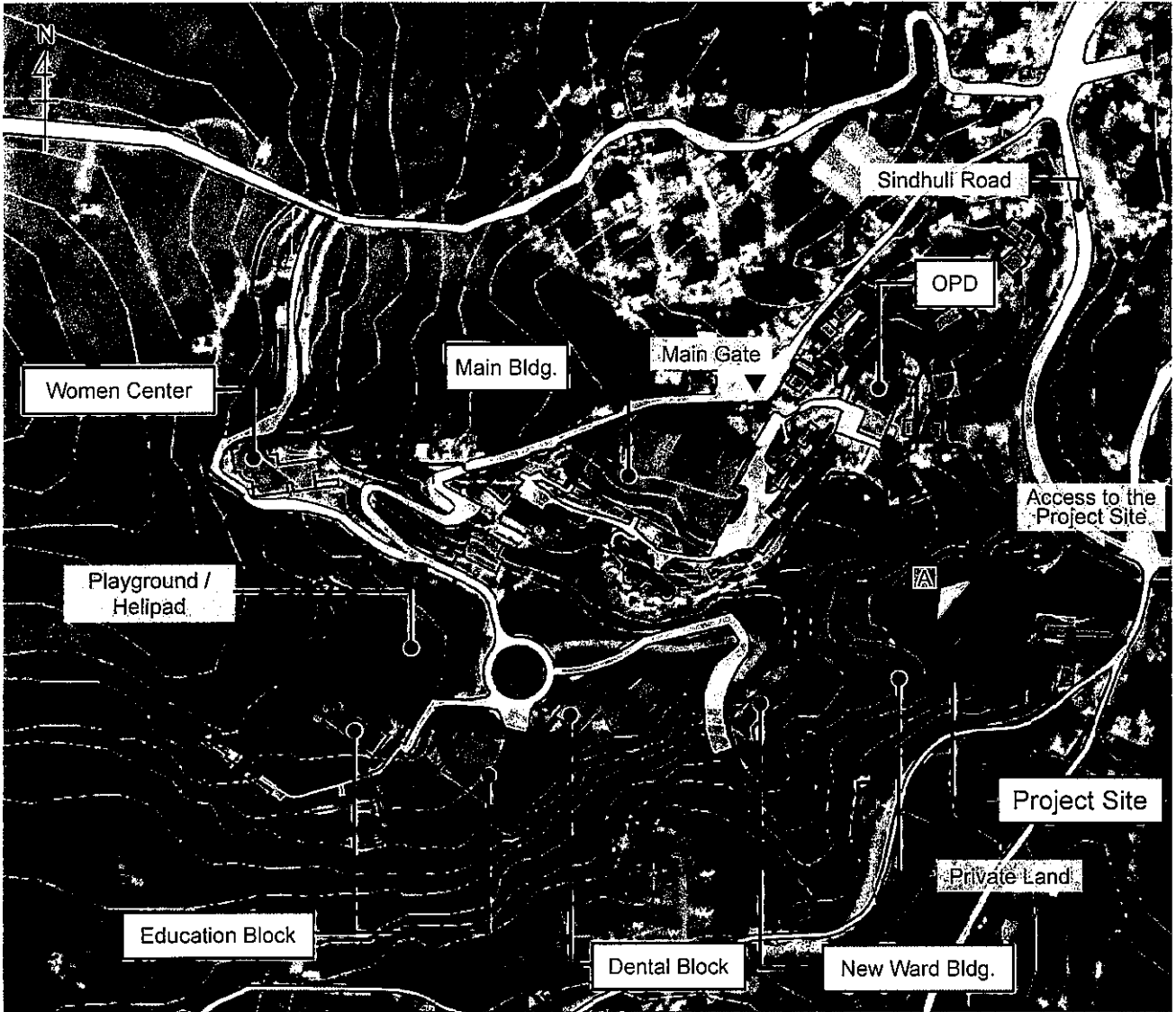
Annex 6 Project Monitoring Report (template)


Annex 7 Major Undertakings to be taken by the Government of Nepal

Annex 8 Existing Structures

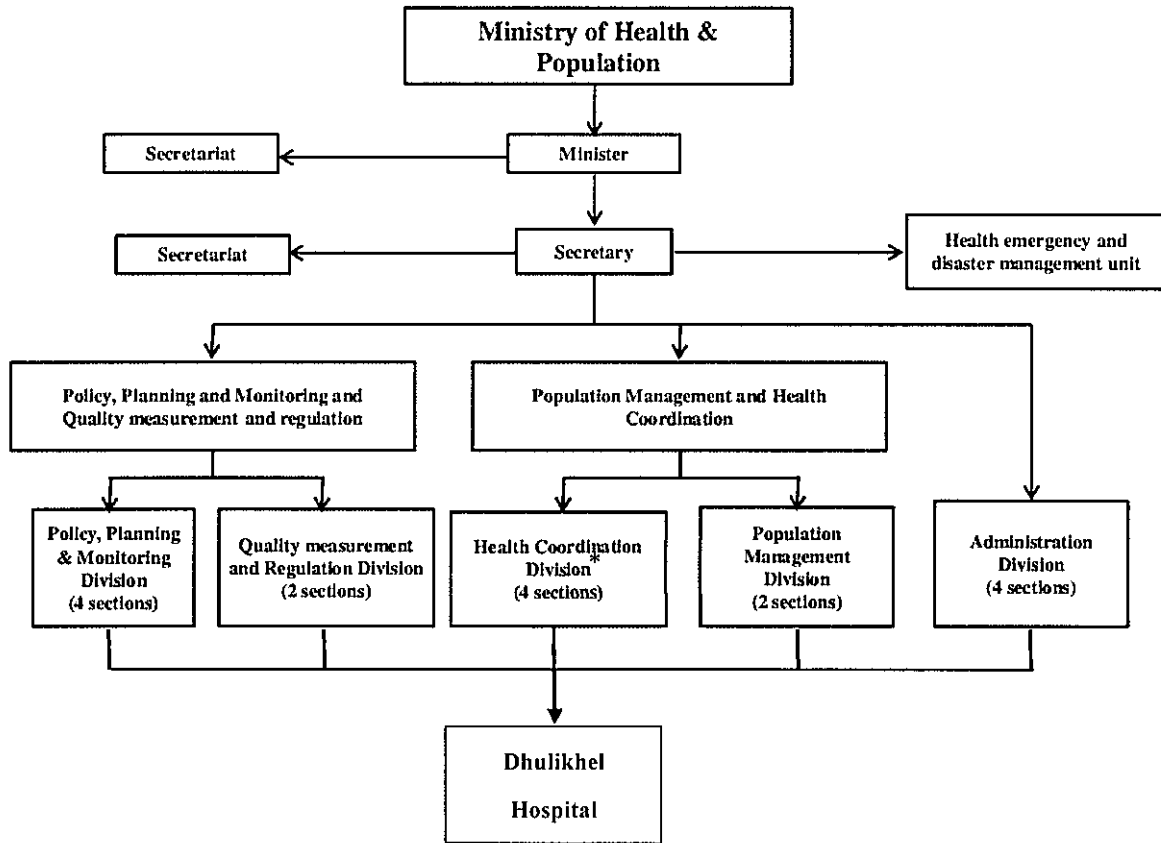
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Project Site



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Organization Chart  
Ministry of Health and Population




\*Project Coordination Division

*RS* 

## List of Facilities (tentative)

Department	Major Room
OPD	Consultation Room, Treatment/Recovery Room
Emergency (31 Beds)	Triage Area, Red zone (Shock Room) (4 Beds), Yellow Zone (6 Beds), Green Zone (10 Beds), Observation Ward (11 Beds), Staff Station, Plaster/Procedure Room, Communication Room
Emergency Operation Theatre	Operation Room, Scrub Area, Storage/Preparation/ Recovery Room
Operation Theatre (5 Beds)	Operation Room, Scrub Area, Anesthesia, Storage, Preparation Room, Changing Room, Post-Operative Ward (POW) (5 Beds)
CSSD	Washing Room, Drying Room, Packing Room, Sterilization Room, Storage
Radiology	X-Ray Room, CT Scan Room, MRI Room, Angiography Room, Ultrasonography Room, Control / Reporting Room
Laboratory	Sample Collection Room, Hematology Room, Biochemistry Room, Microbiology Room, Pathology Room, Pathologist Office, Storage, Blood Bank
Pharmacy	Counter, Office, Storage
Physiotherapy and Rehabilitation	Physiotherapy and Rehabilitation Room, Storage
ICU / HDU (16 Beds)	ICU (10 Beds), HDU (6 Beds), Staff Station, Storage
In-Patient Ward (46 Beds)	1 Bed Room (4 Rooms), 4 Beds Room (5 Rooms), 5 Beds Room (2 Rooms), 6 Beds Rooms (2 Rooms), Staff Station, Drug Preparation Room, Treatment Room, Counseling Room, Storage
Administration	Administration Office, Director's Office, IT Room
Research and Education	Research and Education Office, Department Office, Library, Conference Hall/Workshop, Conference Room
Service	Linen Storage, Changing Room, Waste Management Room
Cafeteria	Cafeteria, Kitchen (Including Kitchen for inpatient)

Rs 

## List of Equipment (tentative)

No.	Name of the equipment	Total Q'ty	Priority
1	CT	1	A-1
2	C-arm	2	A-1
3	X-ray	1	A-1
4	Anesthesia machine	3	A-1
5	Operating light	3	A-1
6	Operating table	3	A-1
7	Bed	84	A-1
8	ICU bed	16	A-1
9	Autoclave B	1	A-1
10	MRI	1	A-2
11	Angiography	1	A-2
12	Ultrasound machine	2	A-2
13	Haemodialysis machine	2	A-2
14	Blood gas analyzer	1	A-2
15	Biochemistry analyzer	2	A-2
16	Hematology analyzer	1	A-2
17	Blood bank refrigerator	2	A-2
18	Ventilator	5	A-2
19	Portable X-ray	2	A-3
20	Portable ultrasound machine	1	A-3
21	Portable ventilator	2	A-3
22	ECG machine	2	A-3
23	Patient monitor A	39	A-3
24	Defibrillator	4	A-3
25	Suction machine	18	A-3
26	ENT work station	1	A-3
27	Otoscope	1	A-3
28	Ophthalmoscope	2	A-3
29	Stretcher	10	A-3
30	Doppler	3	A-3

No.	Name of the equipment	Total Q'ty	Priority
31	Refrigerator	2	A-3
32	Electro surgical cautery unit	3	A-3
33	Operating light mobile	2	A-3
34	Orthopaedic surgical instrument set	2	A-3
35	Neuro surgical instrument set	2	A-3
36	Surgical microscope	1	A-3
37	Patient monitor B	10	A-3
38	Infusion Pump	7	A-3
39	Syringe Pump	10	A-3
40	Radiant warmer	1	A-3
41	Autoclave A	2	A-3
42	Colorimeter	2	A-3
43	Microscope	2	A-3
44	Incubator	2	A-3
45	Hot air oven	2	A-3
46	Blood mixer	3	A-3
47	Blood collection bed	2	A-3
48	Defreeze Refrigerator	1	A-3
49	Oxygen concentrator	2	A-3
50	CPAP/BiPAP machine	6	A-3
51	Bed side cabinet	100	A-3

*Rs*

## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

#### (1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

#### (2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

#### (3) Implementation

##### Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

##### Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

##### Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

##### Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

#### (4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.



- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

## (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

## (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

## 3. Basic Principles of Project Grants

### (1) Implementation Stage

#### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as “the E/N”) will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the “General Terms and Conditions for Japanese Grant (January 2016).”

#### 2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
- b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an

Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

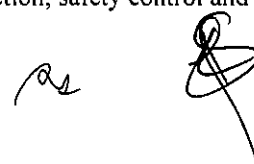
8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and



the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are

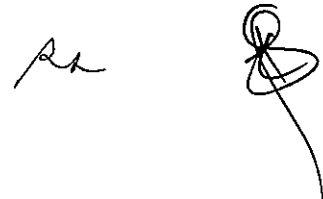
concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Two handwritten signatures in black ink. The signature on the left is a simple, cursive 'R'. The signature on the right is more complex, featuring a large loop and a long, sweeping tail.

**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
 20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ Contacts            Address: _____ Phone/FAX: _____ Email: _____
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ Contacts            Address: _____ Phone/FAX: _____ Email: _____
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ Contacts            Address: _____ Phone/FAX: _____ Email: _____

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____




<b>1: Project Description</b>	
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**1-1 Project Objective**

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**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr     )	Target (Yr     )
Qualitative indicators to measure the attainment of project objectives		

<b>2: Details of the Project</b>
----------------------------------

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
-------

**2-3 Implementation Schedule**

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

--

**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**  
 See Attachment 2.

**2-4-2 Activities**  
 See Attachment 3.

**2-4-3 Report on RD**  
 See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			
Total				

Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original <sup>1),2)</sup> <i>(proposed in the outline design)</i>	Actual
	1.			

- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)



Actual (PMR)

**4: Potential Risks and Mitigation Measures**

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

**Assessment of Potential Risks (at the time of outline design)**

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**


Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
  - Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment Price (Decreased) E=C-D	Price (Increased) F=C+D
Item 1	●●t	●	●	●	●	●
Item 2	●●t	●	●	●		
Item 3						
Item 4						
Item 5						

2. Monitoring of the Unit Price of Specified Materials

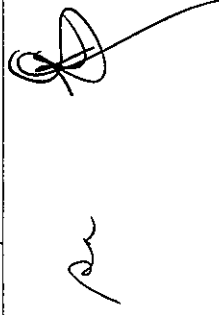
(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
Item 1	●	●	●			
Item 2						
Item 3						
Item 4						
Item 5						

(3) Summary of Discussion with Contractor (if necessary)

●  
●  
●



Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)  
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

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## Major Undertakings to be taken by the Government of Nepal

## 1. Specific obligations of the Government of Nepal which will not be funded with the Grant


## (1) Before the Tender

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MoF		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MoF		
3	To bear the following commissions paid to the Japanese bank for banking services based upon the banking arrangement (B/A)		MoF / MoHP		
	(1) Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)			
	(2) Payment commission	every payment			
4	To approve EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	within 1 month after the signing of the G/A	MoFE		
5	To secure the following land necessary for the implementation of the Project (1) Project sites for the Trauma and Emergency Medical Center. (2) Temporary stock yard for construction near the Project area	Before the notice of tender	MoHP / Dhulikhel Hospital		
6	To clear, level and reclaim the project site (1) Demolition of unnecessary existing buildings (2) Removal of unnecessary existing trees (3) Leveling and reclaiming the sites	Before the notice of tender	MoHP / Dhulikhel Hospital		


7	To obtain the building permission	Before the notice of tender	MoHP / Dhulikhel Hospital		
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MoHP / Dhulikhel Hospital		

## (2) During the Project Implementation

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MoF		
2	To bear the following commissions to a bank of Japan for the banking services based upon the banking arrangement (B/A)				
	(1) Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)	MoHP		
	(2) Payment commission for authorization to pay (A/P)	every payment	MoF		
3	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products (1) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project	MoHP		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOHP / Dhulikhel Hospital		

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5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	MoHP / Dhulikhel Hospital		
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	MoF / MoHP / Dhulikhel Hospital		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	MoHP / Dhulikhel Hospital		
8	To submit Project Monitoring Report	every month	MoHP / Dhulikhel Hospital		
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MoHP / Dhulikhel Hospital		
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MoHP / Dhulikhel Hospital		
11	To construct the following facilities: - The gates and fences in and around the site	before start of the construction	MoHP / Dhulikhel Hospital		

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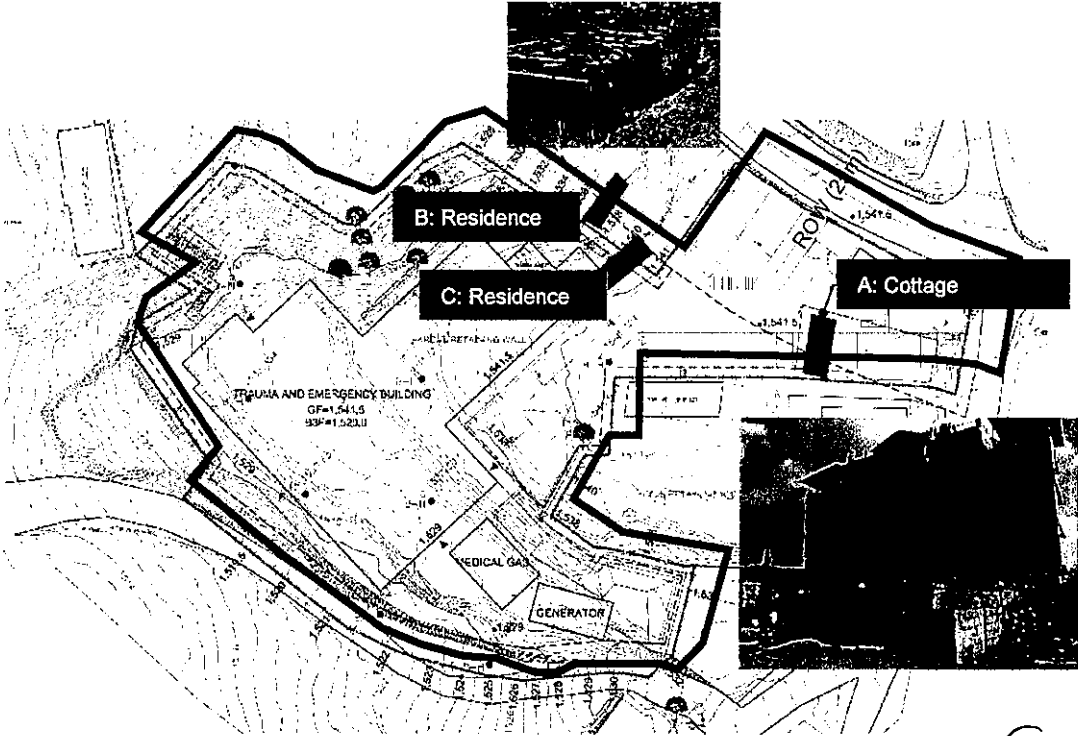
12	<p>To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site</p> <p>(1) Electricity 1) The distribution power line to the site</p> <p>(2) Water Supply 1) The city water distribution main to the site</p> <p>(3) Drainage 1) The city drainage to the site (for storm sewer and others to the site)</p> <p>(4) Gas Supply 1) The city gas to the site</p> <p>(5) Telephone System 1) The telephone trunk line to the main distribution frame/panel (MDF) of the building</p> <p>(6) Furniture and Equipment 1) General furniture</p>	before start of the construction	MoHP / Dhulikhel Hospital		
13	To ensure the safety of persons engaged in the implementation of the Project	during the Project	MoHP / Dhulikhel Hospital		
14	To implement EMP and EMoP	during the construction	MoHP / Dhulikhel Hospital		
15	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MoHP / Dhulikhel Hospital		
16	<p>To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report</p> <p>Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MoHP and JICA.</p>	- for 2 years after land acquisition and resettlement complete	MoHP / Dhulikhel Hospital		


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## (3) After the Project

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MoHP / Dhulikhel Hospital		
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MoHP and JICA.	for 3 years after the Project	MoHP / Dhulikhel Hospital		
3	To ensure that facilities and the products be maintained and used properly and effectively	After completion of the construction	MoHP / Dhulikhel Hospital		
4	To bear all the expenses, other than those covered by the Grant, necessary for operation	After completion of the construction	MoHP / Dhulikhel Hospital		
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. (1) Allocation of maintenance cost (2) Operation and maintenance organization and staff (3) Routine check/periodical maintenance	After completion of the construction	MoHP / Dhulikhel Hospital		

Existing Structures




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**Minutes of Discussions**  
**on the Preparatory Survey for the Project for**  
**Building for Dhulikhel Hospital Trauma and Emergency Center**  
**(Explanation on Draft Preparatory Survey Report)**

With reference to the minutes of discussions signed between Ministry of Health and Population Nepal and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on dated 15th September 2022 and in response to the request from the Government of Nepal (hereinafter referred to as "Nepal") dated 22th June 2021, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Building for Hospital Trauma and Emergency Center (hereinafter referred to as "the Project").

Ramshahpath, Kathmandu, Nepal, 23<sup>rd</sup> February 2023



Mr. Tomoya Yoshida  
Leader  
Preparatory Survey Team  
Japan International Cooperation Agency  
Japan



Ms. Yeshoda Aryal  
Chief  
Health Coordination Division  
Ministry of Health and Population  
Nepal

Witnessed by



Prof. Dr. Rajendra Koju  
Dean  
School of Medical Sciences  
Kathmandu University  
Nepal

Witnessed by



Prof. Dr. Ramesh Makaju  
Administrative Director  
Dhulikhel Hospital  
Nepal

Witnessed by



Mr. Bhim Prasad Sapkota  
Sr. Public Health Administrator  
Health Coordination Division  
Ministry of Health and Population  
Nepal

## ATTACHMENT

### 1 Objective of the Project

The objective of the Project is to strengthen the medical service and response capacity for trauma and emergency medical patients by building the Trauma and Emergency Medical Center at Dhulikhel Hospital with medical equipment, thereby contributing to improve quality of trauma and emergency care in Nepal, especially eastern part of Nepal.

### 2 Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for The Project for Building for Dhulikhel Hospital Trauma and Emergency Center”. The Title of the project could be changed after the approval of the Government of Japan.

### 3 Project site

Both sides confirmed that the site of the Project is in Dhulikhel Hospital, which is shown in Annex 1.

### 4 Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:  
The Ministry of Health and Population will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be managed by relevant authorities properly and on time. The organization charts are shown in Annex 2.

### 5 Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Nepal side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Nepal side around April 2023.

### 6 Cost estimate

Both sides confirmed that the cost estimate explained by the Team is provisional and

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will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

7 Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8 Timeline for the project implementation

The Team explained to the Nepal side that the expected timeline for the project implementation is as shown in Annex 6.

9 Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Nepal side will be responsible for the achievement of agreed key indicators targeted in year 2029 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Quantitative Indicator	Baseline Value (2021)	Target Value (2029)
Out-patients for Trauma and Emergency	21,665	31,000
In-patients for Trauma and Emergency	2,847	4,000
Number of CT Examination	6,987	10,000

[Qualitative indicators]

(1) High-quality trauma and emergency medical services will be provided through the development of specialized trauma and emergency medical facilities and medical equipment.

(2) High-quality trauma and emergency medical training for medical students and professionals will be provided through the development of specialized trauma and emergency medical facilities and medical equipment.

10 Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized.

*RLS*

*T.Y*

The Nepal side is required to provide necessary support for the data collection.

#### 11 Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 7. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in No 3 of (2) During the Project Implementation of Annex 7, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by Ministry of Health and Population Nepal during the implementation stage of the Project.

The Nepal side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 7 will be used as an attachment of G/A.

#### 12 Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 8. The timing of submission of the PMR is described in Annex 7.

#### 13 Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency, but in any event not later than six months after completion of the Project.

#### 14 Environmental and Social Considerations

##### 14.1 General Issues

##### 14-1-1 Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010) (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as B because the Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations April 2010, and its potential adverse impacts on the environment are not likely to be significant.

RLS

T.Y

#### 14-1-2 Environmental Checklist

The environmental and social considerations including major impacts and mitigation measures for the Project are summarized in the Environmental Checklist attached as Annex 9 Nepal side assured that they shall take the necessary measures in accordance with the Environmental Checklist. Both sides agreed that in case of major modification of the content of the Environmental Checklist, the Nepal side shall submit the modified version to JICA in a timely manner.

#### 14-2 Environmental Issues

##### 14-2-1 Environmental Impact Assessment (EIA)

Both sides confirmed the EIA report will be approved by Ministry of Forest Environment by the end of March 2023. The team requested that Nepal side make the EIA Report of the Project available to local residents. Nepal side explained that the EIA Report, written in Nepal and English language, will be disclosed at the Dhulikhel Municipality office and through website of Dhulikhel Hospital by March 2023. Nepal side agreed to disclose the Reports by the completion of the Project.

##### 14-2-2 Environmental Management Plan and Environmental Monitoring Plan

Both sides confirmed Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) of the Project is as Annex 10 respectively. Both side agreed that environmental mitigation measures and monitoring shall be conducted based on the EMP and EMoP, which may be updated during the detailed design stage.

##### 14-2-3 Consultation with Local Stakeholders

Nepal side explained that local stakeholder meetings on the Project with relevant stakeholders and local residents with particular attention to directly affected peoples by the Project were held at the Conference Room of Dhulikhel Municipality on 23<sup>th</sup> September 2021 and 14<sup>th</sup> June 2022. Advance announcements were informed direct. Questions and opinions such as waste, drinking water, employment opportunity issues and were raised by attendees. Nepal side explained the outcome of such consultations was incorporated into the project plans. However, there were no objections to the implementation of the Project. Details regarding the stakeholder meetings are summarized as per Annex11. Nepal side explained appropriate considerations have been given to vulnerable social groups during those meetings by securing easy access venue and using local language for explanation of presentation.



### 14-3 Social Issues

#### 14-3-1 Land Acquisition and Resettlement

Both sides confirmed the 0.095 ha of land was acquired, 5 Households /27 people would be affected, and 2 Households /11 people was resettled due to the implementation of the Project. During the preparatory survey, the land acquisition payments have been carried out by Dhulikhel Hospital in April and December 2021. In addition, after preparation of (Abbreviated) Resettlement Action Plan (RAP) as Annex 12 which was prepared in line with the Guidelines and authorized by the Nepal side in September 2022. The cost for RAP implementation is estimated as 33 million NPR and Nepal side has paid compensation for the resettlement and relocation of buildings in September 2022. There no new land acquisition or resettlement is expected after February 2023.

### 14-4 Environmental and Social Monitoring

#### 14-4-1 Environmental Monitoring

Both sides agreed that the Nepal side will submit results of environmental monitoring to JICA as a part of Monthly Progress Report by using the monitoring form attached as Annex 10 The timing of submission of the monitoring form is described in Annex 7. In case JICA finds that there is a need for improvement in a situation with respect to environmental considerations after the agreed monitoring period, JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed. The extension of the monitoring will be decided in accordance with the agreement between Nepal and JICA.

#### 14-4-2 Social Monitoring

Both sides confirmed that the Nepal side will implement social monitoring about land acquisition and resettlement plan proposed in the ARAP. Nepal side agreed that progress of land acquisition and implementation of ARAP will be monitored until land acquisition and resettlement activities including livelihood restoration program are completed. The Nepal side and the Team agreed that the Executing Agency will submit results of social monitoring to JICA by using the monitoring form attached as Annex 10

In case there is a remaining issue that needs to be addressed (e.g. insufficient restoration of livelihood of displaced Project Affected Persons (PAPs)), JICA may request to extend the period of monitoring and reporting until JICA confirms the issues have been properly addressed and solved. The extension of the monitoring will be decided in accordance with the agreement between Nepal and JICA.

*RLS*

#### 14-4-3 Information Disclosure of Monitoring Results

Both sides confirmed that it will take stipulated procedures for information disclosure in accordance with the Guidelines. In addition, the Team requested Nepal side to disclose results of environmental and social monitoring to local stakeholders and Nepal side agreed to disclose monitoring results at the Dhulikhel Municipality office and through website of Dhulikhel Hospital every six months.

The Nepal side agreed JICA will disclose results of environmental and social monitoring submitted by the Nepal side as the monitoring forms attached as Annex 10 on its website. If the third parties request further information, JICA disclose the information, which is subject to approval by Nepal.

### 15 Other Relevant Issues

#### 15-1. Operation and Maintenance of the Equipment

##### a) Importance of Operation and Maintenance

The Team explained the importance of operation and maintenance of the equipment under the Project considering that proper asset management is necessary to secure the life-span of the equipment and to reduce its maintenance cost. The Nepal side agreed to secure enough budgets necessary for appropriate operation and maintenance of the equipment including the additional purchase of the consumables and spare parts.

#### 15-2. Demolition of the Existing Structure

The Nepal side confirmed the demolition of the existing one cottage and two residences shown in Annex 13 including removal of underground structures before the construction work based on the Guidelines, in a timely manner.

Existing facilities, landscaping, garbage, wastes, soils, and unnecessary existing trees within the construction site should also be removed, and the ground conditions should be reclaimed for reconstruction work.

#### 15-3. Land tenancy

The Nepal side confirmed Kathmandu University is tenanted the land of Project site until 2044 for the exclusive use of Dhulikhel Hospital Trauma and Emergency Center. Nepal side will make the necessary effort to use this land after this period.

#### 15-4. Allocation of Human Resources for Utilization

The Nepal side agreed to secure sufficient personnel for the utilization of the

medical equipment to be provided.

#### 15-5. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

#### 15-6. Gender Mainstreaming

Both sides confirmed that gender mainstreaming should be duly practiced for the Project implementation as the project is categorized as GIP (Gender Equality Project or Project Targeting Women), or GIS (Gender Integrated Project). In particular, Both sides agreed on the following gender elements to be integrated into the Project.

- (a) Provision of job opportunities and fair salary for any gender.
- (b) At least 10% of female workers should be hired as simple workers.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 List of Facilities

Annex 4 List of Equipment

Annex 5 Japanese Grant

Annex 6 Project Implementation Schedule

Annex 7 Major Undertakings to be taken by the Government of Nepal

Annex 8 Project Monitoring Report (template)

Annex 9 Environmental Check List

Annex 10 Environmental Management Plan and Environmental Monitoring Plan and Environmental and Social Monitoring Form

Annex 11 Implementation of Public Consultation Implementation of Public Consultation

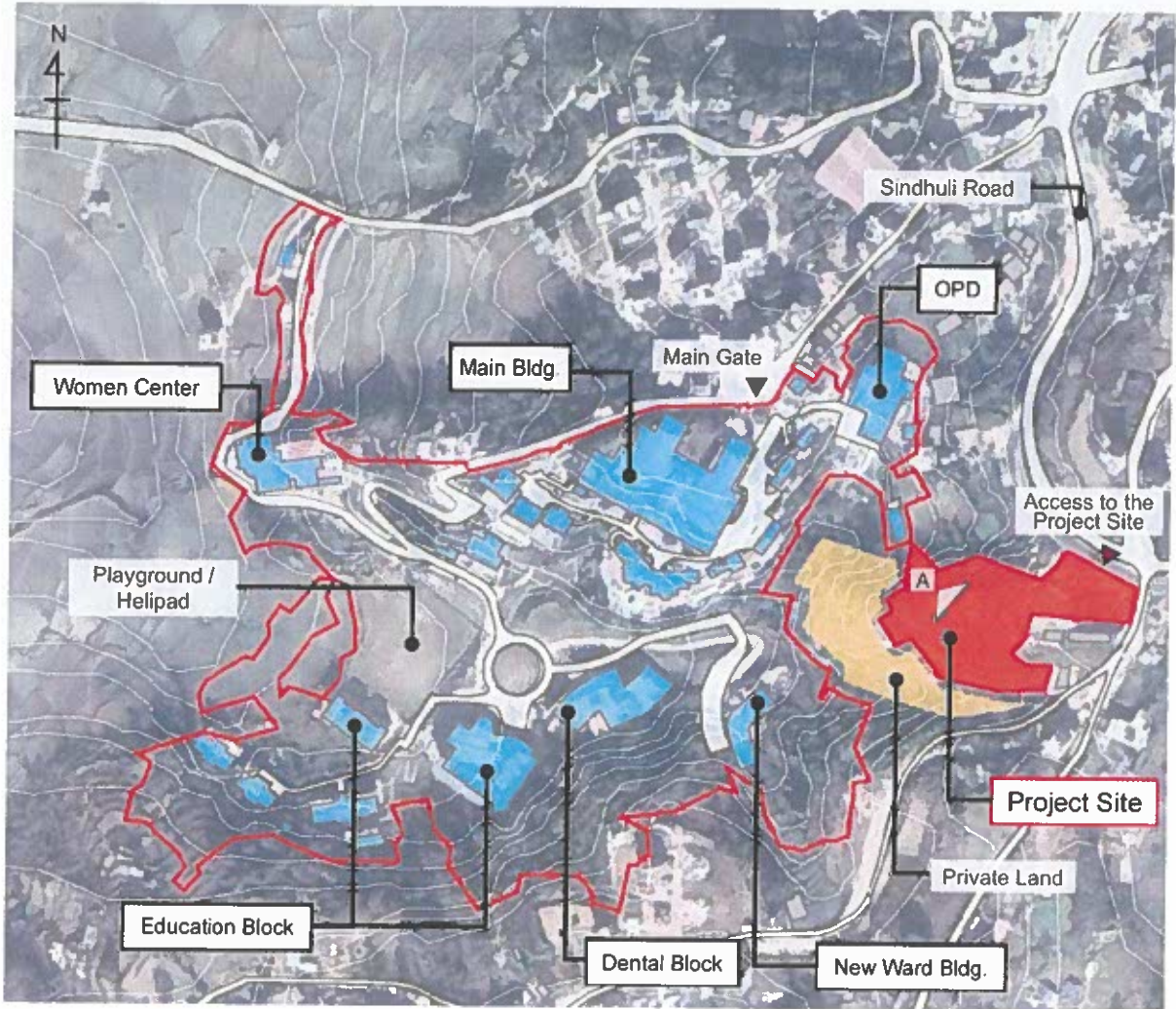
Annex 12 (Abbreviated) Resettlement Action Plan

Annex 13 Existing Structures

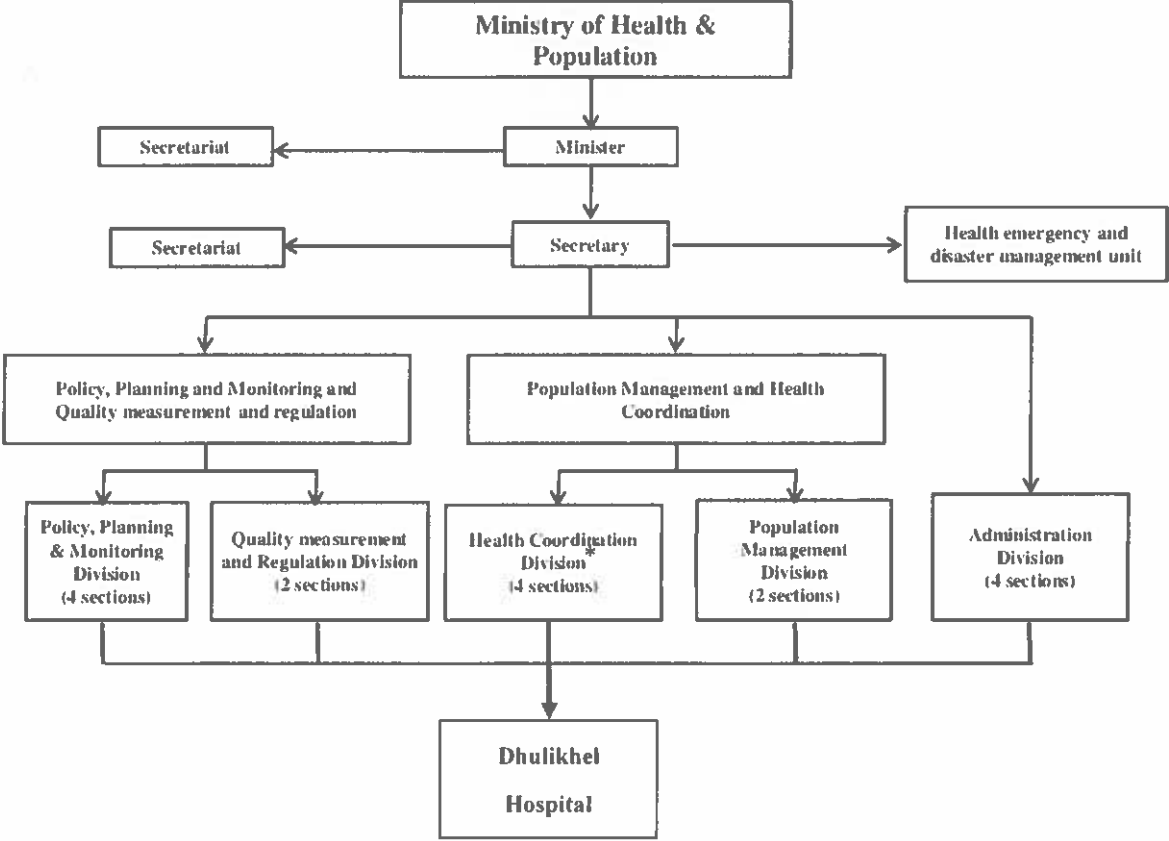
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Project Site



Organization Chart  
Ministry of Health and Population



\*Project Coordination Division

## List of Facilities

Department	Major Room
OPD	Consultation Room, Treatment/Recovery Room
Emergency (31 Beds)	Triage Area, Red zone (Shock Room) (4 Beds), Yellow Zone (6 Beds), Green Zone (10 Beds), Observation Ward (11 Beds), Staff Station, Plaster/Procedure Room, Communication Room
Emergency Operation Theatre	Operation Room, Scrub Area, Storage/Preparation/ Recovery Room
Operation Theatre (5 Beds)	Operation Room, Scrub Area, Anesthesia, Storage, Preparation Room, Changing Room, Post-Operative Ward (POW) (5 Beds)
CSSD	Washing Room, Drying Room, Packing Room, Sterilization Room, Storage
Radiology	X-Ray Room, CT Scan Room, MRI Room, Angiography Room, Ultrasonography Room, Control / Reporting Room
Laboratory	Sample Collection Room, Hematology Room, Biochemistry Room, Microbiology Room, Pathology Room, Pathologist Office, Storage, Blood Bank
Pharmacy	Counter, Office, Storage
Physiotherapy and Rehabilitation	Physiotherapy and Rehabilitation Room, Storage
ICU / HDU (16 Beds)	ICU (10 Beds), HDU (6 Beds), Staff Station, Storage
In-Patient Ward (46 Beds)	1 Bed Room (4 Rooms), 4 Beds Room (5 Rooms), 5 Beds Room (2 Rooms), 6 Beds Rooms (2 Rooms), Staff Station, Drug Preparation Room, Treatment Room, Counseling Room, Storage
Administration	Administration Office, Director's Office, IT Room
Research and Education	Research and Education Office, Department Office, Library, Conference Hall/Workshop, Conference Room
Service	Linen Storage, Changing Room, Waste Management Room
Cafeteria	Cafeteria, Kitchen (Including Kitchen for inpatient)

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**List of Equipment (tentative)**

Equipment to be provided is in bold below.

No.	Name of the equipment	Total Q'ty	Priority
1	<b>CT</b>	1	<b>A-1</b>
2	<b>C-arm</b>	2	<b>A-1</b>
3	<b>X-ray</b>	1	<b>A-1</b>
4	<b>Anesthesia machine</b>	3	<b>A-1</b>
5	<b>Operating light</b>	3	<b>A-1</b>
6	<b>Operating table</b>	3	<b>A-1</b>
7	<b>Bed</b>	84	<b>A-1</b>
8	<b>ICU bed</b>	16	<b>A-1</b>
9	<b>Autoclave B</b>	1	<b>A-1</b>
10	<b>MRI</b>	1	<b>A-2</b>
11	Angiography	1	A-2
12	<b>Ultrasound machine</b>	2	<b>A-2</b>
13	Haemodialysis machine	2	A-2
14	Blood gas analyzer	1	A-2
15	Biochemistry analyzer	2	A-2
16	Hematology analyzer	1	A-2
17	<b>Blood bank refrigerator</b>	2	<b>A-2</b>
18	<b>Ventilator</b>	5	<b>A-2</b>
19	Portable X-ray	2	A-3
20	Portable ultrasound machine	1	A-3
21	Portable ventilator	2	A-3
22	ECG machine	2	A-3
23	Patient monitor A	39	A-3
24	Defibrillator	4	A-3
25	Suction machine	18	A-3
26	ENT work station	1	A-3
27	Otoscope	1	A-3
28	Ophthalmoscope	2	A-3
29	Stretcher	10	A-3
30	Doppler	3	A-3

No.	Name of the equipment	Total Q'ty	Priority
31	Refrigerator	2	A-3
32	Electro surgical cautery unit	3	A-3
33	Operating light mobile	2	A-3
34	Orthopaedic surgical instrument set	2	A-3
35	Neuro surgical instrument set	2	A-3
36	Surgical microscope	1	A-3
37	Patient monitor B	10	A-3
38	Infusion Pump	7	A-3
39	Syringe Pump	10	A-3
40	Radiant warmer	1	A-3
41	Autoclave A	2	A-3
42	Colorimeter	2	A-3
43	Microscope	2	A-3
44	Incubator	2	A-3
45	Hot air oven	2	A-3
46	Blood mixer	3	A-3
47	Blood collection bed	2	A-3
48	Defreeze Refrigerator	1	A-3
49	Oxygen concentrator	2	A-3
50	CPAP/BiPAP machine	6	A-3
51	Bed side cabinet	100	A-3

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## JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

### 1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

#### (1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

#### (2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

#### (3) Implementation

##### Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

##### Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

##### Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

##### Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

#### (4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.

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- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

#### (3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

### 3. Basic Principles of Project Grants

#### (1) Implementation Stage

##### 1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

##### 2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

- a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.
- b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an

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Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and

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the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GOJ will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are

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concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

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Project for Building Dhulikhel Hospital Trauma and Emergency Center  
Fourth Field Survey Schedule (Draft)

Annex 6

月日	JICA HQ		JICA HQ		Project Leader/ Architectural plan 1		Equipment Plan/ Maintenance Plan	
	Mr. Yoshida	Ms. Inclin	Mr. Miyeno	Mr. Abe				
1 2/18/2023 土					NRT11:00-KTM16:25 (RA434)		NRT11:00-KTM16:25 (RA434)	
2 2/19/2023 日	HND00:20-BKK05:25 (TG661) BKK09:15-KTM11:25 (WE319)				Meeting		Meeting	
3 2/20/2023 月	10:30: Visit and meeting with Nepal Office PM: Inspection of the project site Consider and make of MD proposals				10:30: Visit and meeting with Nepal Office PM: Inspection of the project site Consider and make of MD proposals		10:30: Visit and meeting with Nepal Office PM: Inspection of the project site Consider and make of MD proposals	
4 2/21/2023 火	AM: Explain the preparatory survey report(Draft) for Dhulikhel Hospital PM: Inspection of the project site				AM: Explain the preparatory survey report(Draft) for Dhulikhel Hospital PM: Inspection of the project site		AM: Explain the preparatory survey report(Draft) for Dhulikhel Hospital PM: Inspection of the project site	
5 2/22/2023 水	11:00: Ministry of Health and Population Review and preparation of MD proposal/Durikhel Hospital				11:00: Ministry of Health and Population Review and preparation of MD proposal/Durikhel Hospital		11:00: Ministry of Health and Population Review and preparation of MD proposal/Durikhel Hospital	
6 2/23/2023 木	16:00 : Reporting to JICA Nepal office				16:00 : Reporting to JICA Nepal office		16:00 : Reporting to JICA Nepal office	
7 2/24/2023 金	11:00: MD Consultation and Signing for with the Ministry of Health and Population 16:30 Reporting to Embassy of Nepal (TBC)				11:00: MD Consultation and Signing for with the Ministry of Health and Population 16.30 Reporting to Embassy of Nepal (TBC)		11:00: MD Consultation and Signing for with the Ministry of Health and Population 16.30 Reporting to Embassy of Nepal (TBC)	
8 2/25/2023 土	KTM12:30-BKK17:15 (WE320) BKK23:15-				NRT08:00 (RA433)		NRT09:00 (RA433)	
9 2/26/2023 日	HND06:55 (TG682)							

\*NRT: Narita International Airport, BKK: Suvarnabhumi International Airport, KTM: Tuliban International Airport  
\*TG: Thai Airways, WE: Thai Smile Airlines, RA: Nepal Airlines, KB: Royal Bhutan Airline

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## Major Undertakings to be taken by the Government of Nepal

## 1. Specific obligations of the Government of Nepal which will not be funded with the Grant

## (I) Before the Tender

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	MoF	N/A	
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	MoF	N/A	
3	To bear the following commissions paid to the Japanese bank for banking services based upon the banking arrangement (B/A)		MoF / MoHP	(1)	
	(1) Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)		NPR 2.8M	
	(2) Payment commission	every payment		NPR 59,000	
4	To approve EIA (Conditions of approval should be fulfilled, if any) and secure the necessary budget for implementation for EMP and EMoP (and fulfilling conditions of approval, if any).	March 2023	MoFE	N/A	
5	To secure the following land necessary for the implementation of the Project	Before the notice of tender	MoHP / Dhulikhel Hospital	N/A	
	(1) Project sites for the Trauma and Emergency Medical Center.				
	(2) Temporary stock yard for construction near the Project area				
6	To clear, level and reclaim the project site	Before the notice of tender	MoHP / Dhulikhel Hospital	NPR 1.1M	
	(1) Demolition of unnecessary existing buildings				
	(2) Removal of unnecessary existing trees				
	(3) Leveling and reclaiming the sites				

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7	To obtain the building permission	Before the notice of tender	MoHP / Dhulikhel Hospital	NPR 1.4	
8	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MoHP / Dhulikhel Hospital	N/A	

## (2) During the Project Implementation

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	MoF	N/A	
2	To bear the following commissions to a bank of Japan for the banking services based upon the banking arrangement (B/A)			(1) NPR 2.8M (2)	
	(1)Advising commission of authorization to pay (A/P)	within 1 month after the signing of the contract(s)	MoHP	NPR 59,000	
	(2)Payment commission for authorization to pay (A/P)	every payment	MoF		
3	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products (1) Tax exemption and customs, clearance of the products at the port of disembarkation	during the Project	MoHP	N/A	
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	MOHP / Dhulikhel Hospital	N/A	

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5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted	during the Project	MoHP / Dhulikhel Hospital	N/A	
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment including procurement and preparation of the room for installation of angiography during or after the implementation of the project.	during the Project	MoF / MoHP / Dhulikhel Hospital	Not determined	
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers.	during the construction	MoHP / Dhulikhel Hospital	N/A	
8	To submit Project Monitoring Report	every month	MoHP / Dhulikhel Hospital	N/A	
9	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	MoHP / Dhulikhel Hospital	N/A	
10	To submit a report concerning completion of the Project	within 6 months after completion of the Project	MoHP / Dhulikhel Hospital	N/A	
11	To construct the following facilities: - The gates and fences in and around the site	before start of the construction	MoHP / Dhulikhel Hospital	N/A	

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12	To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site (1) Electricity 1) The distribution power line to the site (2) Water Supply 1) The city water distribution main to the site (3) Drainage 1) The city drainage to the site (for storm sewer and others to the site) (4) Gas Supply 1) The city gas to the site (5) Telephone System 1) The telephone trunk line to the main distribution frame/panel (MDF) of the building (6) Furniture and Equipment 1) General furniture	before start of the construction	MoHP / Dhulikhel Hospital	(1) NPR 2.5M (2), (3) NPR 0.5M (4) N/A (5) NPR 2.7M (incl. internet) (6) NPR 8M	
13	To ensure the safety of persons engaged in the implementation of the Project	during the Project	MoHP / Dhulikhel Hospital	N/A	
14	To implement EMP and EMoP	during the construction	MoHP / Dhulikhel Hospital	N/A (included in construction cost)	
15	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction	MoHP / Dhulikhel Hospital	N/A	
16	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between MoHP and JICA.	- for 2 years after land acquisition and resettlement complete	MoHP / Dhulikhel Hospital	N/A	

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## (3) After the Project

No	Items	Deadline	In charge	Estimated Cost	Ref.
1	To implement EMP and EMoP	for a period based on EMP and EMoP	MoHP / Dhulikhel Hospital	NPR 2.7M (for 3 years)	
2	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between MoHP and JICA.	for 3 years after the Project	MoHP / Dhulikhel Hospital	(included in above cost)	
3	To ensure that facilities and the products be maintained and used properly and effectively	After completion of the construction	MoHP / Dhulikhel Hospital	NPR 62.9M / year	
4	To bear all the expenses, other than those covered by the Grant, necessary for operation	After completion of the construction	MoHP / Dhulikhel Hospital	Not determined	
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid. (1) Allocation of maintenance cost (2) Operation and maintenance organization and staff (3) Routine check/periodical maintenance	After completion of the construction	MoHP / Dhulikhel Hospital	N/A	

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**Project Monitoring Report**  
**on**  
**Project Name**  
**Grant Agreement No. XXXXXXXX**  
 20XX, Month

**Organizational Information**

<b>Signer of the G/A (Recipient)</b>	_____ Person in Charge (Designation) _____ Contacts            Address: Phone/FAX: Email:
<b>Executing Agency</b>	_____ Person in Charge (Designation) _____ Contacts            Address: Phone/FAX: Email:
<b>Line Ministry</b>	_____ Person in Charge (Designation) _____ Contacts            Address: Phone/FAX: Email:

**General Information:**

<b>Project Title</b>	
<b>E/N</b>	Signed date: Duration:
<b>G/A</b>	Signed date: Duration:
<b>Source of Finance</b>	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

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**1: Project Description**

**1-1 Project Objective**

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**1-2 Project Rationale**

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

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**1-3 Indicators for measurement of "Effectiveness"**

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr )	Target (Yr )
Qualitative indicators to measure the attainment of project objectives		

**2: Details of the Project**

**2-1 Location**

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

**2-2 Scope of the work**

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)
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**2-3 Implementation Schedule**

Items	Original		Actual
	(proposed in the outline design)	(at the time of signing the Grant Agreement)	

Reasons for any changes of the schedule, and their effects on the project (if any)

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**2-4 Obligations by the Recipient**

**2-4-1 Progress of Specific Obligations**  
 See Attachment 2.

**2-4-2 Activities**  
 See Attachment 3.

**2-4-3 Report on RD**  
 See Attachment 11.

**2-5 Project Cost**

**2-5-1 Cost borne by the Grant(Confidential until the Bidding)**

Components			Cost (Million Yen)	
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
	1.			
Total				

Note: 1) Date of estimation:  
 2) Exchange rate: 1 US Dollar = Yen

**2-5-2 Cost borne by the Recipient**

Components			Cost (1,000 Taka)	
	Original (proposed in the outline design)	Actual (in case of any modification)	Original <sup>1),2)</sup> (proposed in the outline design)	Actual
	1.			

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- Note: 1) Date of estimation:  
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

**2-6 Executing Agency**

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

<b>Original</b> (at the time of outline design) name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
<b>Actual</b> (PMR)

**2-7 Environmental and Social Impacts**

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

**3: Operation and Maintenance (O&M)**

**3-1 Physical Arrangement**

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

<b>Original</b> (at the time of outline design)
<b>Actual</b> (PMR)

**3-2 Budgetary Arrangement**

- Required O&M cost and actual budget allocation for O&M

**Original** (at the time of outline design)

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Actual (PMR)

#### 4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

##### Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

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	Contingency Plan (if applicable):
<b>Actual Situation and Countermeasures</b>	
(PMR)	

**5: Evaluation and Monitoring Plan (after the work completion)**

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan of the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
  - Consultant Member List
  - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)

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**The Project for Building of Dhulikhel Hospital Trauma and Emergency Center**  
Environmental Check List

30/Sep/2022

**1. Environmental Check List (19. Other Infrastructure)**

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Y (b) N (c) N (d) N	(a) Under the approval process of the Government of Nepal (The approval will be obtained by March 2023) (b) Same as above (c) Approval conditions are not indicated by MOFE (Ministry of Forest and Environment) yet (d) Other permits to be obtained include tree felling permits. The final impact area will be determined at the time of detailed design, and confirmation and permission will be obtained from the MOFE.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Twice local stakeholder meetings held in September 2021 and June 2022 (b) Opinions are reflected to the plan (e.g. preferential employment of residents during construction)
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Alternatives analysis were considered from environmental and design aspects
2 Pollution Control	(1) Air Quality	(a) Do air pollutants, (such as sulfur oxides (SO <sub>x</sub> ), nitrogen oxides (NO <sub>x</sub> ), and soot and dust) emitted from the proposed infrastructure facilities and ancillary facilities comply with the country's emission standards and ambient air quality standards? Are any mitigating measures taken? (b) Are electric and heat source at accommodation used fuel which emission factor is low?	(a) Y (b) Y	(a) Emissions from construction machines during construction will be mitigated by mitigation measures. In principle, no air pollutants are emitted under ordinary operation of the facilities. (b) Purchasing fuel or using electricity supplied by the government of Nepal.
	(2) Water Quality	(a) Do effluents or leachates from various facilities, such as infrastructure facilities and the ancillary facilities comply with the country's effluent standards and ambient water quality standards?	(a) Y	(a) A sewage treatment facility will be installed and sewage will be treated and discharged below the effluent standards of Nepal.

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(3) Wastes	(a) Are wastes from the infrastructure facilities and ancillary facilities properly treated and disposed of in accordance with the country's regulations?	(a) Y	(a) Wastes will be sorted and processed at Dhulikhel Hospital's waste treatment facility, which is already licensed and in operation, and will be reused and disposed in accordance with laws and regulations in Nepal.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by the effluents or leachates from the infrastructure facilities and the ancillary facilities?	(a) Y	(a) Sewage treatment facilities will be installed and sewage will be treated and discharged below effluent standards. Rain water is discharged into the adjacent public drainage.
	(5) Noise and Vibration	(a) Do noise and vibrations comply with the country's standards?	(a) Y	(a) There are no equipment that generate noise or vibration during ordinary operation. Since the generator will be installed in a soundproof room, it is expected to satisfy the noise standard value.
	(6) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N	(a) Approximately 50,000L/day of underground water will be pumped from the newly constructed wells for the project, but the possibility of land subsidence is not expected due to the conditions of the surrounding existing wells.
	(7) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a) N	(a) Since both medical waste and general waste are managed in sealed containers, they do not become a source of offensive odors.
	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) There are no protected areas within or near the project site
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) Is there a possibility that changes in localized micro-meteorological conditions, such as solar radiation, temperature, and humidity due to a large-scale timber harvesting will affect the surrounding vegetation? (d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?	(a) N	(a) The site is already developed and abandoned agricultural land without any natural vegetation and/or critical habitat.
			(b) N	(b) The project site does not include critical habitats for valuable species;
			(c) N	(c) The project site is already developed and abandoned agricultural land without any natural vegetation and/or critical habitat.
			(d) N	(d) The new well(s) will be located outside the project site in the lowland area of the Dhulikhel Hospital compound. Since there are no springs below that point, thus it is expected that there will be no impact on aquatic fauna and flora species.
	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the project will adversely affect surface water and groundwater flows?	(a) N	(a) The new well(s) will be located in the lower area of the Dhulikhel Hospital compound. It is not likely to give adverse significant impacts on surface water or groundwater from the results of test pumping results
	(4) Topography and Geology	(a) Is there a possibility the project will cause large-scale alteration of the topographic features and geologic structures in the project site and surrounding areas?	(a) N	(a) Although filling and cutting land with retaining wall, the project site are not alternated drastically.

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
4 Social Environment	(1) Resettlement	<p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Is the compensations going to be paid prior to the resettlement?</p> <p>(e) Is the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p> <p>(e) Y</p> <p>(f) Y</p> <p>(g) Y</p> <p>(h) Y</p> <p>(i) Y</p> <p>(j) Y</p>	<p>(a) It is expected that 11 people from two(2) households will be displaced, even though the design impact has been minimized. The land acquisition for 2 households with 950 m2 have been carried out during the preparatory survey.</p> <p>(b) In August 2021, the project outline and the compensation policy have been explained, and obtained a basic consensus from the affected persons.</p> <p>(c) A census of project affected persons, a socio-economic survey, an inventory of loss assets, and a replacement costs survey were conducted, and an Abbreviated Resettlement Plan (ARAP) including loss compensation based on the replacement cost and supporting compensation for resettlement were prepared.</p> <p>(d) Compensation will be conducted after detailed design and before actual construction activities.</p> <p>(e) Compensation policy is set out in a document of ARAP report.</p> <p>(f) As vulnerable people, the elderly and the households under poverty line have been identified in this ARAP surveys, thus special support will be conducted.</p> <p>(g) Compensation policy was explained in August 2021 and a basic consensus was formulated.</p> <p>(h) Dhulikhel Hospital side has already established a teams for responding of resettlement activities and have secured the budget.</p> <p>(i) Monitoring is planned in the ARAP report approved by the Nepal side.</p> <p>(j) A grievance redress mechanism has been established in the ARAP report endorsed by the Nepal side.</p>
	(2) Living and Livelihood	<p>(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p>	(a) Y	<p>(a) 11 people from 2 households will be resettled. Compensation for resettlement, relocation costs, support for the vulnerable, etc. will be provided, and the impact will be mitigated.</p>
	(3) Heritage	<p>(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?</p>	(a) N	<p>(a) There are no cultural heritage in the project sites and surrounding area.</p>
	(4) Landscape	<p>(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p> <p>(b) Is there a possibility that landscape is spoiled by construction of high-rise buildings such as huge hotels?</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) The project site is already developed and there are no considerable landscapes.</p> <p>(b) The project site is already developed and there are no considerable landscapes. Additionally, the planned buildings is not high-rise.</p>
	(5) Ethnic Minorities and Indigenous Peoples	<p>(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p> <p>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) Ethnic minorities are not identified in the affected area</p> <p>(b) Same as above(a)</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?</p> <p>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) Labor Act (2017) in Nepal is applicable for the project</p> <p>(b) Labor Act (2017) in Nepal is applicable for the project and Safety consideration clauses in FIDIC (International Federation Of Consulting Engineers) will be applied as contract conditions during construction.</p> <p>(c) Same as above (b)</p> <p>(d) No special security guards are planned on the Nepal side for the implementation of this project.</p>
	(6) Working Conditions	<p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p>	<p>(a) Y</p> <p>(b) N</p> <p>(c) Y</p>	<p>(a) Mitigation measures are planned for air pollution, water pollution, waste, soil contamination, noise and vibration.</p> <p>(b) If waste is managed inappropriately, appropriate waste management shall be done as a mitigation measure.</p> <p>(c) Mitigation measures are planned due to concerns about resettlement, impact on the poverty, water use, gender, children's rights, infectious diseases, working environment and safety and accidents.</p>
5 Others		<p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	<p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p>	<p>(a) Monitoring is planned for all items which may give adverse impacts</p> <p>(b) It is set based on the general request frequency of the Nepal side.</p> <p>(c) The organization for management of environmental monitoring has been established under Dhulikhel Hospital.</p> <p>(d) In principle, monthly reports and quarterly written reports will be made and submitted from the construction supervision consultant to Project Management Unit under Dhulikhel Hospital.</p>
6 Note	Reference to Checklist of Other Sectors	<p>(a) Where necessary, pertinent items described in the Roads, Railways and Bridges checklist should also be checked (e.g., projects including access roads to the infrastructure facilities).</p> <p>(b) For projects, such as installation of telecommunication cables, power line towers, and submarine cables, where necessary, pertinent items described in</p>	<p>(a) N</p> <p>(b) N</p>	<p>(a) New access roads will not be constructed in the project</p> <p>(b) Construction of other related facilities is not planned.</p>

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Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	Note on Using Environmental Checklist	<p>the Power Transmission and Distribution Lines checklists should also be checked.</p> <p>(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	(a)N	(a) The project activities do not give any adverse impacts will to transboundary or global issues.

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

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**The Project for Building of Dhulikhel Hospital Trauma and Emergency Center**  
**Environmental Management Plan/Environmental Monitoring Plan and**  
**Environmental and Social Monitoring Form**

30/Sep/2022

**1. Preparation of Environmental Management Plan (EMP)**

In general, EMP consists of i) mitigation measures and ii) monitoring plan. Tentative EMP is shown below.

**i. Mitigation Measures**

Mitigation measures in EMP is shown in Tentative mitigation measures on feasibility study stage are shown below. These mitigation measures shall be updated based on final design and construction plan during detailed design.

In general, costs for these general mitigation measures during construction are included as construction cost.

**Table 1 Environmental and Social Mitigation Measures**

Area	No	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
Pollution	1	Air Pollution	<input type="checkbox"/> Water sprinkling shall be carried out in construction area and connected road, if required. <input type="checkbox"/> Periodic cleaning shall be done for connected public roads	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/MoHP
	2	Water pollution	<input type="checkbox"/> Turbid water from unpaved construction area shall be treated in sedimentation pond and discharged to the river, if required <input type="checkbox"/> Waste oil of construction machines shall be stored and disposed to designated site or by the licensed agent. <input type="checkbox"/> Construction machines shall be maintained so as not to leak oil in the basecamp site. <input type="checkbox"/> Provision of sanitation facilities, if required <input type="checkbox"/> Domestic wastewater and night soil from construction area shall be treated and discharged to designated site and facilities.	<input type="checkbox"/> Effluent from the Trauma and Emergency Center shall be treated by appropriate sewerage facilities and discharged to the river	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/MoHP [After Const] MoHP
	3	Waste	<input type="checkbox"/> Waste soil from construction area shall be reused or disposed to designated landfill site <input type="checkbox"/> Waste oil of the construction machines is collected and disposed at licensed agent. <input type="checkbox"/> Waste chemicals and hazardous materials are stored at contractor's facility and disposed by licensed agent <input type="checkbox"/> Domestic solid wastes shall be collected and disposed by the Municipality. <input type="checkbox"/> Domestic wastewater and night soil shall be treated and/or collected by licensed agent.	<input type="checkbox"/> Domestic waste from the Trauma and Emergency Center shall be collected and disposed to designated landfill site by the Municipality <input type="checkbox"/> Medical waste shall be treated in the Trauma and Emergency Center, and then collected by the licensed agent and disposed at the designated	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/MoHP [After Const] MoHP

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Area	No	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
				landfill site.		
	4	Soil Contamination and Sediment	<input type="checkbox"/> Excavated soil shall be analyzed and confirmed if its quality is under standard values. Polluted soil shall be treated and used as construction material, if excavated soil is not polluted. <input type="checkbox"/> Construction machines shall be maintained so as not to leak oil in the construction site. <input type="checkbox"/> Waste oil of the construction machines is collected and disposed at licensed agent <input type="checkbox"/> Waste chemicals and hazardous materials are stored at contractor's facility and disposed at licensed agent	<input type="checkbox"/> Implementation of wastewater treatment by the sewerage facilities <input type="checkbox"/> Appropriate waste management including medical waste (use the same collection and management process of Dhulikhel Hospital)	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	5	Noise and Vibration	<input type="checkbox"/> Construction activities and operation of construction machines shall be limited during daytime and weekdays <input type="checkbox"/> Construction machines shall be well maintained and checked every day <input type="checkbox"/> Information disclosure, such as construction schedule and activities, in advance to surrounding communities	<input type="checkbox"/> Installation of power generator inside of the building so as not to cause noise pollution	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	10	Ecosystem	<input type="checkbox"/> Appropriate management of hazardous materials such as oil and waste. Domestic garbage shall be stored properly so that these will not be eaten by animals especially birds.	<input type="checkbox"/> Appropriate management of domestic and medical wastes. Domestic garbage shall be stored so that these will not be eaten by animals especially birds.	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	12	Topography and Geology	<input type="checkbox"/> Installation of slope protection and retaining wall with appropriate measures	<input type="checkbox"/> Appropriate maintenance of the installed slope protection	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
Social Environment	13	Involuntary Resettlement	<input type="checkbox"/> Holding consultation meetings for understanding of compensation policy. <input type="checkbox"/> Implementation of adequate compensation in accordance with ARAP based on the JICA Guidelines.	<input type="checkbox"/> Monitoring based on ARAP	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	14	The Poverty				
	18	Water Usage	<input type="checkbox"/> Alternative measures for water provision shall be prepared if water level and water quality at the nearest well change during construction.	<input type="checkbox"/> Alternative measures for water provision shall be prepared if water level and water quality at the nearest well change	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP
	25	Gender	<input type="checkbox"/> Provision of job opportunities and fair salary for any gender. <input type="checkbox"/> At least 10% of female workers should	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/

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Area	No	Item	Draft Mitigation Measures		Responsibility	
			During Construction	After Construction	Implementing Agency	Responsible Agency
			be hired as simple workers.			MOHP
	26	Rights of Children	<input type="checkbox"/> No employment under the age of 18 shall be followed. [Article 6.21 "Child Labor" of Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) and General Conditions/International Federation of Consulting Engineers (FIDIC)]	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital/ MOHP
	27	Infectious Diseases such as HIV/AIDS	<input type="checkbox"/> Installation of sufficient drainage facilities so as not to provide habitat for vector mosquito <input type="checkbox"/> Provision of adequate temporary sanitation facilities <input type="checkbox"/> Enforcement of medical screening and periodic medical check-up for workers <input type="checkbox"/> In order to prevent spread of infectious diseases such as COVID-19, awareness of the workers on this is promoted during construction <input type="checkbox"/> The following shall be followed: Article 6.7, "Health and Safety" of Conditions of Contract for Construction for Buildings and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) General Conditions/ International Federation of Consulting Engineers (FIDIC).	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital / MOHP
	28	Labor Environment and Safety	<input type="checkbox"/> Relevant laws in Nepal such as Labour Act 2017 shall be followed. <input type="checkbox"/> Additionally, Article 23 of Occupational Health and Safety, Labor and Working Conditions in IFC Performance Standards 2 shall be applied. <input type="checkbox"/> Chapter 6, Staff and Labor, including 6.6 "Facilities for Staff" of Conditions Of Contract For Construction for Building and Engineering Works Designed by the Employer Multilateral Development Bank Harmonized Edition (June 2010) General Conditions/ International Federation of Consulting Engineers (FIDIC) shall be followed	Not required	[During Const.] Contractor	[During Const.] Dhulikhel Hospital / MOHP
Others	29	Accident	<input type="checkbox"/> Deploying flagman at the gate of construction area and intersections for traffic management <input type="checkbox"/> Installation of safety sign board such as speed limit and residential area in the project area <input type="checkbox"/> Installing fence around the construction site to keep out local people such as children <input type="checkbox"/> Installation of lighting facility in the night time in the construction area <input type="checkbox"/> Restricting mobilization speed to less than 20 km/h in the construction site <input type="checkbox"/> Implementation of safety training for the workers	<input type="checkbox"/> Appropriate traffic management control for users of the Trauma and Emergency Center	[During Const.] Contractor [After Const] Dhulikhel Hospital	[During Const.] Dhulikhel Hospital/ MoHP [After Const] MoHP

Source: JICA Study Team

## ii. Environmental Monitoring Plan

## (a) Monitoring Items, Frequency, and Estimated Cost

Tentative monitoring items, method, location and frequency is shown below.

Table 2 Environmental Monitoring Plan for Preconstruction and Construction Phases (2 years)

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target*
N a t u r a l E n v i r o n m e n t	1	Air pollution	TSP, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NO <sub>2</sub> , CO, Ozone	Base on the indicated methodology in the National Ambient Air Quality Standards for Nepal, 2012	<b>2 Locations</b> Where baseline monitoring was carried out. (Dhulikhel Hospital and project site)	<b>1 time / year x 2 years</b> (Dry season)	2.0 (1 time /year x 500 USD / point x 2 points x 2 years)	<b>National Ambient Air Quality Standards for Nepal, 2012</b> 1. <b>Total Suspended Solid (TSP)</b> · 24 hours: 230 µg/m <sup>3</sup> 2. <b>PM<sub>10</sub> (Ø &lt; 10µm)</b> · 24 hours: 120 µg/m <sup>3</sup> 3. <b>PM<sub>2.5</sub> (Ø &lt; 2.5µm)</b> · 24 hours: 40 µg/m <sup>3</sup> 4. <b>Sulphur Dioxide (SO<sub>2</sub>)</b> · 24 hours: 70 µg/m <sup>3</sup> · Annual: 50 µg/m <sup>3</sup> 5. <b>Nitrogen Dioxide (NO<sub>2</sub>)</b> · 24 hours: 80 µg/m <sup>3</sup> · Annual: 40 µg/m <sup>3</sup> 6. <b>Carbon Monoxide (CO)</b> · 8 hours: 10,000 µg/m <sup>3</sup> · 24 hours: 50 µg/m <sup>3</sup> 7. <b>Ozone</b> · 8 hours: 157 µg/m <sup>3</sup>
	2	Water Quality	TSP, pH, temperature, TDS, BOD, Total Coliform	Based on the Nepal Gazette, 30 April 2001 and 23 June 2003 editions And/Or same methodology used in baseline surveys	<b>2 Locations</b> Upstream of construction area and downstream of construction area	<b>2 times / year x 2 years</b> (1 time / Dry and Rainy seasons)	1.6 (2 times /year x 200 USD / point x 2 points x 2 years)	<b>Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water (Land /Inland Surface Water))</b> 1. <b>TSP</b> : 200 / 50 mg/L. 2. <b>pH</b> : 5.5-9.0 / same mg/L. 3. <b>Temperature</b> : <40 / same °C 4. <b>TDS</b> : no standard mg/L 5. <b>BOD</b> : 50 / same mg/L
	3	Waste	Volume of waste soil, tree cuttings and domestic garbage	Record volume of generated waste in the project area	<b>Waste Storage and collection points</b>	<b>4 times / year x 2 years</b>	1.6 (4 times /year x 200 USD/point x 1 point x 2 years)	• Generated construction waste and domestic waste shall be reused or disposed at designated site. • Follow the Solid Waste Management Act (2011)
	4	Soil Contamination and Sedimentation Quality	1 Cadmium, 2 Hexavalent chromium, 3.Mercury, 4 Lead, 5 Arsenic, 6 Cyanide, 7 Selenium, 8 Fluorine, 9 Boron	same methodology used in baseline surveys	<b>1 Location</b> Where baseline monitoring was carried out.	<b>1 time (before excavation)</b>	1.0 (1 time x 1,000 USD / point x 1 points)	There are no law-based criteria nor international guidelines to be followed, thus following referred standards are proposed (Japanese heavy metal 9 items) 1. Cadmium (45mg/kg) 2. Hexavalent chromium (250 mg/kg) 3. Mercury (15 mg/kg) 4. Lead (150 mg/kg) 5. Arsenic (150 mg/kg) 6. Cyanide (50 mg/kg) 7. Selenium (150 mg/kg) 8. Fluorine (4,000 mg/kg) 9. Boron (4,000 mg/kg)

	5	Noise	Construction noise (dB(A) <sub>L<sub>Aeq</sub></sub> )	Noise: 24 hrs continuous measurement (at least 10 min in an hour x 24 hours)	2 Locations (NV-1: Dhulikhel Hospital Quadrangle NV-2: Project Site North)	2 times / year x 2 years (2 times / Dry Season)	4.0 (2 times/year x 500 USD / point x 2 years x 2 points)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target. Japanese Standard During Construction [Noise] dB(A) Reference Standard in Japan (Construction Noise) 07:00-19:00: 85 dB(A)
	12	Topography and Geology	Stability of embankment/retaining wall	Condition of embankment/retaining wall	Project area	4 times/ year x 2 years	0.8 (4 times /year x 100 USD/time x 2 years)	The embankment and retaining wall do not have any crack nor displacement.
S o c i a l E n v i r o n m e n t	13	Involuntary Resettlement and the Poor	Payment and implementation of social assistance in accordance with ARAP	Consultation meeting with and /or survey of the project-affected persons (PAPs)	Affected area	Refer to ARAP monitoring plan	Refer to ARAP monitoring plan	There are no law-based criteria nor international guidelines to be followed, thus the following is established as conservation target  JICA Guidelines: Compensation shall be completed prior to actual construction activities, and livelihood standards shall not get worse.  Note) If compensation regarding land acquisition before construction is implemented, monitoring shall be done by internal and external monitoring bodies
	14							
	18	Water Usage	Impacts on surrounding well (underground water level)	Underground water level	2 wells in the Dhulikhel Hospital	12 times / year x 2 years (every month)	2.4 (12 times /year x 100 USD / time x 2 years)	Adverse impacts to the existing wells shall be minimized and/or alternative routes shall be secured as mitigation measures, if water level changes
	27	Infectious diseases such as HIV/AIDS	Number of infected patient such as COVID-19	Confirmation of health check list from contractor	Project area (base-camp site)	4 times / year x 2 years (2 times / year (Rainy and Dry Season))	1.6 (4 times /year x 200 USD/time x 2 years)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target. Infection diseases are not caused by the project
	28	Labor Environment	Construction workers' condition	Confirmation of safety devices and conditions via interviews	Project area (basecamp site)	4 times / year x 2 years (2 times / Rainy and Dry Seasons)	1.6 (4 times /year x 200 USD / time x 2 years)	Following laws and guidelines shall be followed 1. The Labor Act 2017 2. IFC Performance Standard 2, Labor and Working Conditions (FIDIC 2010)
O t h e r	29	Accident	Number of accidents	Confirmation of accident list from local	Project area	4 times / year x 4 years (2 times / Rainy and Dry Season)	1.6 (4 times /year x 200 USD / time x 2 years)	There are no law-based criteria nor international guidelines to be followed, thus following is established as conservation target. Any accidents are not caused by construction activities.

				government/ police department			years)	
Remarks *1: Frequency and timing of monitoring shall be modified at detailed design stage *2: The cost indicates direct cost, not including consultant fee, overhead and personal expense								

Source: JICA Survey Team

Environmental monitoring survey plan for operational phase is proposed as follows. Proposed monitoring period is at least three (3) years.

**Table 3 Environmental Monitoring Plan After Construction Phase (3 Years)**

Area	No.	Item	Parameter	Method	Location	Frequency a Year	Direct Cost (Thousands USD)	Conservation Target*3
Natural Environment	1	Air pollution	TSP, PM <sub>2.5</sub> , NO <sub>2</sub> , Ozone, PM <sub>10</sub> , SO <sub>2</sub> , CO.	Based on the indicated methodology in the National Ambient Air Quality Standards for Nepal, 2012	<u>2 Locations</u> Where baseline monitoring was carried out.	<u>2 times / year x 3 years</u> (Dry season and rainy season)	6.0 (2 times / year x 500 USD / point x 2 points x 3 years)	<b>National Ambient Air Quality Standards for Nepal, 2012</b> 1. <u>Total Suspended Solid (TSP)</u> · 24 hours: 230 µg/m <sup>3</sup> 2. <u>PM<sub>10</sub> (Ø &lt; 10µm)</u> · 24 hours: 120 µg/m <sup>3</sup> 3. <u>PM<sub>2.5</sub> (Ø &lt; 2.5µm)</u> · 24 hours: 40 µg/m <sup>3</sup> 4. <u>Sulphur Dioxide (SO<sub>2</sub>)</u> · 24 hours: 70 µg/m <sup>3</sup> · Annual: 50 µg/m <sup>3</sup> 5. <u>Nitrogen Dioxide (NO<sub>2</sub>)</u> · 24 hours: 80 µg/m <sup>3</sup> · Annual: 40 µg/m <sup>3</sup> 6. <u>Carbon Monoxide (CO)</u> · 8 hours: 10,000 µg/m <sup>3</sup> · 24 hours: 50 µg/m <sup>3</sup> 7. <u>Ozone</u> 8 hours: 157 µg/m <sup>3</sup>
	2	Water Quality	pH, BOD, SS, Total Coliform	Based on the Nepal Gazette, 30 April 2001 and 23 June 2003 editions and/or use of same methodology of baseline surveys	<u>2 Locations</u> Upstream of construction area and downstream of construction area	<u>2 times / year x 3 years</u> (Dry and Rainy season)	2.4 (2 times / year x 200 USD / point x 2 points x 3 years)	<b>Nepal Gazette, 30 April 2001 and 23 June 2003 editions (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water (Land /Inland Surface Water))</b> 1. <u>TSP</u> : 30-200 / 50 mg/L 2. <u>pH</u> : 5.5-9.0 / same mg/L 3. <u>Temperature</u> : <40 / same °C 4. <u>TDS</u> : no standard mg/L 5. <u>BOD</u> : 50 / same mg/L.
	3	Waste	Volume of domestic waste / medical waste /night soil from the facilities	Record of volume of generated waste from facilities	<u>Waste Storage and collection points</u>	<u>2 times / year x 3 years</u>	1.2 (2 times / year x 200 USD / time x 3 years)	Follow the Solid Waste Management Act (2011) Generated construction waste and domestic waste shall be reused or disposed at designated site.
	4	Soil Contamination and Sedimentation Quality	1 Cadmium, 2 Hexavalent chromium, 3 Mercury, 4 Lead, 5 Arsenic, 6 Cyanide, 7 Selenium, 8 Fluorine, 9 Boron	Use of same methodology of baseline surveys	<u>1 Location</u> Where baseline monitoring was carried out.	<u>1 time</u>	3.0 (1 time / year x 1,000 USD / point x 1 point x 3 years)	There are no law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal, 9 items) 1. Cadmium (45mg/kg) 2. Hexavalent chromium (250 mg/kg) 3. Mercury (15 mg/kg) 4. Lead (150 mg/kg)

							5. Arsenic (150 mg/kg) 6. Cyanide (50 mg/kg) 7. Selenium (150 mg/kg) 8. Fluorine (4,000 mg/kg) Boron (4,000 mg/kg)
5	Noise	Ambient Noise (dB(A)) <sub>L<sub>Acq</sub></sub>	Noise 24 hrs continuous measurement (at least 10 min in an hour x 24 hours)	2 Locations (NV-1: Dhulikhel Hospital Quadrangle NV-2: Project Site North)	2 times / year x 3 years (2 times / Dry Season)	6.0 (2 times/year x 500 USD / point x 3 years x 2 points)	Mixed Residential (Ministry of Environment, Science and Technology, Nepal Gazette 2069-07-13/IFC) Daytime 6:00-18:00 63 dB(A) / 70 dB(A) Nighttime 18:00-6:00 55 dB(A) / 70 dB(A)
12	Topography and Geology	Stability of embankment / retaining wall	Condition of embankment / retaining wall	Project area	2 times/ year x 3 years	1.8 (2 times /year x 100 USD/time x 3 years)	The embankment and retaining wall do not have any crack.
18	Water Usage	Impacts on surrounding well (underground water level)	Underground water level	2 Wells in the Dhulikhel Hospital	2 times / year x 3 years (Dry and rainy seasons)	0.6 (2 times /year x 100 USD / time x 3 years)	Adverse impacts to the existing wells shall be minimized and or alternative routes shall be secured as mitigation measures, if water level changes
<b>Total Cost During Construction: <u>21,000 (USD)</u> for 3 years (After construction)</b>							
Remarks							
*1 Frequency and timing of monitoring shall be modified at detailed design stage							
*2 The cost indicates direct cost, not including consultant's fee, overhead, and personal expenses							

The environmental monitoring sheet in accordance with JICA's Guidelines are shown below. The Project Responsible Authority of Nepal side shall submit the result of environmental monitoring as a part of project status report (PSR) every quarter to JICA.

**Table 4 Environmental Monitoring Sheet During Construction Based on the JICA Format**

Item	Parameter Standard	Data by Location (Exceeding standard)				Major Impacts during construction, Standard Source, Monitoring Frequency
		Location Date	Air-1 (Project Site)	Air-2 (Project Site)	Air-3 (Inside of DH)	
Air pollution						[Major Impacts] Dust from project site and access road
	TSP 230 µg/m <sup>3</sup> (24hrs)	Jul/2021 **/2024				[Standard Source] National Ambient Air Quality Standards for Nepal, 2012
	PM <sub>10</sub> 120 µg/m <sup>3</sup> (24hrs)	Jul/2021 **/2024				[Monitoring Frequency] 1 time / year x 2 years (Dry season)
	PM <sub>2.5</sub> 40 µg/m <sup>3</sup> (24hrs)	Jul/2021 **/2024				
	SO <sub>2</sub> 70 µg/m <sup>3</sup>	Jul/2021 **/2024				
	NO <sub>2</sub> 80 µg/m <sup>3</sup> (24hrs)	Jul/2021 **/2024				
	CO 50 µg/m <sup>3</sup> (24hrs)	Jul/2021 **/2024				
	Ozone 157 µg/m <sup>3</sup> (8hrs)	Jul/2021 **/2024				

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Water Quality		Location Date	Surface Water-1 (Upstream)	Surface Water- 1 (Downstream)		Nepal Gazette , 30 April 2001 and 23 June 2003 (Tolerance Limits for Different Industrial Effluents Discharged into Inland Surface Water(Land /Inland Surface Water)]  2 times / year x 2 years (1 time / Dry and Rainy season)
	TSP 30-200 / 50 mg/l	Jul/2021 **/2024				
	pH 5.5-9.0 / same mg/l	Jul/2021 **/2024				
	Temperature <40 / same °C	Jul/2021 **/2024				
	TDS no standard mg/l	Jul/2021 **/2024				
	BOD 50 / same mg/l	Jul/2021 **/2024				
	Total Coliform 5,000 MPN/100ml (Japanese Standard)	Jul/2021 **/2024				
Waste	Waste soil (accumulate m <sup>3</sup> )	**/2024				Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
	Domestic garbage (base-camp, if any)	**/2024				
Soil Contaminatio n and Sedimentation Quality		Location Date	Soil-1 (Project Site)			There are not law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal 9 items)  1 time (before excavation)
	Cadmium 45 mg/kg	Jul/2021 **/2024				
	Hexavalent Chromium 250 mg/kg	Jul/2021 **/2024				
	Mercury 15 mg/kg	Jul/2021 **/2024				
	Lead 150 mg/kg	Jul/2021 **/2024				
	Arsenic 150 mg/kg	Jul/2021 **/2024				
	Cyanide 50 mg/kg	Jul/2021 **/2024				
	Selenium 150 mg/kg	Jul/2021 **/2024				
	Fluorine 4,000 mg/kg	Jul/2021 **/2024				
	Boron 4,000 mg/kg	Jul/2021 **/2024				
Noise		Location Date	NV-1 (Project Site North)	NV-2 (Project Site South)	NV-3 (DH Quadrangle)	There are not law-based criteria nor international guidelines to be followed, thus following is established as conservation target Japanese Standard during Construction [Noise] dB(A) Reference standard in Japan (construction noise) 07:00-19:00; 85 dB(A)
	Construction noise (dB(A) <sub>L<sub>Aeq</sub></sub> ) 85 dB(A)	Jul/2021	Day 67/ Night 61	Day 65/ Night 62	Day 67/ Night 61	
		**/2024			No need monitoring	
Topography and geology	Stability of embankment / retaining wall	Condition of embankment/retaining wall			The embankment and retaining wall does not have any crack	
Involuntary Resettlement	Payment and implementation of social assistance in accordance	Confirmation of conflicts and claims from resettlers Confirmation of livelihood including income			The resetteler keeps their quality of life after resettlement	

	with ARAP		
Infectious diseases such as HIV/AIDS	Number of infected patient such as COVID-19	Construction workers	Not to cause infection disease in the project activities
Labor Environment and Accident	Construction worker's condition	Number of accident for the project	Follow the Labor act 2017

Source: JICA Study Team

**Table 5 Environmental Monitoring Sheet After Construction Based on the JICA Format**

Item	Parameter and Standard	Data by Location (Exceeding standard)				Major Impacts during construction, Standard source, Monitoring Frequency
		Location Date	Air-1 (Project Site)	Air-2 (Project Site)	Air-3 (Inside of DH)	
Air pollution	TSP 230 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2026				[Major Impacts] Dust from project site and access road  [Standard] National Ambient Air Quality Standards for Nepal, 2012  [Monitoring Frequency] 1 time / year x 2 years (Dry season)
	PM <sub>10</sub> 120 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2026				
	PM <sub>2.5</sub> 40 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2026				
	SO <sub>2</sub> 70 $\mu\text{g}/\text{m}^3$	Jul/2021 **/2026				
	NO <sub>2</sub> 80 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2026				
	CO 50 $\mu\text{g}/\text{m}^3$ (24hrs)	Jul/2021 **/2026				
	Ozone 157 $\mu\text{g}/\text{m}^3$ (8hrs)	Jul/2021 **/2026				
	Water Quality		Location Date	Surface Water-1 (Upstream)	Surface Water-1 (Downstream)	
TSP 30-200 / 50 mg/l		Jul/2021 **/2026				
pH 5.5-9.0 / same mg/l		Jul/2021 **/2026				
Temperature <40 / same °C		Jul/2021 **/2026				
TDS no standard mg/l		Jul/2021 **/2026				
BOD 50 / same mg/l		Jul/2021 **/2026				
Total Coliform 5,000 MPN/100ml (Japanese Standard)		Jul/2021 **/2026				
Waste	Waste soil (accumulate m <sup>3</sup> )	**/2026				Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
	Domestic garbage (base-camp, if any)	**/2026				

Soil Contamination and Sedimentation Quality		Location Date	Soil-1 (Project Site)			There are not law-based criteria nor international guidelines to be followed, thus following referred standard is proposed (Japanese heavy metal 9 items)  1 time (before excavation)
	Cadmium 45 mg/kg	Jul/2021 **/2026				
	Hexavalent Chromium 250 mg/kg	Jul/2021 **/2026				
	Mercury 15 mg/kg	Jul/2021 **/2026				
	Lead 150 mg/kg	Jul/2021 **/2026				
	Arsenic 150 mg/kg	Jul/2021 **/2026				
	Cyanide 50 mg/kg	Jul/2021 **/2026				
	Selenium 150 mg/kg	Jul/2021 **/2026				
	Fluorine 4,000 mg/kg	Jul/2021 **/2026				
	Boron 4,000 mg/kg	Jul/2021 **/2026				
Noise		Location Date	NV-1 (Project Site North)	NV-2 (Project Site South)	NV-3 (DH Quadrangle)	Mix Residential (Ministry of Environment, Science and Technology, Nepal Gazette 2069-07-13/IFC) Daytime 6:00-18:00 63 dB(A) / 70 dB(A) Night time 18:00-6:00 55 dB(A) / 70 dB(A)
	Ambient noise Daytime 6:00-18:00 63 dB(A) / 70 dB(A) Night time 18:00-6:00 55 dB(A) / 70 dB(A)		Day 67/ Night 61	Day 65/ Night 62	Day 67/ Night 61	
		Jul/2021 **/2026			No need monitoring	
Topography and geology	Stability of embankment / retaining wall	Condition of embankment/retaining wall				The embankment and retaining wall does not have any crack
Involuntary Resettlement	Payment and implementation of social assistance in accordance with ARAP	Confirmation of conflicts and claims from resettlers Confirmation of livelihood including income				The resettler keeps their quality of life after resettlement
Water Use	Water level does not drop in the project area and surrounding area	Location Date	New Well-1	New Well-2	Dulikhel Hospital	Generated construction waste and domestic waste shall be reused or disposed at designated site. 4 times / year x 2 years
		**/2022 **/2023				

Source: JICA Study Team

### (b) Institutional Framework for the Environmental Monitoring During Construction

The objectives and design of the EMP and Environmental Monitoring Plan are described in the earlier sections of this chapter. There is a necessity to form a proper institutional framework for the effective implementation of the formulated environmental management and monitoring plan. The elements of this institutional framework will coordinate and work with each other throughout the project, i.e., during pre-construction, construction and operation stages.

The implementation of formulated environmental mitigation measures comes with a cost, so the budgeting of EMP is necessary, and also the financial source that will provide this budget is discussed



in this section.

The suggested elements of institutional framework for implementing EMP during construction will be as follows:

- Project Management Unit (PMU) under Ministry of Health and Population (MoHP)
- Construction Supervision Consultant (CSC)
- Project Management Consultant (PMC)
- Environmental Consultant (EC)
- Project Construction Contractor - Construction Company (PCC)
- Authorized Environmental Agency [Ministry of Forest Environment (MoFE)]
- Local Government –Dhulikhel Municipality
- Funding Agency – JICA

The above stated elements comprised the “Institutional Framework” that will work together to effectively implement the formulated Environmental Management Plan. The roles and responsibilities of these elements are given in Table 6.

**Table 6 Environmental Management Organization During Construction**

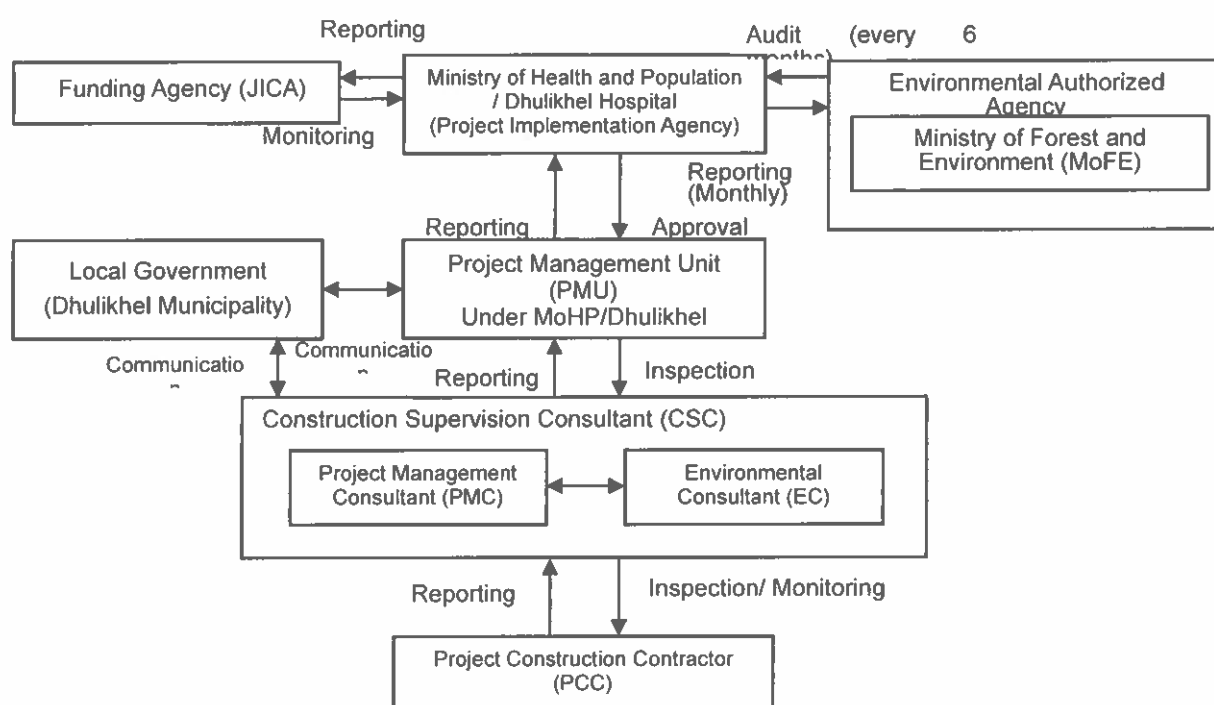
Name of Organization	Roles and Responsibilities
Project Management Unit under Dhulikhel Hospital/ MOHP (PMU)	Initiate the coordination process among the concerned organizations (Elements of Institutional Framework) for EMP implementation. Management of EMP in association with CSC Review and approve monthly Environmental Report from CSC and sending the report to MoHP and MoFE
Construction Supervision Consultant (CSC)	CSC works in association with Project Construction Contractor (PCC) and the Environmental Consultant (EC) on a full-time basis at the project site office. PMC mainly looks after managing engineering and construction-related activities.
Environmental Consultant (EC)	EC inspects the implementation of mitigation measures and environmental monitoring conducted by PCC. EC reviews and corrects Environmental Monitoring Report (EMR) submitted by PCC and then submit it to PMU after inspection.
Project Construction Company (PCC)	PCC implements approved EMP (mitigation measures) under observation of PMC and EC. PCC submits EMR for all conducted mitigation measures on site to the EC on weekly and/or monthly basis.

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Name of Organization	Roles and Responsibilities
Authorized Environmental Agency (MoFE)	Inspect and audit periodical environmental monitoring report (once 6 months) Inspect the implementation of mitigation measures on site, as required Request for necessary action and additional surveys and implementation of mitigation measures, if required
Local Government (Dhulikhel Municipality)	Monitor construction activities Request for necessary action and additional surveys and implementation of mitigation measures, if required
Funding Agency (JICA)	Review periodic environmental monitoring report Request for necessary action and additional surveys and implementation of mitigation measures, if required

Source: JICA Study Team



Source: JICA Survey Team

**Figure 1 Environmental Management Implementing Organization During Construction**

**After Construction**

The major authorities for implementing the EMP after construction are as follows:

- Responsible Agency: Ministry of Health and Population (MoHP) and Dhulikhel Hospital
- Local Government: Dhulikhel Municipality
- Authorized Environmental Agency (MoFE)

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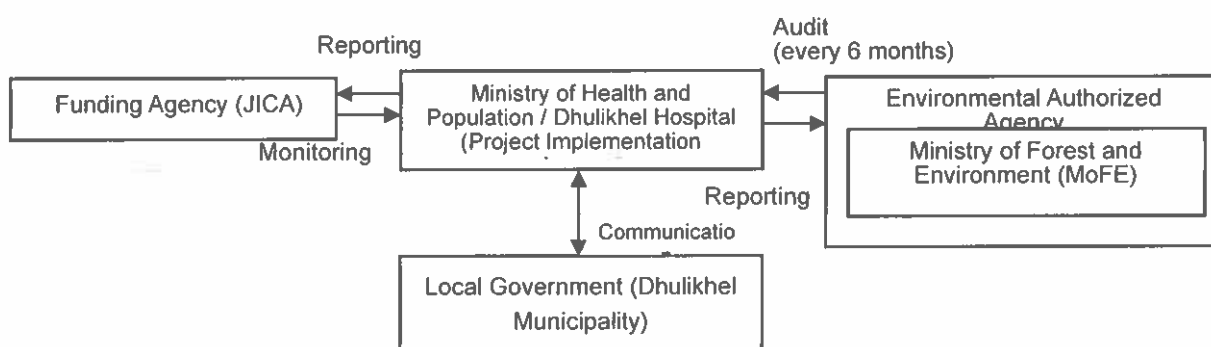
- Funding Agency – JICA

The roles and responsibilities of each organization are shown below:

**Table 7 Environmental Management Organization After Construction**

Name of Organization	Roles and Responsibilities
Ministry of Health and Population (MoHP)/ Dhulikhel Hospital	Implementation of Environmental Monitoring in accordance with approved EMP in the EIA Preparation of Monitoring Report and Submission to MoEF
Local Government (Dhulikhel Municipality)	Monitor project site (natural condition and social condition) Request for necessary action and additional surveys and implementation of mitigation measures, if required
Authorized Environmental Agency (MoFE)	Inspect and audit the periodic environmental monitoring report Inspect the implementation of mitigation measures on site, as required Request for necessary action and additional surveys and implementation of mitigation measures, if required
Funding Agency (JICA) Regional Office	Review the quarterly environmental report and monthly report Request for necessary action and additional surveys and implementation of mitigation measures, if required

Source: JICA Survey Team



Source: JICA Survey Team

**Figure 2 Environmental Management Implementing Organization After Construction**

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### Implementation of Public Consultation

#### 1. 1st Public Consultation on the Scoping Stage

The result of the 1<sup>st</sup> Local Stakeholder Meeting is shown below.

In the meeting, Dhulikhel Hospital and MoHP, in cooperation with JICA Study Team, had explained the outline of the project, its positive and negative impacts, and tentative project schedule.

Some comments and questions were raised by the attendees. Nevertheless, all participants agreed to proceed with the project and formulated consensus for the project.

**Table 120 Overview of the Public Consultation**

Name of Meeting (date and venue)	Agenda	Major Attendees	Methodology
Scoping Meeting (1 <sup>st</sup> Local Stakeholder Meeting)  (11:40-12:40 / 23 <sup>rd</sup> of September 2021 at the Conference Room of the Dhulikhel Municipality)	Opening Remarks Project Outline Alternative Analysis of the Building Location Positive and Negative Impacts of the Project Opinion Exchange Closing Remarks	Participants: Local people, Kathmandu University, Dhulikhel Municipality, Dhulikhel Hospital, JICA Study Team Total Number of Participants: 20 (Males: 17, Females: 3)	1) Information disclosure Direct informing 2) Language used was Nepali.

Source: JICA Survey Team

The opinions, questions, and corresponding answers during the discussion session are shown below.

**Table 121 Opinions Raised in the Public Consultation (23<sup>rd</sup> of September 2021)**

No	Major Opinion and Answer				
	Question/Comment		Answer		Reaction of Questioner
	Name/Position	Question/Comment	Position	Answer	
1	Engineer (male)	How will you manage the hospital waste?	Dhulikhel	Proposed Trauma Center will follow same process in waste	Accepted the

			Hospital	management of Dhulikhel Hospital.	answer
2	Engineer (male)	How will you manage the waste water?	Dhulikhel Hospital	Still not final but planning to manage the wastewater in Dhulikhel Hospital wastewater treatment plant.	Accepted the answer
3	Engineer (male)	How will you manage the supply of drinking water in the Trauma Center?	Dhulikhel Hospital	Drinking water will be supplied from Dhulikhel municipality pipeline and also well water will be used to fulfill water demand.	Accepted the answer
4	Local People (female)	What about demarcation of Raj Kulo (boundary) and land acquisition process?	Dhulikhel Hospital	Demarcation of Rajkulo will be fixed very soon with presence of local people, and private land is already purchased.	Accepted the answer
5	Deputy Mayor (female)	The Trauma Center Building should be disabled friendly as well as child friendly, and it should have a separate room for breast feeding.	Dhulikhel Hospital	The Trauma Center Building will be built with disabled friendly features (construct ramp, lift, etc.), and there will be a separate room for breast feeding.	Accepted the answer
6	Ward Chief (male)	Employment opportunities should be provided to the local people according to their qualifications.	Dhulikhel Hospital	Hospital management team will decide about priority to give employment opportunities to the local people.	Accepted the answer

Source: JICA Survey Team

## 2. 2nd Public Consultation During the Draft EIA Stage

The result of the 2<sup>nd</sup> Local Stakeholder Meeting, which is called as “Public Hearing” in the EIA law, is described below.

In the meeting, Dhulikhel Hospital and MoHP, in cooperation with JICA Study Team (subcontractor), had explained the updated outline of the project, predicted positive and negative impacts, and tentative project schedule. Some comments and questions were raised by the attendees of the meeting, nevertheless, all participants

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agreed to proceed with the project and formulated a consensus.

**Table 122 Overview of the Public Consultation**

Name of Meeting (Date and Venue)	Agenda	Major Attendees	Methodology
Public Hearing  (10:45-12:30 / 14th of June 2022 at the Conference Room of Dhulikhel Municipality)	Opening Remarks Project Outline Alternative Analysis of the Building Location Environmental Impacts, Enhancement and Mitigation Measures Environmental Management Plan Environmental Monitoring Plan Environmental Auditing Plan Conclusion and Commitment Exchange of Opinions Closing Remarks	Participants: Local People, Dhulikhel Municipality, Dhulikhel Municipality Ward Number 6, Dhulikhel Hospital Number of Total Participants: 44 (Males: 41, Females: 3)	1) Information disclosure Direct informing 2) Language used was Nepali.

Source: JICA Survey Team

The opinions, questions, and corresponding answers during the discussion session are shown below.

**Table 123 Opinions Raised in the Public Consultation (14<sup>th</sup> of June 2022)**

No	Major Opinions and Answers				
	Question/Comment		Answer		Reaction of Question er
	Name/Position	Question/Comment	Position	Answer	
1	Engineer (male)	How will you manage solid waste?	Dhulikhel Hospital	Trauma Center will follow Healthcare Waste Guideline 2014 to manage solid waste. Segregation of waste from the source will be implemented and infectious waste will be autoclaved. Also, the 3R principle will be followed.	Accepted the answer
2	Engineer (male)	How will you manage the liquid waste?	Dhulikhel Hospital	Proposed Trauma Center will follow same process as in liquid waste management in	Accepted the answer

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				Dhulikhel Hospital, for which certain land area is allocated for the installation of wastewater treatment plant.	
3	Local People (Male)	How will you manage drinking water in the Trauma Center?	Dhulikhel Hospital	Drinking water will be supplied from Dhulikhel municipality pipeline and also groundwater will be used to fulfill water demand.	Accepted the answer
4	Local People (Male)	Project building should be constructed only after approval of the drawing.	Dhulikhel Hospital	Building of project will be constructed only after the approval of drawing by the municipality.	Accepted the answer
5	Local People (Male)	How will you manage parking issue?	Dhulikhel Hospital	Sufficient land is allocated for parking.	Accepted the answer
6	Local People (Male)	How will you dispose wastewater without affecting the agricultural sector?	Dhulikhel Hospital	Research work is going on to construct wastewater treatment plant.	Accepted the answer
7	Ward Female Member	Employment opportunity should be provided to the local people according to their qualifications.	Dhulikhel Hospital	Hospital management team will decide about priority to give employment opportunities to the local people.	Accepted the answer
8	Ward Chief (Male)	Proper management of mercury waste and canteen waste should be done.	Dhulikhel Hospital	Mercury free instrument and equipment like thermometer and BP set will be used.	Accepted the answer

Source: JICA Survey Team

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**The Project for Building Dhulikhel Hospital  
Trauma and Emergency Center**

**Abbreviated Resettlement Action Plan  
(ARAP)**

**(Final, February 2023)**

**Dhulikhel Hospital  
Ministry of Health and Population (MoHP)**

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(Final Abbreviated Resettlement Action Plan: February 2023)

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## Currency Equivalents

(As of 24<sup>th</sup> of Jan. 2022)

Currency Unit	-	Nepal Rupee (NPR)
NPR 1.00	=	US\$ 0.00841
US\$ 1.00	=	NPR 118.95

## Abbreviations

ADB	Asian Development Bank
AP	Affected Person
ARAP	Abbreviated Resettlement Action Plan
CDC	Compensation Determination Committee
COD	Cut-off Date
COI	Corridor of Impact
D/D	Detailed Design
DH	Dhulikhel Hospital
DMS	Detailed Measurement Survey
DOR	Department of Roads
DPAP	Direct Project Affected Person
DPs	Displaced Persons
EIA	Environmental Impact Assessment
EM	Entitlement Matrix
EMA	External Monitoring Agent
ESMF	Environment and Social Management Framework
F/S	Feasibility Study
GL	Guidelines
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRO	Grievance Redress Officer
HH	Household
IMA	Internal Monitoring Agent
IOL	Inventory of Loss
IOL	Inventory of Loss Assets
JICA	Japan International Cooperation Agency
JST	JICA Study Team
LA	Land Acquisition
LARC	Land Acquisition and Resettlement Committee
MOHA	Ministry of Home Affairs
MoHP	Ministry of Health and Population
NCD	Non Communicable Diseases
NGO	Non-governmental Organization
NHSS	Nepal Health Sector Strategy
NPC	National Planning Commission
NPR	Nepalese Rupees
PAH	Project Affected Household
PAHs	Project Affected Households
PAPs	Project Affected Persons
PMU	Project Management Unit
RAP	Resettlement Action Plan
RCS	Replacement Cost Survey

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ROW	Right of Way
RP	Resettlement Plan
SAHs	Severely Affected Households
SES	Socio-Economic Survey
SES	Socio-Economic Survey
SLC	School Leaving Certificate
SPS	Safeguard Policy Statement
SRN	Strategic Road Network
TOR	Terms of Reference
UNDP	United Nation Development Programme
URAP	Updated RAP
USD	United States Dollar
VAHs	Vulnerable Affected Households
WB OP	World Bank Operational Policy

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## CHAPTER 1 Introduction

### 1.1. Background of the Project

Federal Democratic Republic of Nepal (hereinafter referred to as "Nepal") is one of the poorest countries in the South Asia region and the country ranks 149th out of 189 countries in the Human Development Index (UNDP, 2018). In the National Health Care Policy (2019), the government of Nepal (hereinafter referred to as "GoN") has set the medium and long term policy goal of "provision of quality medical services to all citizens from basic to advanced health care". In order to achieve the goal, GoN is dealing with issues through the implementation of the Nepal Health Sector Strategy (NHSS) (2015/16 to 2020/21 period), which identified specific actions to be taken. One of the key strategies of the NHSS is to strengthen preparedness for public health emergencies and disasters including emergency medical services. With the increase in vehicular traffic, the number of road accidents increased by about 3.5 times to 14,000 per year between 2000 and 2012, trauma accounted for 10% of cause of death (the global average is about 6%). The number of accidents is particularly high in the central and eastern regions of Nepal.

Dhulikhel Hospital is also a regional hub medical institution and one of the largest tertiary hospital in Nepal, receiving patients from 21 districts in the coverage area. When the Nepal Earthquake occurred in 2015, the hospital accepted patients immediately after the quake and served as a hub for disaster medical care. Since the hospital is located near the intersection of Sindhuli and Arniko roads, a major point of transportation, it receives a large number of emergency trauma patients including those injured in road accidents (16,292 in 2016/17). The hospital is short of equipment and beds due to the rapid increase in emergency stroke and heart disease patients because of the spread of Non-Communicable Diseases (hereinafter referred to as "NCDs") caused by dietary changes and urbanization associated with economic development. With the number of trauma and emergency patients on the rise, the hospital is expected to strengthen the capacity to cope with cases, including increase of its equipment and beds. The hospital also serves as a teaching hospital of Kathmandu University and trains a wide range of medical professionals, including doctors, nurses, and physical therapists. The hospital is highly important as a medical education institution and only university in the county which has bachelors course for physical therapists.

With regard to the measures against COVID-19, Dhulikhel Hospital has been designated as one of the five highest level (Level 3) hospital, and is expected to strengthen its capacity to cope with severe cases of COVID-19.

"The Project for Building Trauma and Emergency Medical Center at Dhulikhel Hospital " (hereinafter referred to as "the Project ") is a high-priority project in the field of health and medical services in Nepal, which aims to develop facilities and provide medical equipment for strengthening of regional medical services by constructing the Trauma and Emergency Medical Center.

Japan's Country Assistance Policy for Nepal (September 2016) set "poverty reduction and improvement of quality of life" as a priority area and "improvement of education and health services" as a development goal. In addition, JICA Country Analysis Paper for Nepal (June 2020) stated that JICA will address "poverty reduction and improvement of quality of life" and improve health and medical services through the development of tertiary medical facilities. The project is in line with these policies and analysis.

The project is consistent with the development goal and policies in Nepal, and the cooperation policy of Japan and JICA. The project will contribute to the improvement of health care services quality in Nepal through the construction of facilities and the provision of medical equipment to address the increasing stroke and heart disease patients due to the spread of NCDs, as well as the rapidly increasing trauma patients due to the increase in traffic accidents. In addition, the project is expected to contribute to SDG Goal 3 (to ensure healthy lives and promote the welfare of all people of all ages). Therefore, there is a strong need to support the implementation of the project.

## 1.2. Outline of the Project

Main project activities are building of the Dhulikhel Hospital Trauma and Emergency Center including medical equipment as shown below.

**Table 1.1 Construction Facilities in Trauma and Emergency Medical Center**

Name of Facility	Specification	
	Contents	Building Construction Area (Tentative Specification as of October 2021)
1. Facilities	Emergency treatment room, outpatient room, ward, laboratory, radiology department, operation room, ICU	<ul style="list-style-type: none"> <li>• Number of Bed: 100 Beds</li> <li>• Compound Area: App 0.62 ha</li> <li>• Total built up Area: 0.65 ha</li> <li>• Number of Floor: 6 floors</li> <li>• * Ground 3 floors and basement 3 floors</li> <li>• * Land fill and cutting land volume is less than 20,000 m<sup>3</sup></li> </ul>
2. Equipment	MRI, CT scan, digital X-ray apparatus, defibrillator, ventilator, complete set of surgical equipment, blood testing equipment, autoclave, power generation equipment, emergency power supply	
3. Service	Trauma and emergency medical care, Trauma and Emergency inpatient and outpatient services, Trauma and Emergency operation, ICU and HDU services, Radiology services, Laboratory services, Blood transfusion, Physiotherapy, Pharmacy	Total 218 technical and non-technical staff Physician, Trauma surgeon, General surgeon, Orthopedic, Neurosurgeon, Cardiothoracic and vascular surgeon, Anesthetist/Critical care, Medical officer, Staff nurse, Health Assistant, Laboratory staff, Radiographer, Pharmacist, Maintenance/Biomedical, Ambulance paramedics, Ambulance driver, Administrative officer/Manager, Account section officer, Security, Secretarial/Receptionist, Hygiene, Ward boys/girls, Social worker/public relation officer, Medical recording and statistics

Source: JICA Study Team

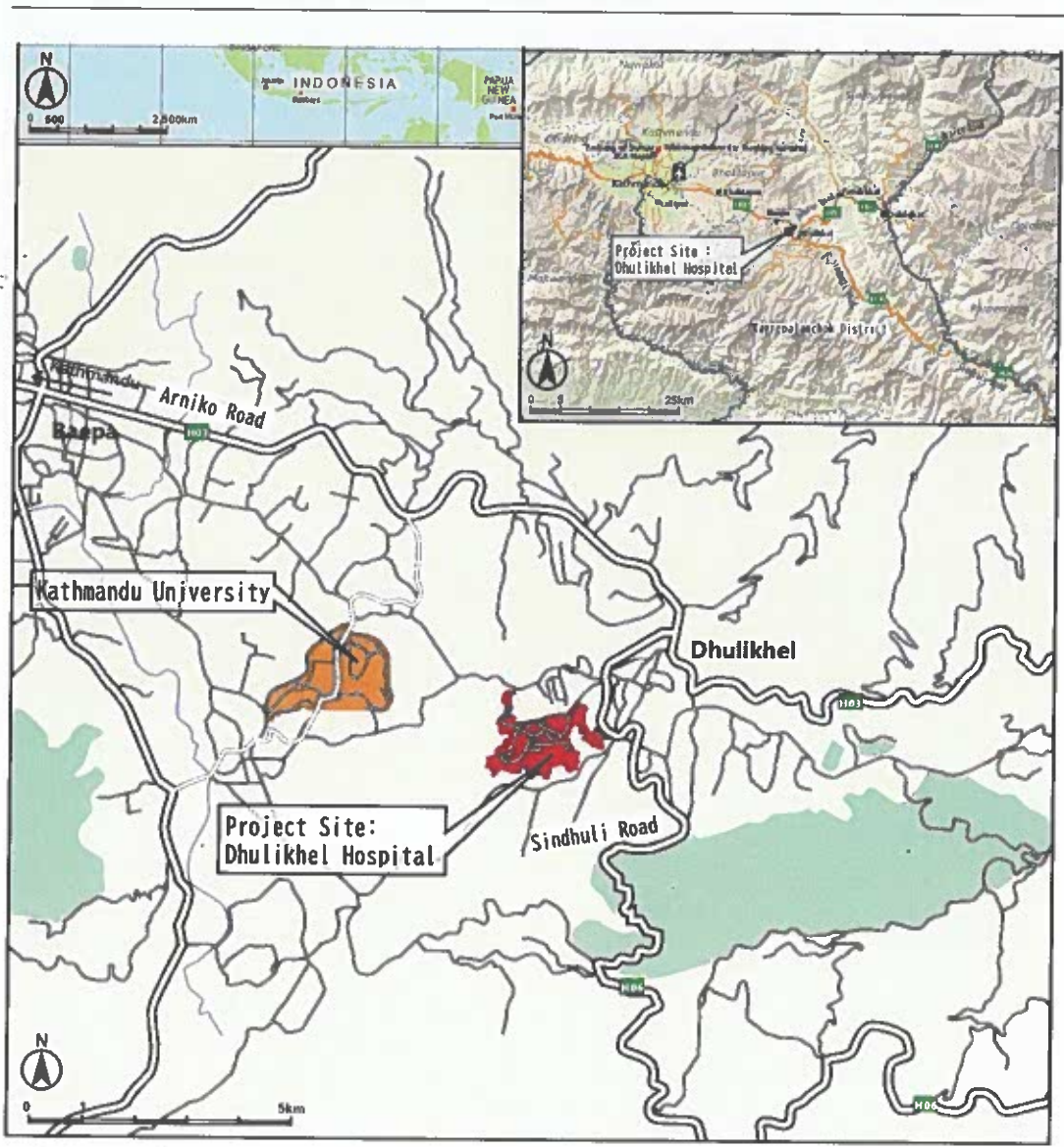
## 1.3. Study Area

The project area is located in Dhulikhel Municipality, Kavrepalanchok District as shown below.

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Source: JICA Study Team

Figure 1.1 Project Location Map-1

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Source: JICA Study Team based on the Google Earth Map

Figure 1.2 Project Location Map-2 (Site A)

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## CHAPTER 2 Land Acquisition and Resettlement Scope

### 2.1. Project Layout Plan and Affected Property

The project area is approximately 6,000m<sup>2</sup> and building area of 1600 m<sup>2</sup>. There are a 5-story building with ground 2 floors and basement 3 floors.

1 plot of the private land, 2 residences and 1 restaurant are located in the project site, the feature of affected properties are shown below;

**Table 2.1 Affected Properties by the Project**

Affected Property	Specification	Current Status as of End of Dec. 2021
1. Restaurant (Cottage-A)	All structures of restaurant is located in the Project area (Leased land of Dhulikhel Hospital)	<ul style="list-style-type: none"> <li>The lease contract between Ministry of Industry and the Kathmandu University has contracted for 30 years 9<sup>th</sup> of June, 2014</li> <li>Payment was done in Sep. 2022</li> </ul>
2. Residence -B	A part of residence is located in the project area	<ul style="list-style-type: none"> <li>A family (4 persons) is living this residence</li> <li>Payment was done in Sep. 2022</li> </ul>
3. Residence-C	Approximately 50% of residence is located in the project area.	<ul style="list-style-type: none"> <li>A family (7 persons) is living this residence</li> <li>Payment was done in Sep. 2022</li> </ul>
4 Private Land -A (0.03ha)	This private land plot is located in the center of project area	Dhulikhel Hospital side has purchased at replacement (market) price and registered this plot app 0.03ha on 13 <sup>th</sup> of April, 2021
5. Private Land -B (0.06 ha)	This private land plot is located in the center of project area	Dhulikhel Hospital side has purchased at replacement (market) price and registered this plot app 0.06 ha on 28 <sup>th</sup> of December 2021

Source: JICA Study Team



Source: JICA Study Team

**Figure 2.1 Affected Properties and Land to be Secured in the Project Area(as of Dec. 2021)**

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**2.2. Efforts to avoid or minimize negative impact on land acquisition and Resettlement**

As a result of alternative analysis for the selection of the project site, Site-A (current project site) has been selected from the view of the proximity to Dhulikhel Hospital, the safety of the approach road and the feature of geology. Although the private land acquisition area has been minimized approximately 900 m<sup>2</sup> of land with 2 landowners, 2 dwellings and 1 restaurant, it is not avoided a few households are impacted by the project.

**2.3. Objective of Resettlement Action Plan**

The main objective of this Resettlement Action Plan is to ensure that no affected persons are worsened off as a result of the Project, and that:

- 1) Adverse social and physical impacts are avoided, minimized, and mitigated;
- 2) Stakeholders, and more importantly the Project-Affected Persons (PAPs), will benefit from the Project;
- 3) All PAPs who stand to lose their respective houses, land or other livelihood assets due to construction/ improving of the project are provided with sufficient compensation and assistance which will help them improve or at least restore their pre-project standard of living; and
- 4) Resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those PAPs.

**2.4. Potential Impacts**

In the preliminary design stage, selecting the alignment that will entail minimal involuntary resettlement and disturbance to the community, particularly in terms of displacement was the main concern for this project. It is however still inevitable that some properties would be affected. In terms of extent and duration of impacts, it will be permanently or temporarily, partially or fully from land acquisition as a result of the Project.

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## 2.5. Summary of Project Impacts

### 2.5.1. Summary of Project Affected Households and Persons

As a result of the census survey, it was found that the total number of affected households (PAHs) of the project was 5, in which three PAPs are tenant and the total number of affected persons (Project Affected Persons: PAPs) was 27. Table 2.2 shows the breakdown of the number of affected households and the number of affected persons.

**Table 2.2 Summary of Project Affected Households and Persons**

Affected Item	Affected Number		of which			
	Total		Relocation Households		Vulnerable households	
	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs
1. Landowner	2	12	0	0	0	0
2. Resident (tenant) at residence	2	11	2	11	2	11
3. Commercial worker (tenant) at cottage restaurant	1	4	1	4	0	0
<b>Total (1+2)</b>	<b>5</b>	<b>27</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>11</b>

Source: JICA Study Team

### 2.5.2. Inventory of Affected Fixed Assets

Summary of the affected properties such as land, structures, are shown below;

Total PAHs and PAPs are 5 and 27 respectively, and affected land area is approximately 0.6 ha. Total affected private land area is 0.09 (ha) and 0.57 (ha) is lease land from the Ministry of Industry. The lease agreement had done between Kathmandu University (KU) and Ministry of Industry on 9th of June, 2014 for 30 years. On the other hand, private land has been purchased at market price by the Dhulikhel Hospital and registered on 13th of April, 2021.

During the inventory survey, 2 residences (Residence B and C) and 1 restaurant have been observed, and maize crop fields have been observed in the project site.

**Table 2.3 Summary of Project Affected Properties**

Affected Item	Affected Number		of which			
	Total		Replacement/Relocation Households		Vulnerable households	
	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs	No. of PAHs	No. of PAPs
1. Land	2	12	0	0	0	0
2. Structure (including residence)	3	15	3	15	2	11
3. Trees and Crops	0	0	0	0	0	0
4. Other Properties (fence/wall secondly structures)	0	0	0	0	0	0
<b>Total (1+2+3+4)*</b>	<b>5</b>	<b>27</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>11</b>

Note) \*Vulnerable Households: Landless (2 HHs PAH03 and 04), Under poverty line (1 HH PAH03), Elderly (1 HH PAH04)

Source: JICA Study Team

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**Table 2.4 Summary of Lands to be Acquired**

No. of Affected Land Owner (No.)	Affected Area (ha)	Land use
2	0.09	Open land

Source: JICA Study Team

**Table 2.5 Inventory of Affected Structures**

No. of Structure Affected	Structure Type	Secondary Structure Affected	Material
2	Residence (tenant land)	Wall, fence	Bamboo, Galvanized iron and clay-soil
1	Restaurant	Wall, fence	made by bamboo, Galvanized iron and wood

Source: JICA Study Team

### 2.5.3. Summary of Socio-Economic Survey Result

Summary of socio-economic surveys are shown below;

**Table 2.6 Summary of Socio-Economic Survey Result**

Item	Summary of Result		
1) Gender	Male-15; Female- 12		
2) Ethnicity (person)	Ethnic group (Janjati)- 23 persons ; Upper caste (bramhn, Chhetri, Thakuri)- 4 persons		
3) Religion	Hindu (5 HHs)		
4) Language	Nepali (5 HHs)		
5) Education Level of Household Heads	Bachelor level (1 HH), Primary School (1 HH), Secondary School (1 HH), Normal reading and writing (not enrolled in school) Level (2 HHs)		
6) Occupation of Household Heads	Business (Private land Restaurant owner (2 HHs), Business (1 HH), Farmer cum wage earner (2 HHs)		
7) Annual Income and Expenditure of PAHs	<b>PAH</b>	<b>Annual Income</b>	<b>Annual Expenditure</b>
	PAH01	6.0 million NPR	5.0 million NPR
	PAH02	1.8 million NPR	1.5 million NPR
	PAH03	0.02 million NPR	0.02 million NPR
	PAH04	0.045 million NPR	0.04 million NPR
8) Vulnerability	PAH05	0.3 million NPR	0.25 million NPR
	Landless (2 HHs:PAH03 and 04), Under poverty line (1 HH: PAH03), Elderly(1 HH: PAH04)		
9) Project Acceptability	Accept (if appropriate compensation is provided)		

Note) [Definition of vulnerable people] elderly more than 60 YO, woman head, under poverty line, disable, indigenous people and landless people.

Source: JICA Study Team

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## CHAPTER 3      Census and Socioeconomic Studies

### 3.1.      Overview and Current Status (as of December 2021)

This section analyzes the findings of the Socio-economic Survey (SES) relevant to the PAHs and PAPs by land acquisition of the project. This section will also analyze findings from the Census and Inventory of Loss Assets (IOL) Survey specific to four households impacted by land acquisition and structures loss in Dhulikhel Municipality ward no 6, Kabhre district under Bagmati province. All compensation and resettlement activities shall follow from these surveys, including individual household compensation entitlements.

Land acquisition of a private landowner for the Private Land-A and Land-B has completed on 13<sup>th</sup> of April and 28<sup>th</sup> of December 2021 respectively through negotiation between Dhulikhel Hospital and the landowners.

### 3.2.      Methodology for Census and Socioeconomic Survey

The section discusses the methodologies for the SES, Census and IOL and analyses findings relevant to impacted households as defined by this RAP. The Census and IOL of first stage were identification of all PAPs at the time of declaring the Cut-Off Date (COD) and all the assets of those PAPs that will need to be compensated. The census and socioeconomic survey was conducted after the cut-off date declaration on 24<sup>th</sup> of July 2021 and 13<sup>th</sup> of November, 2021. Those surveys were conducted by JICA study team joined by officers/staffs from the Dhulikhel Hospital and Dhulikhel Municipality.

As the project is in preliminary stage, delineation of affected structures and identification of project-affected persons was based on preliminary design of the Project for Building Dhulikhel Hospital Trauma and Emergency Center. The land area of the project is plotted in cadastral map and affected land parcels were noted down. One affected private land and tenant structure owners were interviewed with open questionnaires. This census and socio economic survey covers every single household impacted by land acquisition and structure loss. Data of the survey includes information of households affected by the project, information regarding presence of vulnerable people. Moreover, data needed for formulation of necessary relocation assistance schemes for tenant households (HHs) were also collected. Summary of survey components and methodology is presented in Table 3.1.

**Table 3.1 Summary of Survey Components and Methods**

	Survey Component	Method	No. of Survey target
1	Inventory data of occupied land and assets of each household	<ul style="list-style-type: none"> <li>Counting number of facilities</li> <li>Measuring size</li> </ul>	5 Project Affected Households (PAHs) in which 3 PAHs are tenants (2 residences and 1 restaurant) and 2 PAHs are landowners
2	Land use condition	<ul style="list-style-type: none"> <li>Collection of secondary data</li> <li>Direct observation of sites</li> </ul>	
3	Socioeconomic condition of affected households Perception of the household heads regarding the project	By face-to-face interview with questionnaire form including: <ul style="list-style-type: none"> <li>Baseline information on household (name of household head, location etc.)</li> <li>Family structure and education level</li> <li>Income and expenditures by source</li> <li>House structure</li> <li>Properties Owned</li> <li>Period of living and/or business</li> <li>Registration and/or ownership</li> <li>Project awareness/preference</li> </ul>	

Source: Field Survey July 2021: JICA Study Team

### 3.3. Results of the Survey

#### 3.3.1. Profile of Project Affected Households

##### (1) Gender

Table 3.2 shows the number of PAHs based on the census survey. According to the survey result, out of 5 PAHs, 4 are male headed and 1 is female headed households.

**Table 3.2 Gender of PAHs**

Gender of Household Head	No.	Rate (%)
Male headed HH	4	80%
Female headed HH	1	20%
<b>Total</b>	<b>4</b>	<b>100%</b>

Note) Address of the affected area: Dhulikhel Municipality Ward-6

Source: JICA Study Team

##### (2) Ethnicity

Distribution of PAHs by ethnicity is presented in Table 3.3. It is found that 4 HHs are from janjati (ethnic) and 1 HH is upper caste (Chhetri).

**Table 3.3 Ethnicity of PAHs**

Janjati	Brahmin/Chhetri	Others	Total
4	1	0	5

Source: JICA Study Team

##### (3) Religion

Table 3.4 shows the distribution of PAHs by religion in the project site. As a result of the survey, 100% of the PAHs in the project area are Hindu.

**Table 3.4 Religion of PAHs**

Hindu	Christian	Islamic	Hindu	Total
5	0	0	0	5

Source: JICA Study Team

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(4) Daily Languages of PAHs

Daily language used by PAHs is shown in Table 3.5. It shows that all of the PAHs in project area communicate in Nepalese languages on daily basis. However, sometime they communicate on their native language too.

**Table 3.5 Daily Language Used by PAHs**

Nepali	Tamang	Others	Total
5	0	0	5

Source: JICA Study Team

(5) Education Level of Household Heads

The education level of household heads shown in Table 3.6. In accordance with the surveyed results, there are 2 household heads that have the informal education (not enrolled in school), 1 household head has secondary level, 1 household head has completed the higher secondary level, and remaining 1 household head accomplished University/Graduate level.

**Table 3.6 Education Level of Household Heads**

Education Level	No.	Rate(%)
No education	0	0.0
Informal education: normal reading and writing (not enrolled in school)	2	40.00
Secondary level	1	20.00
High School	1	20.00
Bachelor level	1	20.00
<b>Total</b>	<b>5</b>	<b>100.0</b>

Source: Field Survey July 2021 by JICA Study Team

(6) Occupation of Household Heads

Table 3.7 shows the main occupation of household heads in the project area where the Trauma and Emergency Medical Center is going to be built. It is found that in Dhulikhel Municipality ward no 6, 3 household heads are business person in which one is operating hotel/restaurant, other one is grocery business, another one is clothing business. Remaining two household heads in the same village are wage earner and do some farming in tenant land. However, wage earning is their main occupation. The percentage ratio is 60 percent have business related occupation and remaining 40 percent are wage earner. This result shows that the business and wage earner are the major occupation in the project area.

**Table 3.7 Occupation of Household Heads**

Category	No.	%
Business	3	60.00
Wage Earner	2	40.00
<b>Total</b>	<b>5</b>	<b>100.0</b>

Source: JICA Study Team

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### 3.3.2. Socioeconomic Condition of Project Affected Households

#### (1) Annual Income and Expenditure of PAHs

Table 3.8 shows the annual income and expenditure of the PAHs in the project area. According to the survey result, the PAHs have an annual income between 20,000 – 6,000,000 NPR and expenditure is between 20,000 and 5,000,000 NPR in the project area.

Since the poverty line in Nepal is 191.1 (22,371 NPR), 1 AHH is categorized as a “Under Poverty Line.

**Table 3.8 Annual Income and Expenditure**

PAH	Annual Income (NPR)	Annual Expenditure (NPR)
PAH-A	6,000,000	5,000,000
PAH-B	1,800,000	1,500,000
PAH-C	20,000	20,000
PAH-D	45,000	40,000
PAH-E	300,000	250,000

Source: JICA Study Team

#### (2) Vulnerability

In Nepal, there is no official definition of vulnerable groups at present. In this project, however, particular attention is paid to respective groups. For vulnerable groups, the project defines a household headed by woman, a household headed by elderly (over 60 years old), a household including a person with disability, a household below the poverty line, a household including indigenous peoples, a household headed by child and a landless households by referring JICA and other international practices.

Regarding with the poverty line, according to the Government of Nepal, 18.7 percent Nepali population are living under the poverty line currently. Per capita annual income is NPR 22,371 and 191.121 USD. Table 3.9 shows that there are 2 vulnerable households in the project area. The survey shows that, these two HHs are tenant and they do not have their own land. Hence, the project categorized them as a vulnerable HHs based on landless criteria.

**Table 3.9 Number of Vulnerable People among PAHs**

Category	No.
Household headed by woman	0
Household headed by elderly person (over 60)	1
Household including a person with disability	0
Household below the poverty line and/or landless households	2
Household including indigenous peoples	0
Household headed by child	0
<b>Total</b>	<b>2</b>

Note) 1 PAH(Project Affected Household) is landless and under the poverty line  
Source: JICA Study Team

#### (3) Project Acceptability

As shown in Table 3.10, 100 % of PAHs expressed a positive response or accepted the project. The raised positive and negative opinions are as follows;

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[Opinions]

- Since the project improves emergency health facilities particularly for fatal injuries by road accident or other cause, implementation of the project should be conducted soonest.
- However sufficient and fair compensation should be paid on time

**Table 3.10 Project Acceptability**

Yes		No	
Number	%	Number	%
5	100	0	0

Source: Field Survey July 2021 by JICA Study Team

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## CHAPTER 4 Policy and Legal Framework

### 4.1. Relevant Laws and Regulations in Nepal

Currently in Nepal, there is a major act for land acquisition and resettlement if Land Acquisition Act 1977 with subsequent amendment in 1997 and 2020. The Land Acquisition Act, enacted in 1977 is still the legal basis for land acquisition in Nepal. Besides, Land Acquisition, Resettlement and Rehabilitation Policy (2015) is another policy prepared by the National Planning Commission of Nepal. The Land Acquisition Act 1977 determines the land acquisition for public infrastructure construction. Resettlement-related issues are depicted in some of the existing laws and regulations. However, the LA act 1977 ensures that notwithstanding anything contained elsewhere in this Act, Government of Nepal may acquire any land for any purpose through negotiations with the concerned landowner. It shall not be necessary to comply with the procedure laid down in this Act while acquiring lands through negotiations relevant Nepal laws and regulations for land acquisition and resettlement that are applicable to Building Trauma and Emergency Medical Center at Dhulikhel Hospital. Below table presents Relevant Laws in Nepal.

- |   |
|---|
| <ul style="list-style-type: none"><li>- Constitution of the Federal Republic of Nepal, 2015</li><li>- Land Acquisition Act, 1977 (Amended in 1997 and 2020)</li><li>- Land Acquisition, Resettlement and Rehabilitation Policy, 2015</li><li>- Environmental &amp; Social Management Framework (ESMF), 2007 with amendment 2013</li><li>- Local Self Governance Act, 1999</li><li>- The Land Revenue Act, 1992</li><li>- Guthi Sansthan Act, 1976</li><li>- The Forest Act, 2019</li><li>- Gender Equality Act, 2006</li><li>- Land Reform Act, 1942</li><li>- Child Labour Act, 2000</li></ul> |
|---|

Source: Nepal Law Commission

Among these national laws, relating clauses in key laws are shown as follows.

#### 1) Land Acquisition Act (1977)

The Land Acquisition Act, 1977 has been enacted to integrate the laws for Acquisition of Land, and partially updated in 1997 and 2020 by its subsequent amendment. The process of land acquisition for public purpose has two types as follows.

In this project, since there are few private land owners, the hospital will negotiate directly. Additionally, based on the Land Acquisition Guidelines (1989), related governmental organizations shall grasp the living standards of affected households. In addition, the amount of compensation for land and buildings is determined with reference to similar market prices.

#### a) Establishment of Compensation Determination Committee

In the case of public works projects that require negotiations with a large number of landowners, an organization called the Compensation Determination Committee (CDC) will be formulated to negotiate with the landowners that has been provisioned in LA act 1977.

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b) Direct Negotiation with Landowners

In the case of small businesses or individual purchases that require negotiations with a small number of landowners, the business entity negotiates with the landowners themselves. The act reveals that, notwithstanding anything contained elsewhere in the act, Government of Nepal may acquire any land for any purpose through negotiations with the concerned landowner. It shall not be necessary to comply with the procedure laid down while acquiring lands through negotiations.

2) **Environmental and Social Management Framework (ESMF), DOR, (2007 with subsequent amendment in 2013)**

The project is not categorized as road project, however, the hospital side has agreed to follow this ESMF through discussion with JICA Study Team in April, 2021.

This Environmental and Social Management Framework report (ESMF) is prepared for the Department of Roads (DOR) to compile in an overview and guidance manner, various safeguard and compliance aspects of environmental and social issues related with the Sector Wide Road Program and the Priority Investment Plan Study for Nepal's Strategic Road Network (SRN) planning for 2007 to 2016. The Study commenced in September 2005 and was completed in December 2006. The ESMF intends to provide technical and managerial inputs and guidance into the design of the strategic roads (both designated for rehabilitation and, to lesser extent, to new construction), through identification of key environmental and social issues related to the foreseen projects (hereunder referred as "SRN sub-projects"), mitigate potential impacts and concerns and, devise opportunities to enhance the benefits. The framework integrates in a step-wise approach the most important environmental and social considerations into all stages of project preparation, implementation, monitoring and operation and is applicable to all future sub-projects funded under the SRN program. The ESMF is applicable to all proposed subproject activities and through all stages of the subproject cycle, i.e. from pre-planning, planning and design, implementation to post- implementation. The design flow of ESMF activities will be coordinated and integrated into the project cycle.

4.2. **JICA's Policy on Resettlement**

JICA has policies on resettlement, which are stipulated in JICA Guidelines on Environmental and Social Considerations (April, 2010). The key principle of JICA policies on involuntary resettlement is summarized below:

- a. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.
- b. When, population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.
- c. People who must be resettled involuntarily and people whose measures of livelihood will be hindered or losses must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.
- d. Compensation must be based on the full replacement cost as much as possible.

- 
- e. Compensation and other kinds of assistance must be provided prior to displacement.
  - f. For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.
  - g. In preparing a resettlement action plan, consultations must be prompted in the planning, implementation, and monitoring of resettlement action plans.
  - h. Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. In addition to the above policies, JICA also applies for the following policies stipulated in World Bank OP 4.12.
  - i. Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advantage of such benefit.
  - j. Eligibility of Benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.
  - k. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.
  - l. Provide support for the transition period (between displacement and livelihood restoration).
  - m. Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.
  - n. For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, an abbreviated resettlement plan is to be prepared.

### 4.3. Gap Analysis

In principle, there are no significant gaps between the JICA Guidelines and Nepal laws. The comparisons between the Nepal laws and JICA Guidelines for Environmental and Social Considerations (April, 2010) are shown in table below.

**Table 4.1 Comparisons between Laws in Nepal and JICA Guidelines**

No	JICA Guidelines	Laws and Guidelines in Nepal	Gap between JICA GL and Laws in Nepal (Lower column)	Project Policy
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	The adverse impacts can be minimized or avoided or dealt with positive and constructive ways (1.1.1, ESMF)	There is no significant difference.	Follow JICA GL
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	-The adverse impacts can be minimized or avoided or dealt with positive and constructive ways (1.1.1, ESMF)  -Government of Nepal may, if it so deems necessary, acquire any land at anyplace for any public purpose, subject to compensation under this Act (Article 3, Land Acquisition Act)	There is no significant difference	Follow JICA GL
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Thus, the affected persons in the project will be entitled to various types of compensation and resettlement assistance that will help in the restoration of their livelihoods, at least, to the pre-project standards (7.3.1, ESMF)	There is no significant difference	Follow JICA GL  The project considers the assistance to improve or restore the livelihood.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	When GON requires assets, national law does not specify about the provision of mandatory replacement cost. Therefore, ESMF strongly recommended that. Practical provisions must be made for the compensation for all lost assets to be made at replacement cost without depreciation or reductions for salvage materials. Efforts must be made to assess the real replacement costs of land to the extent possible. A procedure should be established for determining compensation rates accurately plus rigorous efforts to assess the replacement costs and market rates for all assets, including labour costs for construction.	There might be gaps on determination of compensation rate between Nepali side and the JICA Environment Guidelines. In the past cases, deduction and/or using government fixed rate lower than market price are common.	Follow JICA GL  The result is compared with the government's official unit price for determining validity.

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No	JICA Guidelines	Laws and Guidelines in Nepal	Gap between JICA GL and Laws in Nepal (Lower column)	Project Policy
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	ESMF referred OP 4.12. The measures (i.e. the RP) include provision of compensation and of other assistance required for relocation, prior to displacement, and preparation and provision of resettlement sites with adequate facilities, where required.	There is no significant difference.	Follow JICA GL
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	ESMF regulated RAP preparation and disclose to the PAPs	There is no significant difference.	Follow JICA GL The project will hold consultations with the affected people and their communities on sufficient information made available to them in advance
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	-In Chapter 5, the section of 2.2.1: The Procedural Steps in Road IEEs and EIAs of ESMF, and other sections covers all conditions concerning public participation/consultation. -Domestic EIA procedure supported by some conditions in ESMF requires public consultation meeting	There is no significant difference.	Follow JICA GL The consultation will be held at initial stage and after preparation stage during JICA's preparatory survey.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)			Follow JICA GL The project considers appropriate explanation when consultations are held by using local language.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)			Follow JICA GL The project considers the appropriate participation of affected people.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	5.1 and 7.5 of ESMF stipulated establishment of grievance redress mechanism (GRM)	There is no significant difference.	Follow JICA GL The project considers the grievance redress mechanism by utilizing the existing administration system to be convenient for PAPs.
11	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers or others who wish to take advantage of such benefits. (WB OP 4.12)	N/A *Cut-off date is recommended to set as the date of Census survey (7.2.3, ESMF)	There is no direct regulation of recommendation regarding the item.	Follow JICA GL Based on the JICA's Environmental Guidelines, the cut-off date is explained at the 1st time stakeholder meetings. In case that certain time, e.g. two years, will have passed since the cut-off-date declaration before land acquisition is commenced, Census and other relevant field surveys shall be updated and revised with the latest situation.

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No	JICA Guidelines	Laws and Guidelines in Nepal	Gap between JICA GL and Laws in Nepal (Lower column)	Project Policy
	Para. 6)			
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP 4.12 Para. 15)	In the proposed project, the absence of formal titles will not be able to resettlement assistance and rehabilitation (7.3.1, ESMF)	In Nepal laws and applicable ESMF prescripts, that the persons who does not have any evidence are not compensated. On the other hand, JICA guidelines stipulates to compensate for the persons who don't have formal legal rights.	Follow JICA GL  The project considers eligibility for assistance to all households whose income sources or assets are confirmed as affected due to project implementation.
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP 4.12 Para. 11)	Not Applicable	Cash for land is the common way of compensation for both formal and informal land cases in Nepal, and PAPs also prefer to cash compensation generally.	Follow JICA GL  The project considers the land-based resettlement strategies.
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP 4.12, para.6)	Not Applicable	The item is not clearly mentioned even in ESMF. Some kinds of assistance have a function to support such transition period.	Follow JICA GL  The project considers the support for the transition period.
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities, etc. (WB OP 4.12 Para. 8)	8.3 of ESMF or the part of Entitlement Matrix stipulated the considerations scheme for such vulnerable groups	There is no significant difference.	Follow JICA GL  The project pays particular attention to vulnerable groups.

Source: JICA Study Team

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## CHAPTER 5 Compensation Entitlements and Entitlement Matrix

### 5.1. Cut-off Date for Entitlement

The Cut-Off Date (COD) for entitlements is recognized by international institutions such as WB and JICA. It is a tool to determine eligibility for entitled assistance. The COD is set on in order to avoid influx of population into the project area, and people who encroach on the area after the COD are not entitled to compensation or any other form of resettlement assistance. Although the census begins normally on the COD, the COD could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated, according to World Bank OP 4.12. Based on the concept, the COD for this project was declared on 24th of July and 13th of November 2021 by Dhulikhel Hospital under MoHP. In addition, PAPs (Project Affected Persons) were reminded verbally several times during PAPs meetings, census, Socio-Economic Survey (SES) and interview surveys.

As mentioned, additional land and structure development is to be limited after the COD, and the policy is being explained and understood among the PAPs in occasions such as public consultation meetings, interviewing, etc. In addition, local administrations and local officials of MOHP in charge of the matter monitor the situation and try to collect information on unfair development or illegal encroachment of people from the dwellers and so on.

### 5.2. Entitlement Matrix

The entitlement matrix is a matrix to systematically show the relations of compensation, which includes type of loss, application, person entitled, assistance policy and responsible entity. The matrix is developed based on the impact identified through the census survey and other related activities. In this Project, the Entitlement Matrix was prepared to show the eligibility conditions and the main compensation measures proposed to PAPs according to the type of impact. It should be noted that depending on the type of impact, the PAP may be eligible for one or more compensation measure.

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Table 5.1 Entitlement Matrix

	Type of loss/ impact	Application	Eligible Persons	Entitlements	Implementation issues
1	Land				
1.1	Residential or Farm Land	Full or Partial Impact	Land owner/ Occupant or a person who has recognizable right to claim to the land	<p>(A) Cash compensation at replacement cost for the affected land area or Provide full title to land of equal area and productivity acceptable to owner in the vicinity.</p> <p>(B) Resettlement assistance in lieu of compensation for land occupied (land, other assets, employment) at least restore their livelihood living standard to pre-displacement levels</p> <p>(C) In the case of farm land, the PAPs will be entitled the cultivation disruption allowance equal to one-year production</p> <p>(A) Allowance for finding of new land is paid for 6 months of rent * if the landlord refund lease fee, this is not applicable</p>	<p>a) Valuation for land undertaken by the project authorities should respect the results of replacement cost survey and the RAP supported by JICA's preparatory survey</p> <p>b) Direct negotiation with the landowner can be done for land valuation as per Land Acquisition Act clause 27</p> <p>c) Notice to vacate will be served at least 35 days prior to acquisition.</p> <p>d) Compensation and relevant assistance must be paid and conducted in advance at least before the notification of relocation</p>
2	Structure				
2.1	Private Residential House	Loss of partial or full houses	House owner regardless of tenure status	<p>(A) Cash compensation at full replacement cost with no depreciation, according to house type. For houses and structures the market cost of the materials and labor to build a replacement structure of a similar quality or better than the affected structure.</p> <p>(B) If the owner wants to relocate using the materials of the current building, the cost of dismantling, transporting, reassembling are paid in cash.</p> <p>(C) Assistance to repair the remaining portion of structure in case of partial impacts, or full compensation is carried out from the view of safety</p>	<p>a) Valuation for structures undertaken by the project authorities on the basis of standard norms of Department of Urban Development should respect the results of replacement cost survey and the RAP supported by JICA's preparatory survey</p> <p>b) Construction material can be salvaged by PAPs</p> <p>c) Deduction from the full replacement cost is not allowed</p> <p>d) Displaced households will receive a housing displacement allowance and transportation cost.</p> <p>e) Notice of relocation will be given at least 35 days prior to the land clearance</p> <p>f) Compensation and relevant assistance must be paid in advance at least before the notification of relocation</p>

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Type of loss/ impact	Application	Eligible Persons	Entitlements	Implementation issues
2.2 Other Structure (Secondly Structure)	Loss of partial or full structure	House owner regardless of tenure status	Same as 2.1	In addition to above conditions of the case of 2.1: a) Other structures include: fence, walls etc. b) Only the case of loss of structures is not eligible for the displacement allowance.
3 Loss of Business/work/e employment				
3.1 Loss of Business (Hotel/ Restaurant other business)	Direct impact the business	Owners of the business (hotel/stop/restaurant/other business)	(A) One time cash assistance for the income loss during the period of the business disruption while the remaining structure is being repaired	a) One-time cash assistance will be paid equivalent to two (2) -month's income based on the nature of business for re- establishing the businesses at the alternative premise. Shifting allowance (transport plus loading / unloading charges) will be paid to affected businessmen (if applicable), on actual cost basis. The amount of deposit or advance payment paid by the business tenant to the landlord will be deducted from the payment of the landlord a) APs who are eligible for semi-skilled and unskilled labor will be given priority employment opportunities in the Project's implementation works
3.2 Loss of wages by Employees	Income reduced during period of readjustment	Employees of business	(A) One-time financial assistance to hired employees equivalent to 30 days wages to be computed based on local wage rate as determined by Compensation Determination Committee (CDC)	
4 Rehabilitation Assistance				
4.1 Relocation stabilization assistance		Displaced household	Housing displacement allowance for loss of own residential accommodation.	a) Displaced households will receive a displacement allowance equal to 90 days minimum wage rate as established at the national or local level. b) Allowances will be paid at the time of serving the notice to vacate.
4.2 Special assistance for vulnerable people		Women headed households, Dalit households, disable, elderly more than 60 y.o. and below poverty level, landless people.	Special allowance for stabilization of livelihood	a) Cash assistance for 90 days at the local agricultural wage rate for respective district. b) Assistance in re-establishment and improvement of livelihood c) Preferential employment of the project to the extent possible.
4.3 Transportation Assistance		Relocation household	(A) One-time cash assistance for transportation cost for moving	a) The transportation assistance amount will be determined during the RAP updating

Source: JICA Study team

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## CHAPTER 6 Implementation Framework

With regard to the land acquisition of privately owned land in this project, the Dhulikhel hospital (DH) has formed a committee to acquire land directly through negotiation with the landowner. The DH has already been acquired 300 m<sup>2</sup> private land from the one landowner on April 2021 through negotiation process which is also stipulated in the Land Acquisition act 1977 (clause 27) of Nepal. This process is carried out under the supervision of the Ministry of Health and local governments. The process and organization of the land acquisition and compensation is shown in as shown below

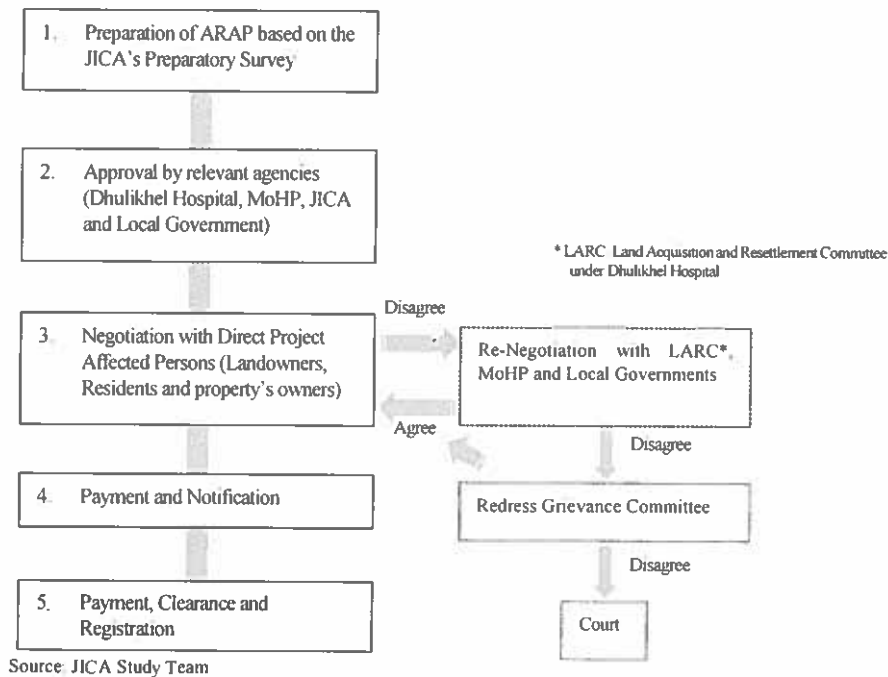


Figure 6.1 Process of the ARAP Implementation

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**Table 6.1 Roles of Organizations to Implement the Resettlement Action Plan**

Organization	Composition	Major Roles
1. Land Acquisition and Resettlement Committee under Dhulikhel Hospital (LARC)	Representative members of Dhulikhel Hospital	<ul style="list-style-type: none"> <li>• Overall Execution of the Project</li> <li>• Directs the PMU</li> <li>• Responsibilities for approving Updated ARAP (UARAP), if necessary</li> <li>• Securing resources for compensation based on the final approved ARAP</li> </ul>
2. Project Management Unit (PMU)	Ministry of Health and Population (MoPH) Board Member of Dhulikhel Hospital	<ul style="list-style-type: none"> <li>• Responsibilities to update ARAP during the Detailed Design Stage, if necessary</li> <li>• Responsibility to coordinate all organizations concerned on ARAP activities after the preparatory survey stage</li> <li>• To supervise ARAP implementation activities after the preparatory survey</li> </ul>
3. Local Government (Dhulikhel Municipality, Kavrepalanchowk districts, Bagmati Province)	MoHP, DH and Dhulikhel municipality	<ul style="list-style-type: none"> <li>• To monitor encroachment of illegal settlers into the project area after declaration of the Cut-off-Date</li> <li>• To cooperate negotiation between Dhulikhel Hospital and Direct Project Affected Persons</li> </ul>
4. Grievance Redress Committee	Member of LARC, Local Government, MoHP, NGO (if PAPs request)	<ul style="list-style-type: none"> <li>• Resolution of opposition from PAPs</li> </ul>

Source: JICA Study Team

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## CHAPTER 7 Grievance Redress Mechanism

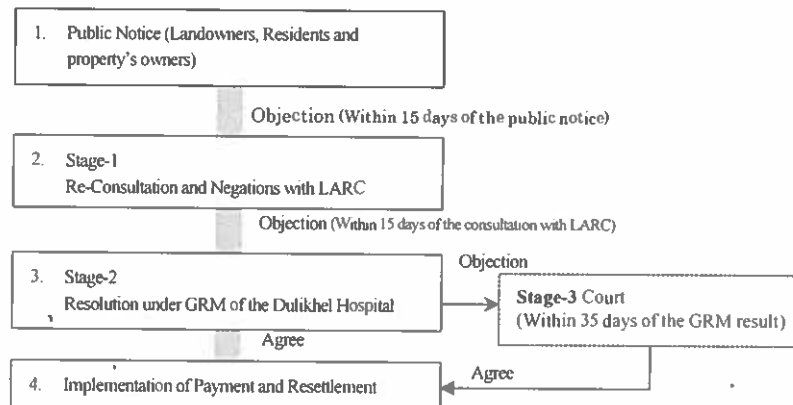
Agencies in charge of implementing the procedure for handling grievance during compensation and land acquisition in the project affected areas should be established as Grievance Redress Committee (GRC) of the Project. Detailed procedures on handling grievances will be established for the Project to ensure that PAPs have the opportunity to present their complaints about compensation and resettlement. PAPs have formal option to appeal GRM of the Dhulikhel Hospital and the court as shown in Table 7.1

**Table 7.1 Process and Role Grievance Redress Mechanism**

Stage	Process
Stage-1	Complaints of PAPs on any aspect of compensation, resettlement, or unaddressed losses shall in first instance be settled verbally or in written form in Land Acquisition and Resettlement Committee (LARC) of the Dhulikhel Hospital. The complaint can discuss with member(s) of LARC in an informal meeting. LARC shall explain detailed compensation policy such as the entitlement and eligibility and survey results.
Stage-2	If the conflict(s) between LARC and PAP(s) is not solved, PAP(s) is able to appeal with GRM. The PAP(s) can be accompanied by NGOs, village/community leader(s) in the discussion of GRM. GRM shall reassess the findings and then arbitrate the complaint
Stage-3	If the PAP(s) is not satisfied with the decision of the GRM, within 35 days of the complaint, the PAP(s), in his/her last resort, may submit its case to the court.

Source: JICA Study Team

Proposed mechanism for grievance resolution is given below:



Source: JICA Study Team

**Figure 7.1 Grievance Redress Mechanism and Process**

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## CHAPTER 8      **Monitoring Activity**

Internal and external monitoring for the implementation of ARAP in the project shall be carried out in accordance with relevant laws and guidelines. The main purpose of monitoring is to ensure that PAPs have been adequately compensated and paid for lost assets in accordance with the policies and procedures set out in the ARAP. The main tasks and responsible bodies for internal and external monitoring are as follows.

### **8.1.      Internal Monitoring**

Internal monitoring will be carried out by LARC. The main activities are as follows.

- a) Appropriate management and monitoring of the implementation of approved RAPs
- b) Ensuring timely and appropriate compensation payments based on agreements with PAPs
- c) Recording of all complaints from PAPs and their resolution process and results.

### **8.2.      External Monitoring**

External monitoring is carried out by an independent body employed by LARC, if necessary. The main activities are as follows.

- a) Monitoring the implementation of appropriate compensation and resettlement in accordance with the ARAP
- b) Recommendations for implementing RAP in accordance with JICA guidelines and related laws, if necessary

Examples of RAP monitoring form and TOR for External Monitoring are shown in **Appendix** .



## CHAPTER 9 Information Disclosure, Consultation and Participation

### 9.1. Background and objectives of the consultation

Public consultation is an important phase in the implementation and success of RAP implementation. It is an activity that consists of holding meetings to inform the public about the Project and gather the opinions and suggestions of the affected people. The objective is to sufficiently involve the populations to obtain their adhesion to the Project. Thus, the Project must inform, consult and give the opportunity for the Project Affected Persons to participate in all stages of the process in a constructive manner.

Insofar as the land acquisition and resettlement for public purpose is the Government action that may affect the well-being of the population, it is mandatory that the people affected by the Project be fully informed of the intentions of the public authorities. Project disclosure and consultation at an early stage provides a good venue for PAPs to express their opinions, apprehensions, and even objections. It opens grounds for discussion, and allows the Implementing Office to address issues raised, most of which can be incorporated into the final design and resettlement plan.

Generally in the ARAP preparation process, meetings inviting PAPs in different two stages are planned, firstly prior to the preparation of ARAP and secondly after preparation of Draft ARAP. Table 9.1 shows the general objectives of the meeting in each stage.

**Table 9.1 Activities for ARAP Meetings**

Objectives (Date and Venue)	Agenda	Major Participants	Announcement
<b>1<sup>st</sup> Meeting for 2 residences and 1 structure owner</b>  (11:00-14:00, 24 <sup>th</sup> of July, 2021/ Project site /Dhulikhel Hospital)	1. Introduction of project 2. Explanation of necessity of resettlement and relocation 3. Explanation of Cut of Date 4. Explanation of Census and Socio-economic survey 5. Explanation of basic compensation policy 6. Implementation of ARAP Survey	<ul style="list-style-type: none"> <li>• Participants                              Project Affected Persons (PAPs- non title holders/tenants), Dhulikhel hospital, JICA Study Team (Local consultant)</li> <li>• Number of Total Participants:                              13 (Male: 10, Female: 3)                             <ul style="list-style-type: none"> <li>- PAPs: 7</li> <li>- Dhulikhel Hospital: 1</li> <li>- JICA Study Team (Local consultant): 5</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Method:                              Direct inviting by telephone</li> <li>• Language:                              Nepali</li> </ul>
<b>1<sup>st</sup> Meeting for 1 land owner for Plot No.230</b>  (12:00-13.30, 13 <sup>th</sup> of November, 2021/ venue: Project Site)	1. Introduction of project 2. Explanation of necessity of resettlement and relocation 3. Explanation of Cut of Date 4. Explanation of Census and Socio-economic survey 5. Explanation of basic compensation policy and the entitlement matrix 6. Implementation of ARAP Survey	<ul style="list-style-type: none"> <li>• Participants                              Project Affected Persons (PAPs, Dhulikhel hospital, JICA Study Team (Local consultant)</li> <li>• Number of Total Participants:                              7 (Male: 5, Female: 2)                             <ul style="list-style-type: none"> <li>- PAPs: 2</li> <li>- Dhulikhel Hospital: 1</li> <li>- JICA Study Team (Local consultant): 3</li> <li>- Community people: 1</li> </ul> </li> </ul>	
<b>2<sup>nd</sup> Meeting for the 2 residences and 1 structure owner</b>  Explanation of draft ARAP report and the Entitlement Matrix (14:00-16:00, 13 <sup>th</sup> of November, 2021/ Venue: Project site)	1. Introduction of project 2. Explanation of compensation policy (the Entitlement Matrix) 3. Conclusion of the consensus of compensation policy	<ul style="list-style-type: none"> <li>• Participants                              Project Affected Persons (PAPs- non title holders/tenants), Dhulikhel hospital, JICA Study Team (Local consultant)</li> <li>• Number of Total Participants: 14                              (Male: 9, Female: 5)                             <ul style="list-style-type: none"> <li>- PAPs: 10</li> <li>- Dhulikhel Hospital: 1</li> <li>- JICA Study Team (Local consultant): 3</li> </ul> </li> </ul>	

Source: JICA Study Team

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## 9.2. Result of the PAPs Meeting

The main opinions and answers are as follows. Some opinions were raised regarding the implementation of this project, but there were no objection of the implementation of the project, and it is understood that a basic consensus on the implementation of the project was formulated.

**Table 9.2 Major Opinions and Answers in the ARAP Meeting**

ARAP Meeting	Opinion/Question (Questioner)	Answer (Respondent)	Reaction of Questioner	Item to be reflected to the Project or ARAP
1 <sup>st</sup> ARAP Meeting (For 2 residences and 1 restaurant owner) (24 <sup>th</sup> of July, 2021)	1. When the construction starts?	The schedule of the project implementation is not fixed yet, however, the hospital side would like to proceed a series of land acquisition process after the meeting (Dhulikhel Hospital side)	Accept the answer	Nothing
	2. Will prior notice publish for demolish of structures	The Hospital management will issue prior notice	Accept the answer	Reflected to the Entitlement Matrix
	3. How does valuation carry out for the structures?	Valuation will be carried out by the competent engineer from Dhulikhel Hospital as a market rate without depreciation	Accept the answer	Reflected to the Entitlement Matrix
	4. Does landlord refund the advance payment?	Project (resettlement team) will facilitate to landlord for refund	Accept the answer	Nothing
1 <sup>st</sup> ARAP Meeting (For 1 landowner of Plot No. 230) (13 <sup>th</sup> of November, 2021)	1. When the construction starts?	The schedule of the project implementation is not fixed yet, however, the hospital side would like to proceed a series of land acquisition process after the meeting (Dhulikhel Hospital side)	Accept the answer	Nothing
	2. When will conduct ownership transfer of the land?	Most probably by the end of December 2021.	Accept the answer	Nothing
	3. Is there any employment opportunity for a family member?	During and after construction, occupation vacancy may be announced. DH will consider based on the capability.	Accept the answer	Nothing
	4. Is there any discount provided for the treatment?	Not yet known.	Accept the answer	Nothing
2 <sup>nd</sup> ARAP Meeting (For 2 residences and 1 restaurant owner) 13 <sup>th</sup> of November, 2021	1. When compensation and other allowances will be distributed?	After approval of final ARAP by the DH and JICA	Accept the answer	To be confirmed in the monitoring
	2. Is unskilled labour get opportunity in construction works?	Contractor, JICA and DH will decide on this. Not yet known	Accept the answer	Nothing
	3. When does ownership transfer of plot 230 take place?	Most probably by the end of December 2021.	Accept the answer	Nothing

Source: JICA Study Team

## 9.3. Activity on Information Disclosure

Another important activity for promoting the people's understanding of the Project is information disclosure. Explanation and discussion in the public consultation is part of the information disclosure and the ARAP document and the related information of the ARAP is

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required to be disclosed in accordance with JICA guideline and WB OP4.12. Apart from the public consultation (socialization), the activity of information disclosure is planned as below.

1) Preparatory Survey stage (ARAP preparation stage)

In the Preparatory Survey stage, the finalized this ARAP (in English) will be uploaded on JICA's website and made available to the public.

Additionally any PAPs can read and make copy the approved ARAP in Nepali and English at the Dhulikhel Hospital and Dhulikhel Municipality.

2) Detail Design stage (Updated RAP)

ARAP will be updated if the affected area and/or affected project persons are added during detailed design stage. After updating ARAP in DD stage, the approved updated ARAP will be translated into Nepali and disclosed in the location where APAPs can access it, such as local administration offices.

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## CHAPTER 10 Cost and Financing

The affected area of the project has been fixed at the preparatory survey stage, and the land acquisition of private land was completed in April and December 2021 by the Dhulikhel Hospital side before implementation of actual site survey under the preparatory survey. However, cost of relocated structures, acquired land, economic loss, rehabilitation cost and administration cost is valued and calculated in this chapter.

### 10.1. Basic Calculation for Compensation Amount

#### 10.1.1. Basic Methodology for the Estimation Cost

In this ARAP, approximate costs are estimated based on the results from the Replacement cost survey (RCS), socio-economic survey and other related information. Basic calculation methods are as follows and valuation and detailed calculation method is provided in **Appendix**.

- Cash compensation for the loss of all types of lands including (Crop Land, Garden Land, and Residential Land): the amount is calculated based on current market prices and information obtained by interviews with local PAPs and local government as well as examples of a neighboring similar projects.
- Cash compensation for the affected structures: this amount is calculated based on market prices of construction materials, construction fee and interviews with the structure owners. Additionally, the cost for structures have been valued engineers and architect of the Dhulikhel Hospital and calculated. It is noted that depreciation of the asset and value of salvage materials are not taken into account.
- Vulnerable allowance for the Vulnerable People such as (i) Under poverty line households, (ii) Female headed households, (iii) Households including a person with disability, (iv) Households headed by elderly, (v) landless households, (vi) ethnic minority are applied up to 90 days of district agriculture wage rate/day in this Project based on minimum subsistence level.
- Other special assistance such as relocation stabilization assistance are referring to other projects as well as coordinated with the plan of road section.

#### 10.1.2. Result of Replacement Cost Survey

The result of valuation survey for the structures are shown below. Additionally valuation of the land price has been carried out from the view of validation.

As described in previous article, valuation of structures has been conducted by the architect, and validation of land price has been done by interview with local government and real estate companies.

**Table 10.1 Result of Replacement and Relocation Cost Survey**

Item		Result of Valuation	Result of Validation
Structure	Restaurant Cottage-A (33.48 m <sup>2</sup> ) (including secondly structures)	281,892 NPR (Relocation Cost*)	Market price without depreciation
	Residence B (25 92 m <sup>2</sup> ) (including secondly structures)	81,676 NPR (Replacement Cost)	
	Residence C (25 92 m <sup>2</sup> ) (including secondly structures)	75,487 NPR (Replacement Cost)	
Land	Private Land-A Open land (0.03 ha) along the Sindhuli Road	1. Concluded Price (as of April, 2021) • Unit Price : 66,667 NPR/m <sup>2</sup> 2. Local Government Unit Price • Unit Price : 2,017 NPR/m <sup>2</sup> 3. Market Price (Average of Real Estate Companies) Unit Price • Unit Price : 68,300 NPR/m <sup>2</sup>	The concluded price is higher than government and market price
	Private Land-B Open land (0.065 ha) not along the Sindhuli Road	1. Concluded Price (as of September, 2021) • Unit Price : 37,736 NPR/ m <sup>2</sup> Local Government Unit Price • Unit Price : 2,001 NPR/m <sup>2</sup> 2. Market Price (Average of Real Estate Companies) Unit Price • Unit Price : 38,116 NPR/m <sup>2</sup>	

Note) \* Relocation cost is including dismantling of current structure, transporting of material from current structure and reassembling at the relocated place

Source: JICA Study Team

## 10.2. ARAP Implementation Budget

The estimated ARAP implementation budget for the Project is summarized in Table 10.2. Major cost includes for land, structures, and vulnerable allowance associated with other cost.

Dhulikhel Hospital and MoHP are responsible for providing adequate funds for land acquisition and resettlement related to the Project. It is important to note that these figures need to be updated during updating of the ARAP in the Detailed Design stage, if the implementation of ARAP is postponed after the Detailed Design.

**Table 10.2 ARAP Implementation Budget**

No.	Item	Cost (NPR)
<b>1</b>	<b>Compensation for the PAPs</b>	
1.1	Private Land-A *note-1(Purchased Land in April 2021)	(20,000,000)*note
1.2	Private Land-B *note-2(Plot No.230)	24,372,173
1.3	Structures (Replacement of 2 residences and relocation** of 1 restaurant) including secondly structures	439,055
1.4	Relocation stabilization assistance for displaced house	126,000
1.5	Special allowance for vulnerable people (2 Households)	126,000
1.6	Transportation (2 Residence Heads)	20,000
1.7	Updating of ARAP during Detailed Design stage (if necessary)	1,000,000
1.8	Contingency of compensation for 1.2-1.7 (20%)	5,216,646
	<b>Sub-Total for 1(not include 1.1 20,000,000 NPR)</b>	<b>31,299,874</b>
<b>2</b>	<b>ARAP Management Cost</b>	
2.1	External ARAP Monitoring, if necessary (sub-contract with external organization)	1,500,000
	<b>Sub-total for 2</b>	<b>1,500,000</b>
	<b>Grand Total</b>	<b>32,799,874</b>

Note-1: Private Land-A has already been purchased before the preparatory survey and registered as the property of Dhulikhel Hospital on 13<sup>th</sup> of April, 2021, thus land cost will be deducted from sub-total 1 and grand total  
Private Land-B has been purchased after preparation of draft final ARAP on 28<sup>th</sup> of December, 2021. The cost is included in above table.

Note-2: Relocation cost is including dismantling of current structure, transporting of material from current structure and reassembling at the relocated place.

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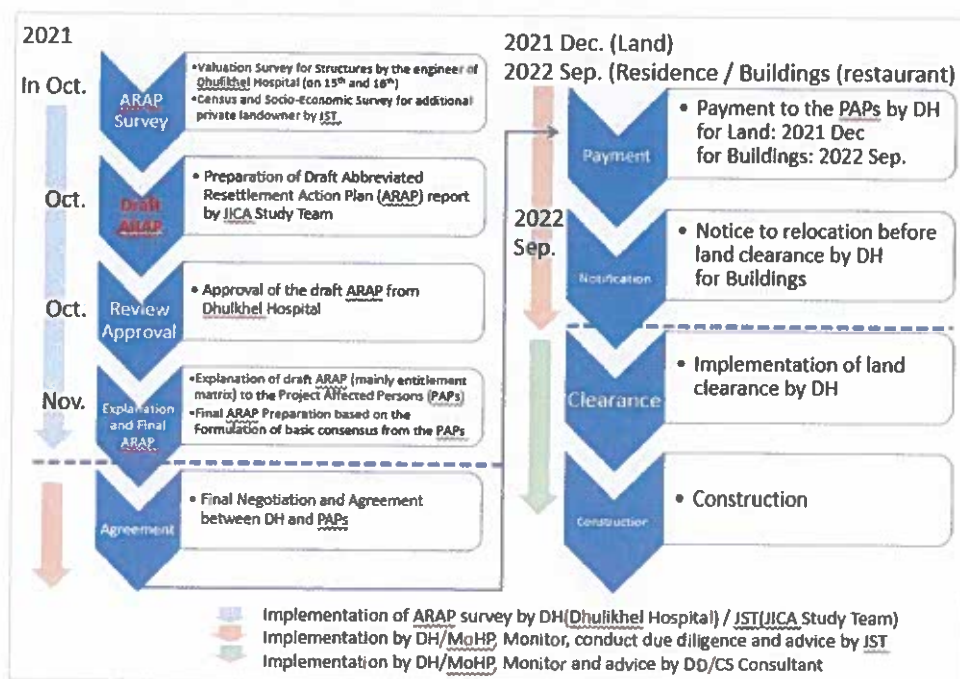
## CHAPTER 11 Implementation Schedule

The expected ARAP approval and implementation schedule is shown below.

With regard to the land acquisition, a part of the land was secured before the start of the field survey for this preparatory survey (April 2021). In addition, as shown in the figure below, after preparation of draft ARAP in October 2021, the draft ARAP was reviewed and approved by Dhulikhel Hospital.

In September 2022, resettlement and compensation payment, removal, and relocation of buildings (residential and restaurant) were implemented. It was confirmed that a series of compensations, payments, and resettlement were implemented in accordance with the approved ARAP in accordance with JICA Guidelines and relevant laws in Nepal.

The expected process and schedule is shown in below;



Source: JICA Study Team

Figure 11.1 Process of the ARAP Implementation

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**Table 11.1 ARAP Implementation Process**

Item		2021					2022			DDM Const.			
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Dec				
1	Draft ARAP Preparation	■	■	■	● Final explanation to PAPs								
2	Approval of ARAP by DH			■	■								
3	Implementation of ARAP (Final Negotiation, Agreement, Payment)					● For the Land			● For the resettlement and buildings				
4	Monitoring (by JICA Study Team)					■							
5	Monitoring (Livelihood Level of Resettlers), if necessary								■			■	■

Source: JICA Study Team

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# APPENDICES

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## Appendix A Relating Materials to ARAP Meeting

### 1. Meeting Minutes for the 1<sup>st</sup> ARAP Meeting for 3 structures on 24<sup>th</sup> of July, 2021

1. Meeting Minutes for the 1<sup>st</sup> ARAP Meeting for 3 Structures :-  
Date :- 24 July 2021  
Venue: Project site

Attendees :-

- ① Hari Bahadur Panwar - AP -
- ② Sanga Lama - AP -
- ③ Uyyan Bahadur Karki - AP -
- ④ Dhruva Kaju - AP -
- ⑤ Indira Lama - AP (family member) -
- ⑥ Milan Raj Uiri - AP (family) -
- ⑦ Rajatam Parajuli - Ex. (PH) -
- ⑧ Rashmi Niroula - SM - Local Consultant -
- ⑨ Surendra Bhatta - Local Consultant -
- ⑩ Chetan Dahal - Local Consultant -
- ⑪ Hirman Bhuwal - AP (Staff) -
- ⑫ Lalib Kuikel - AP - (staff) -
- ⑬ Bal Bahadur Panwar - AP (family mem.) -
- ⑭ Bishnu Maya Panwar - AP " " -

Discussion:-

- ① Discussion was focused onto early start of the project.
- ② Affected persons are keen to have employment in construction work.
- ③ Collected socio-economic & census data from affected persons.

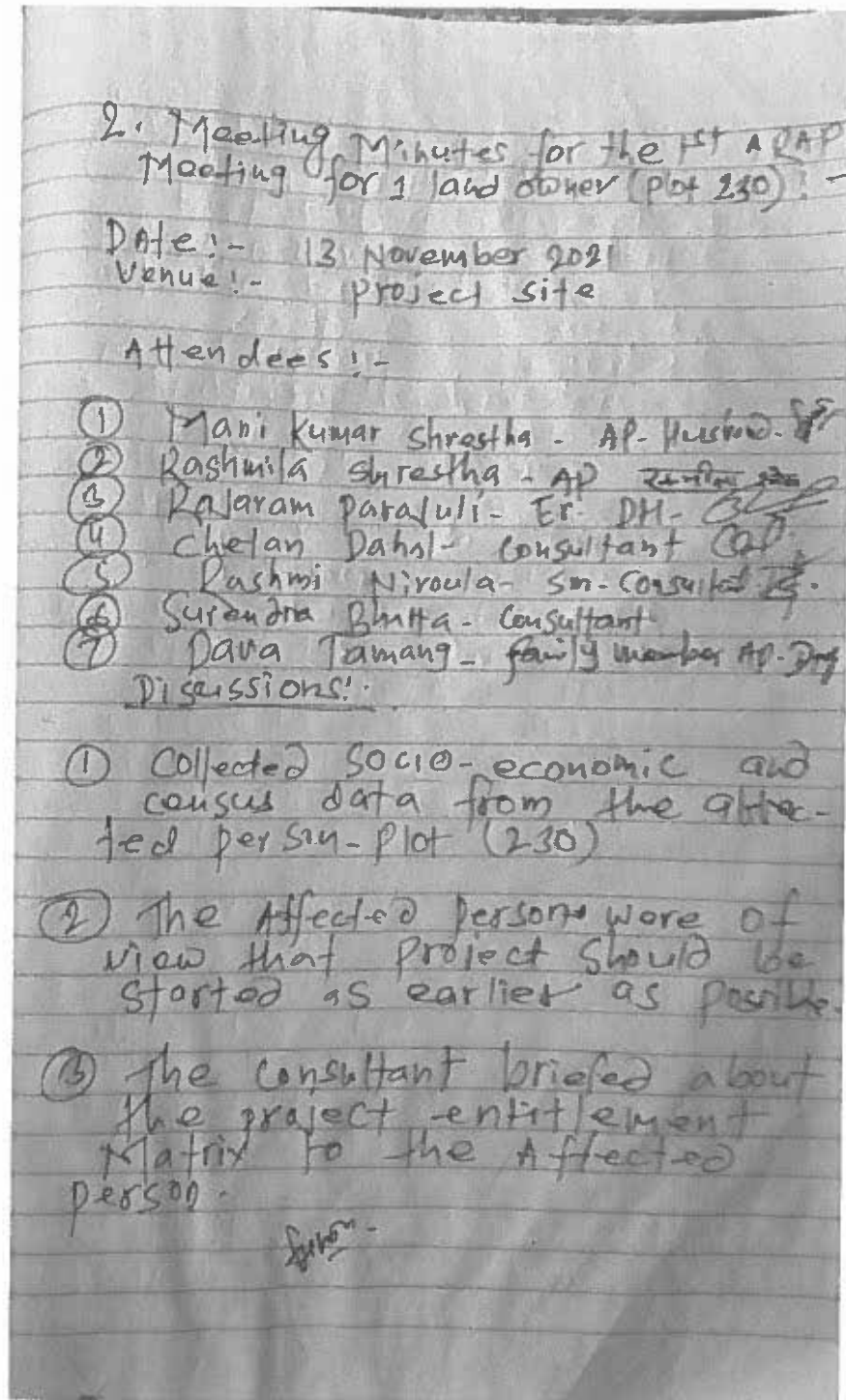
④ Dhulikhel hospital will carry out valuation survey.

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2. Meeting Minutes for the 1<sup>st</sup> ARAP Meeting for 1 land owner (Plot 230) on 13th of November, 2021



(1) The affected person has no objection towards the project.

(2) Disclosed the provision of entitlement matrix of the project.

*[Signature]*  
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3. Meeting Minutes for the 2<sup>nd</sup> ARAP Meeting (Explanation of Draft ARAP) for 3 structures and 1 land owners

3. Meeting Minutes for the 2<sup>nd</sup> ARAP Meeting (Explanation of Draft ARAP) for 3 structures and 1 land owner! -  
Date: - 13 November 2021  
Venue: - Project site

Attendees: -

- 1. Rashmi Shrestha - AP - राशमी श्रेष्ठा
- 2. Ganga Lama - AP - गंगा लामा
- 3. Hari Bahadur Panwar - AP - हरी बाहदुर पानुवर
- 4. Udayada Uiri - AP - उदयदा उीरि
- 5. Dhruv Kolu - AP - ध्रुव कोलु
- 6. Suprin Lama - AP (family member) - सुप्रिन लामा
- 7. Milan Raj Uiri (AP, family) - मिलन राज उीरि
- 8. Indra Lama - AP family member - इन्द्र लामा
- 9. Bishnu Maya - Panwar - AP family member - बिष्णु मया
- 10. Bal Bahadur Panwar - AP family member - बाल बाहदुर पानुवर
- 11. Ralaram paroluli - En. (PH) - रालाराम पारोलुलि
- 12. Rashmi Niroula - SM - Consultant - राशमी निरौला
- 13. Chetan Dahal - consultant - चेतन दाहल
- 14. Purnam Bishwakarma - community people - पुर्णम बिशुवकर्मा

Discussions,

- 1. Discussion was made on entitlement matrix of the project. Also disclose the provision of entitlement matrix to the affected persons.
- 2. They were of view that project should be started as soon as possible.

③ The Dhulikhel Hospital should  
start paying compensation. Rem-  
bilation & Bulkerable upwawe  
at the earliest.

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**Appendix B Photographs of ARAP Meetings**

**1. Photographs of the 1<sup>st</sup> ARAP Meeting for 3 structures on 24th of July 2021**



Source: JICA Study Team

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2. Photographs of the 1st ARAP Meeting for 1 Landowner (Plot 230: Private Land-B)



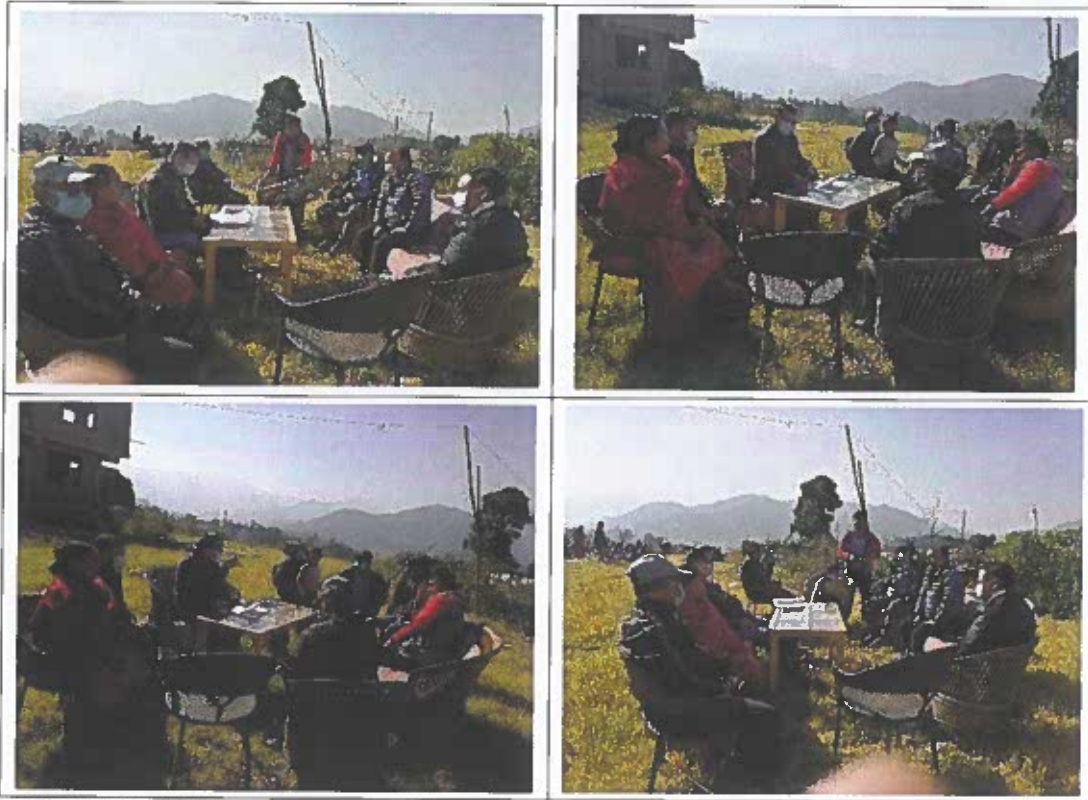
Source: JICA Study Team

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3. Photographs of the 2<sup>nd</sup> ARAP Meeting for 3 Structures and 1 Landowner (Private Land-A)



Source: JICA Study Team

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## Appendix C Calculation Methodology for Compensation Amount

### 1. Replacement Costs of Land

Dhulikhel Hospital has acquired private land through direct negotiation with the landowner of Private Land-A and Private Land-B landowner (plot 230). Dhulikhel Hospital (DH) side has invited affected persons for negotiation of land as per Land Act 1977 (clause 27). The landowner propose to adopt the current market rate and then the negotiation has been succeed.

According to replacement cost survey for the private land, the land rate by the Government is much cheaper than purchased rate, and it is almost the same as real state rate. Thus the landowner of the Private Land-A was satisfied the proposed rate from the DH side. With regard to the Private Land-B (app. 0.06 ha) and DH side is under initial negotiation as of December, 2021. The DH has paid NPR 900,000 as an advance payment for the land.

**Table C-1 Replacement cost survey result for Land**

Kind of Price	Unit Price		Remarks
	Private Land-A (App. 0.03 ha)	Private Land-B(Plot No.230) (App. 0.06 ha)	
Concluded Unit Price	66,667 NPR/m <sup>2</sup> (13 <sup>th</sup> of April, 2021)	37,736 NPR/ m <sup>2</sup> (29 <sup>th</sup> of September, 2021)	Based on market price and willing to sell price by the landowner
Government Land	2,017 NPR/m <sup>2</sup>	2,001 NPR/ m <sup>2</sup>	Fixed land price for public project
Real Estate Companies	68,300 NPR/m <sup>2</sup>	38,116 NPR/ m <sup>2</sup>	Average unit cost based on the interview with real estate companies

Source: JICA Study Team

### 2. Replacement Cost of Structures

The cost has been valued engineers and architects of the Dhulikhel Hospital without any depreciation by using market price cost of the materials.

**Table C-2 Replacement and Relocation cost survey result for Structures**

Item		Result of Valuation	Result of Validation
Structure	Restaurant Cottage (33.48 m <sup>2</sup> ) (including secondly structures)	281,892 NPR (Relocation Cost*)	Market price without depreciation
	Residence B (25.92 m <sup>2</sup> ) (including secondly structures)	81,676 NPR (Replacement Cost)	
	Residence C (25.92 m <sup>2</sup> ) (including secondly structures)	75,487 NPR (Replacement Cost)	

Note) \* Relocation cost is including dismantling of current structure, transporting of material from current structure and reassembling at the relocated place

Source: JICA Study Team

### 3. Relocation Stabilization Assistance

Displaced household can receive following one-time livelihood assistance.

**Table C-4 Relocation Stabilization Assistance Cost**

Item	Calculation Unit Rate/ Quantitate	Total Cost (NPR)
Relocation Stabilization Assistance Cost	90 days minimum wage rate as established at the national or local level. Wage Rate 700 NPR/day x 90 days x 2 residence (700 NPR/day x 90 days x 2 residences)	126,000

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Source: JICA Study Team

#### 4. Vulnerable Assistance

Vulnerable household can receive following one-time livelihood assistance

**Table C-5 Vulnerable Assistance Cost**

Item	Calculation Unit Rate/ Quantitate	Total Cost (NPR)
Vulnerable Assistance Cost	90 days minimum wage rate as established at the national or local level Wage Rate 700 NPR/day x 90 days x 2 households (700 NPR/day x 90 days x 2 households)	126,000

Source: JICA Study Team

#### 5. Transportation Cost

One-time cash assistance for transportation cost for moving is estimated 25,000 NPR/Displaced residential households.

**Table C-6 Transportation Cost**





Item	Calculation Unit Rate/ Quantitate	Total Cost (NPR)
Transportation Cost	10,000 NPR (Lump Sum) x 2 households	20,000

Source: JICA Study Team

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**Appendix D Photographs of Affected Structure and Land**

Name – i)Gayendra Giri ii) Hari Bahadur Danuwar iii) Sange Lama Village- Dhulikhel Municipality ward 6 Total Affected Structures – 1 Restaurant cottage, 2 Residential structure (tenants)		
	Total Area of Structure (m <sup>2</sup> )	Affected area of structure (m <sup>2</sup> )
 Structure-A : Restaurant Cottage (Gyanendra Giri)	33.48 m <sup>2</sup>	33.48 m <sup>2</sup>
 Structure B Residential House (Sange Lama)	25.92 m <sup>2</sup>	25.92 m <sup>2</sup>
 Structure-C Residential House (Hari Bahadur Danuwar)	25.92 m <sup>2</sup>	25.92 m <sup>2</sup>
 Private Land-B (Plot No 230)	645.86 m <sup>2</sup>	645.86 m <sup>2</sup>

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**Appendix E Land Transfer Certificate**

**Land-A**

1. This document was agreed by the Dhulikhel Hospital and Land owner Mr. Dhruva Koju
2. Agreed date: 13 April 2021
3. Agreed price: NPR 20 Million
4. Land Area: 0.03 hectare

**जम्गाधनी दर्ता प्रमाण-पुर्जा**

भूमि व्यवस्था, सडकारी तथा शहरी विकास मन्त्रालय  
भूमि व्यवस्थापन तथा अभिलेख विभाग  
सुमिपथर तथा सारथी/सालपाक कार्यालय

जम्गाधनी दर्ता प्रमाण-पुर्जा

संस्थापक नाम: **1** धुलिकhel अस्पताल

दिनांक: १३/०४/२०२१

पुर्जा नं: २०२१/००३

पुर्जा लागू गर्ने मिति: २०२३/००३/००५

पुर्जा लागू गर्ने स्थान: सुमिपथर, सारथी/सालपाक

पुर्जा लागू गर्ने क्षेत्र: ०.०३ हेक्टर

संख्या	पुर्जा क्षेत्र	पुर्जा क्षेत्रको विवरण	पुर्जा क्षेत्रको क्षेत्रफल	पुर्जा क्षेत्रको मूल्य	पुर्जा क्षेत्रको मिति	पुर्जा क्षेत्रको स्थिति	पुर्जा क्षेत्रको विवरण	पुर्जा क्षेत्रको क्षेत्रफल	पुर्जा क्षेत्रको मूल्य	पुर्जा क्षेत्रको मिति	पुर्जा क्षेत्रको स्थिति
१	१	सुमिपथर, सारथी/सालपाक	०.०३	२००००००	१३/०४/२०२१	सुमिपथर, सारथी/सालपाक	०.०३	२००००००	१३/०४/२०२१	सुमिपथर, सारथी/सालपाक	०.०३

जम्गाधनी दर्ता प्रमाण-पुर्जा

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नेपाल सरकार  
भूमि व्यवस्था, कृषि तथा मत्पशु विकास विभाग  
ग्रामीण विभाग  
मापी कार्यालय काभ्रेपलान्चोक  
गा.बि.स./न.पा. धुलिखेल

जिल्ला-काभ्रेपलान्चोक  
सेट नं.- १५७ १४०६

कित्ताकाट गर्ने

खटा नं.- ५क  
मापनमाप- १:१,२५०



प्रध्या श्रेष्ठ कृष्ण राज श्रेष्ठ विमल राज श्रेष्ठ

कित्ताकाट गरेको ठिक साथो हो भनी सहिष्ठाप गर्नेहरु  
दिनेहरु शुक्र राज श्रेष्ठ सिनेहरु

हरि भोम राज श्रेष्ठ

कित्ताकाट गर्ने

रजु गर्ने

प्रमाणित गर्ने

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Land-B

1. Land Ownership Certificate
2. Name of Institution: Dhulikhel Hospital
3. Registration Date: 22nd October 1996
4. Ownership Transfer Date: 28th December 2021
5. Land Area: 645.84 Square Meter
6. Existing Plot Number: 230

**जम्गाधनी दत्ता प्रमाण पत्र** (Land Ownership Certificate)

जम्गाधनी नाम: **2** (Name of Institution: Dhulikhel Hospital)

दाता मिति (दि.सं.): **3** 2053/07/06 (Registration Date: 22nd October 1996)

प्लॉट नं.	कमल संकेत	विस्तार / का. वि. सं. / म. सं.	प्लॉट नं. / सुस्ता संकेत नं.	विस्तार / का. वि. सं. / म. सं.	जम्गाधनी को प्रकृति	जम्गाधनी को नाम	प्लॉट नं.	विस्तार / का. वि. सं. / म. सं.	प्लॉट नं.	विस्तार / का. वि. सं. / म. सं.	प्लॉट नं.	विस्तार / का. वि. सं. / म. सं.
<b>6</b>	<b>4</b>											

जम्गाधनीको कुल क्षेत्रफल: **5** 645.84 वर्ग मिटर (Land Area: 645.84 Square Meter)

दाता मिति: 2053/12/28 (Ownership Transfer Date: 28th December 2021)

अस्तित्व प्लॉट नं.: 230 (Existing Plot Number: 230)

APs

T-1

- 
1. This document was agreed by the Dhulikhel Hospital and Land owner Mr. Dhruba Kaju
  2. Agreed date: 13 April 2021
  3. Agreed price: NPR 20 Million
- Land Area: 0.03 hectare

**Appendix F Lease Agreement Between Ministry of Industry and Kathmandu University**

1. Lease Agreement was done between Ministry of Industry and Kathmandu University (KU); please refer highlighted part in the scanned copy from 1 to 5
2. Agreed date: 9 June, 2014
3. Agreed duration: For 30 years
4. Agreed purpose of land use is to build Trauma Center having advanced services with adequate infrastructures
5. Land Area: 0.85 hectare





21/11/2015

20.3.2015

समिति अगुमान गरी दिइएका विदेशांतर पालना गर्ने प्रक्रिया अन्तर्गत र बाटोको  
विश्वविद्यालय (टुमा सेन्टर) को बन्दो हुनेछ ।

उक्त जग्गाको लिज (भाडा) बापत काठमाडौं विश्वविद्यालयले नेपाल सरकार, उद्योग मन्त्रालयलाई  
प्रत्येक वर्ष अग्रिम रूपमा वार्षिक रु. ४५,०००/- (अक्षरपी पैसातिरा हजार) मुस्तानी गर्नेछ । भाडा  
बापतको रकम काठमाडौं विश्वविद्यालयले प्रत्येक वर्षको वैशाख महान्तमिमा उद्योग मन्त्रालयको  
राजस्व खातामा अर्पण गरी सोको सबैको दोषो प्रति भौचर उद्योग मन्त्रालयमा बुझाउनु पर्नेछ । भाडा  
बापतको रकममा प्रत्येक वर्ष १०% (दश प्रतिशत) का दरले वृद्धि हुनेछ ।

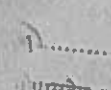
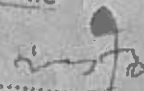
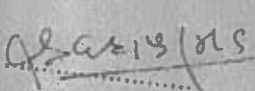
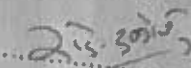
समझदारीपत्रको अवधि नौ समझदारीपत्रमा हस्ताक्षर भएको मितिले ३० वर्षसम्म कायम रहनेछ । बा  
गमझदारीपत्र हस्ताक्षर भएको मिति देखि प्रारम्भ हुनेछ ।

यो समझदारीपत्रको अवधि समाप्त भई तेशमा सरकार (मन्त्रपरिषद्) बाट अर्को निर्णय नभएको  
अवस्थामा उक्त जग्गा र सीमा निर्माण भएका भौतिक संरचना चामु अवस्था (tenable condition) मा  
थाल सरकार, उद्योग मन्त्रालयमा हस्तान्तरण हुनेछन् ।

यो जग्गाको उपयोग गरे बापत र भौतिक पूर्वाधार निर्माण गर्दा वा अन्य कार्य गर्दा लाग्ने स्थानीय  
सुदक तथा अन्य सेवा सुत्कहरु बुझाउने सम्बन्धी सम्पूर्ण दायित्व काठमाडौं विश्वविद्यालयले बहन  
नेछ ।

समझदारीपत्रमा उल्लेख हुन नसकेका अन्य विषयहरु पृथकमा उल्लेख भए तमर्तकम  
३ ।

समझदारीपत्र बमोजिम कार्य गर्दा कुनै विवाद उत्पन्न भएमा अर्थ मन्त्रालय, उद्योग मन्त्रालय,  
काठमाडौं विश्वविद्यालय टुमा सेन्टर र शिक्षा मन्त्रालय समेत बसी आपसी सहमतिमा विवाद समाधान  
हुनेछ । यसरी विवाद समाधान हुन नसकेमा विवाद समाधान सम्बन्धी पृथकमा बानुन बमोजिम

शिक्षा मन्त्रालयको सहसचिव	अर्थ मन्त्रालयको सहसचिव	उद्योग मन्त्रालयको सहसचिव	काठमाडौं विश्वविद्यालयको सहसचिव
			
नाम : रामदेव पन्त	नाम : चन्द्रकुमार श्रेष्ठ	नाम : लक्ष्मण मल्ल	नाम : डा. राजेन्द्र कोण्ड
पद : उपसचिव	पद : उपसचिव	पद : उपसचिव	पद : एसोसिएट प्रिन्सिपल

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Appendix G ARAP Monitoring Form and TOR for External Monitoring

Resettlement Monitoring Sheet					
Name of HH _____					
<b>1. Progress of Resettlement</b>					
Progress	Date	Check	Remark		
Official Notice					
Confirmation on survey results of inventory					
Survey on relocation site if any					
Negotiation					
1 <sup>st</sup>					
2 <sup>nd</sup>					
3 <sup>rd</sup>					
4 <sup>th</sup>					
Agreement on compensation and relocation					
Compensation payment					
Vacation of land					
<b>2. Post Resettlement Monitoring</b>					
Date	Location	Occupation if change	Income Level	Perception	Remark
Note: biannually for 2 years after relocation					
<b>3. Record of Grievance / Perception and Redress</b>					
Date	Grievance	Redress	Results	Check by independent organization if any	

*B/S*

*T-T*

**Dhulikhel Hospital / Ministry of Health and Population**

**Term of Reference**

**(TOR)**

**for**

**External Resettlement Monitoring Experts**

**(Draft)**

**1. Introduction**

The Project for Building Trauma and Emergency Medical Center at Dhulikhel Hospital is a joint undertaking of the Government of Nepal (the GoN) and the Japan International Cooperation Agency (JICA). The Project was approved on dd/mm/yy and became effective on dd/mm/yy.

The Project, however, will provide not only the positive outcome above mentioned but also negative impacts such as disturbance in livelihood to the people in the Project area. In order to restore their livelihood, the Project developed the Abbreviated Resettlement Action Plan (the ARAP) with assistance for loss of assets and income source, resettlement and vulnerable groups.

In order to implement activities planned for assistance securely, regular monitoring of progress and appropriateness by the project implementing agency itself (i.e. internal monitoring) and by the third party (i.e. external monitoring) is necessary. Then, the terms of reference (the TOR) are prepared by the project implementer (the Client) to conduct external monitoring (the Work) by the contracted expert(s) (the Expert) for the Project.

**2. Project Area**

The areas to be monitored are along and adjacent them determined by the Project. The overview of project location is shown in Figure.



**Figure 1 Overview of Project Location**

*h/s*

*T-7*

### 3. Objective of External Monitoring

The main objectives for the external monitoring by the individual expert are as follow:

- To monitor the progress of assistance activities;
- To assess the living restoration of PAPs compared to the one before the resettlement;
- To assess the effectiveness and impact of assistance activities; and
- To identify the issues/ future risk facing the PAPs after the resettlement, and suggest how to mitigate / overcome those issues.

### 4. Scope of Works

The major tasks and activities of the Expert are as below. The details of activities shall be decided based on the discussion between the Client and the Expert.

No.	Main Tasks	Contents of Tasks
<b>I. Living restoration of PAPs</b>		
1	Review and analyze the profile of the project affected persons(PAPs)	(1)To review relevant reports such as resettlement work plan, income restoration program and existing monitoring reports/ records to collect detailed information of PAPs/PAHs and their socio-economic condition. (2)To conduct additional socio-economic survey to obtain detailed data of PAPs/PAHs, if necessary.
2	Observe and collect the data for verifying the effectiveness of resettlement work (Field Monitoring)	(1)To observe the relocation site as well as the Project Area for verifying the effectiveness of resettlement works (2)To conduct household survey with PAPs, Host Community and people (not PAPs) who are living in relocation site, following the 'Monitoring Sheet' developed by JICA Expert Team. (3)To conduct key informant interview and group discussion with stakeholders such as PAPs, government officer, and other concerned actors in order to identify the issues facing PAPs and government staff on resettlement work. (4)To identify issue and suggest how to mitigate and overcome those issues facing PAPs and government staff on relocation
3	Verify the effectiveness of grievance redress mechanism	To verify the record of grievance redress; i) whether grievance redress mechanism works effectively, and ii) raised grievance is managed properly
<b>II. Income Restoration</b>		
1	Observe and collect the data for verifying the progress of income restoration (Field Monitoring)	(1)To conduct household survey with PAPs, community representative and non-PAPs who are living in relocation site, using the check sheet. (2)To conduct key informant interview and group discussion with stakeholders such as PAPs, government officer, and other concerned actors in order to identify the issues facing PAPs and government staff on restoration. (3)To identify issue and suggest how to mitigate and overcome those issues facing PAPs and government staff on relocation
<b>III. Monitoring Report</b>		
1	Prepare and submit the monitoring report to the Client	(1) To prepare the monitoring report on the survey result of I & II (2) To submit the monitoring report to the Client

*B/S*

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### 5. Key Qualifications

The Expert must have experience of the external monitoring work of involuntary resettlement activities in a project or should have done monitoring work on similar nature of works in the past.

Qualification and experience of the Expert should include:

- 1) Experience and expertise in monitoring and evaluation in involuntary resettlement activities in infrastructures development projects and rehabilitation of PAPs;
- 2) Sufficient knowledge in livelihood improvement, participatory community development and mobilization and dealing with the poor and vulnerable groups; and
- 3) Familiar with relevant laws and regulation in Myanmar regarding land acquisition, compensation and infrastructure project as well as the JICA Guidelines for Environmental and Social Considerations (April 2010) and the World Bank's Environmental and Social Safeguard Policies.

### 6. Frequency of Monitoring

The Expert should carry out monitoring of all activities of resettlement aspect of all affected areas of selected districts 1) before, 2) during and 3) after construction, and check compliance of the implementation of all requirements as per the project document. The details of schedule shall be decided based on the discussion between the Client and the Expert.

### 7. Output Submission

The Expert shall submit following outputs:

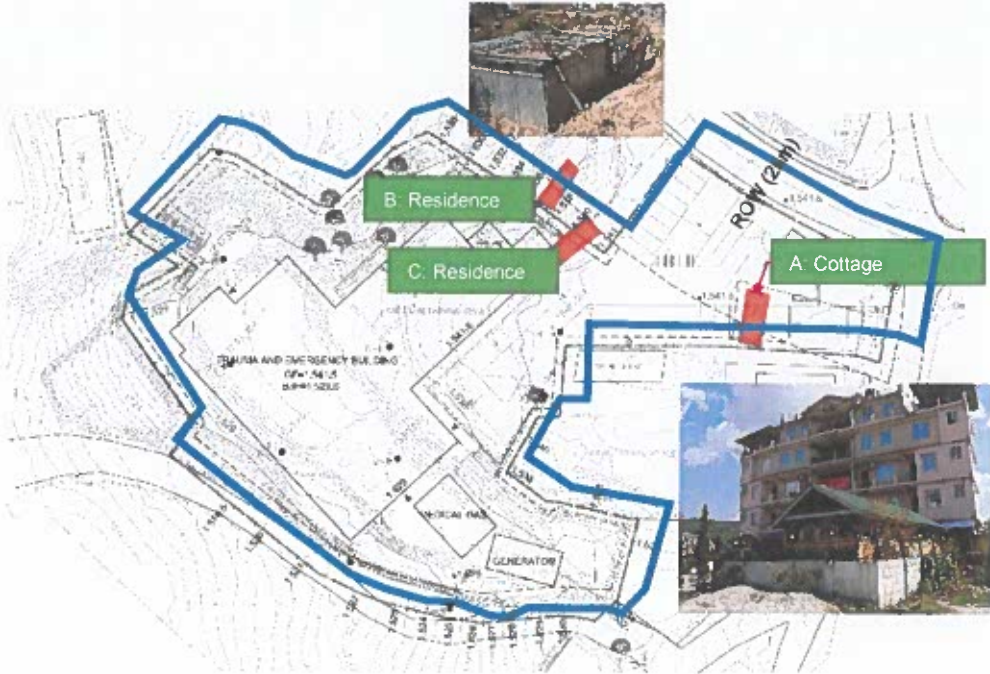
No	Report	No. of Report	Contents to be Included	Submission Timing
1	Monitoring Report(s)	2 set of hardcopy and soft copy in CD in English/English	Field monitoring records	Within two weeks after data collection by the field survey finish
2	Completion Report	- Main Report: 2 sets of hardcopies and CDs - Set of filled original forms - Photo book of the field monitoring	Compilation of all of above	By the end of final monitoring and within contract period

*BPS*

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Existing Structures



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**Technical Note**  
**on the Preparatory Survey for the Project for**  
**Building Dhulikhel Hospital Trauma and Emergency Centre**

In addition to the discussion held by the officials of the Government of Nepal and the Preparatory Survey Team (hereinafter referred to as “the Team”) for the Outline Design of the Project for Building Trauma and Emergency Centre at Dhulikhel Hospital (hereinafter referred to as “the Project”) dispatched by Japan International Cooperation Agency (hereinafter referred to as “JICA”) which minutes was signed on 27<sup>th</sup> September 2021, Dhulikhel Hospital and the Team have confirmed the technical matters described in the attached sheets.

Dhulikhel, Kavrepalanchowk, Nepal, 28<sup>th</sup> September 2021

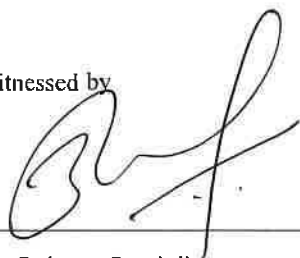


Prof. Dr. Ramesh Makaju  
Administrative Director  
Dhulikhel Hospital  
Nepal



Mr. Tomoki Miyano  
Chief Consultant  
Preparatory Survey Team  
Oriental Consultants Global  
Japan

Witnessed by



Mr. Rajaram Parajuli  
Civil Engineer  
Dhulikhel Hospital  
Nepal

Witnessed by



Prof. Dr. Dipak Shrestha  
Associate Dean  
School of Medical Sciences  
Kathmandu University  
Nepal



## ATTACHMENT

### 1. Building Layout and Floor Plans

The Team conducted site survey and interview with the Dhulikhel Hospital based on the drawings which were prepared and submitted. The drawings are presented in Annex 1-1 to 1-2.

MOHP and Dhulikhel Hospital confirmed the drawings and agreed to proceed for the further works based on those.

#### Outline of Buildings

Name	No. of Beds	Structure	Story	Floor Area (m <sup>2</sup> )	
Dhulikhel Hospital Trauma and Emergency Center	98	RC	6	TF	128
				1F	1,066
				GF	1,500
				B1F	1,505
				B2F	1,063
				B3F	1,063
				TOTAL	6,325
Medical Gas Room	-	RC	2	1F	36
				GF	72
				TOTAL	108
Generator Room	-	S	1	GF	78
				TOTAL	78
Guard House	-	Brick	1	GF	23
				TOTAL	23
				GRAND TOTAL	6,534

### 2. Outline of Electrical and Mechanical Facilities

MOHP and Dhulikhel Hospital confirmed the outline of the electrical and mechanical facilities to be applied.

#### 2.1. Electric Power Supply

The power supply for the Trauma and Emergency Center come from 11kV high



voltage public distribution line. Diesel generator is also planned as back-up emergency power supply in consideration with power outage, facile procurement of fuel and maintenance. Uninterruptible Power Supply System (UPS) is provided in OT, ICU, HDU, CT, MRI, Laboratory, Angiography room and Emergency rooms.

**Design Capacity**

Equipment	Trauma and Emergency Center
Demand Power	500 kVA
Generator Capacity	350 kVA×2
UPS Capacity	150 kVA

## 2.2. Telecommunications

The extension telephone is provided to the Trauma and Emergency Center and connected to the existing hospital telephone exchanger. LAN system is provided to the Trauma and Emergency Center and connected to the existing hospital server. Fire alarm equipment which is based on the law is provided. CCTV, broadcast equipment and television receiver are also provided.

## 2.3. Water Supply

“Reservoir Tank and Pressurized Water Pump System” is applied for water supply to sanitary appliances and medical equipment, and filtered water is supplied to the building. Reservoir tank capacity is 100% of daily water consumption. Based on the Nepal National Building Code (NBC) 206, water consumption can be calculated as shown in the table below. However, the capacity of the receiving water tank has been increased to 50,000L in consideration of the actual water consumption of the existing hospital.

**Daily Water Consumption and Water Tank Capacity**

Number of Bed	Daily Consumption per Bed (NBC206:2015)	Daily Consumption	Reservoir Tank Capacity
98 Beds	340L/Bed	33,320 L	50,000L

Hot water is supplied to basin for staff, surgical wash basin, showers, etc., using a central hot water supply system with solar water heater.




#### 2.4. Drainage / Sewage

A waste water treatment facility is provided, and treated water is discharged to inland surface water (Municipality drainage system). The treated water quality shall be within the tolerance limits based on the Environmental Protection Act- 2054 Government of Nepal.

#### Tolerance Limits of Discharged Water

Category	Water Quality
Combined Wastewater Treatment Plant into Inland Surface Water	BOD50mg/L, COD250mg/L, SS50mg/L

#### 2.5. Air Conditioning

Electrical package air conditioning system (VRF) is provided. Rooms with air conditioning are shown below.

#### Targeted Rooms Installed Air Conditioning

Department	Room
EMERGENCY	TRIAGE, STAFF, DUTY, PRE-HOSPITAL CARE/COMMUNICATION, STAFF STATION, PLASTER/PROCEDURE, RED4B, YELLOW6B, GREEN10B, ISOLATION, OBSERVATION
ER-OT	ER-OT, STORAGE/PREPARATION/RECOVERY
RADIOLOGY	RECEPTION, X-RAY, CONTROL, USG, CT (Dedicated chiller), CPU, ANTEROOM, CONTROL/REPORT, MRI, CPU
INPATIENT WARD	STAFF STATION, TREATMENT, STAFF, SLUICE, DRUG/PREPARATION, INCHARGE, COUNSELING, 1BED×4, 4BED×5, 5BED×2, 6BED×2
OPERATION THEATER	OT-1, OT-2, ANESTHESIA, S.S, INCHARGE, CHANGING
POW	POW (PACU), STAFF
CSSD	WASHING, DRYING, STERILIZATION, PACKING
ICU/HDU	STAFF STATION, ICU (10B), HDU (6B), STAFF, DUTY
CATH-LAB	ANGIOGRAPHY (Dedicated chiller), CPU, CONTROL
PHYSIOTHERPY REHABILITATION	PHYSIOTHERPY REHABILITATION, STAFF
OPD	TREATMENT RECOVERY, CONSULTATION, RECEPTION, STAFF



PHARMACY	COUNYER, OFFICE, STORAGE
LABORATORY	CONTER, HEMATOLOGY. MICROBIOLOGY. BIOCHEMISTRY. PATHOLOGIST OFFICE, PATHOLOGY, BLOOD BANK, SAMPLE COLLECTION
SERVER	SERVER
ADMIN	DIRECTOR

Temperature condition for calculation of air conditioning capacity is as below. For average maximum and minimum temperatures for the years 2015-2020, refer Monthly Weather Data in Dhulikhel.

**Monthly Weather Data in Dhulikhel**

Summer	dry bulb : 29.6°C	Winter	dry bulb : 1.4°C
--------	-------------------	--------	------------------

**Temperature-Humidity Condition for Planning (Target Value)**

	Normal Room	OT/Angiography	
	Temp	Temp	Humid
Summer	26.0°C	26.0°C	55%
Winter	22.0°C	26.0°C	55%

**2.6. Medical Gas**

Oxygen (O), Air (A) and Vacuum (V) are provided as medical gas supply. Oxygen supply is planned with central piping system and manifold setting. Air supply is planned with central piping system and compressor setting. Vacuum supply is planned with central piping system and vacuum pump setting.

**Departments Provided Medical Gas**

Department	Allocated Number
EMERGENCY	TRIAGE : O,V RED(4B) : O,A,V YELLOW(6B) : O,A,V GREEN(10B) : O,V OBSERVATION : O,V
ER-OT	ER-OT : O,A,V,Ex,SA RECOVERY : O,A,V
RADIOLOGY	X-RAY : O,V CT : O,V MRI : O,V
ICU/HDU	ICU : O,A,V HDU : O,A,V
INPATIENT WARD	TREATMENT : O,V WARD : O,V
OPERATION THEATER	OT-1 : O,A,V,Ex,SA OT-2 : O,A,V,Ex,SA




	ANESTMESIA : O,A,V
POW	PACU : O,A,V
CATH-LAB	ANGIOGRAPHY : O,V
OPD	TREATMENT/RECOVERY : O,V
Legend	
O: Oxygen (O), A: Medical Air (4 bar), V: Vacuum, SA: Surgical Air (7 bar), Ex: Excess Anesthesia Gas	

### 3. Connection to Infrastructures

#### 3.1. Electric Power and Telecommunications

The power supply source to the Trauma and Emergency Center is the existing public power line of 11kV. A new transformer for the Trauma and Emergency Center is provided. Telephone and internet cables are installed, and connected to the existing hospital.

#### 3.2. Water Supply and Drainage / Sewage

The water source is water pipe supplied by city water and deep well. Water supply source and amount is to be discussed. The well water will be drilled by “the Project for Building Dhulikhel Hospital Trauma and Emergency Center” for the Trauma and Emergency Center.

Drainage which is treated to standard water quality is discharged to inland surface water (Municipality drainage system).

### 4. Result of Geological Survey and Policy of Structural Design

#### 4.1. Boring Survey

Boring survey and Standard Penetration Test (SPT) were carried out at 11 points to a depth of 20 meters below the current ground level. SPT results showed that N values ranged from 20 in shallow layers to 50 in deep layers. The soil type is fine silty sand on the surface layer and weathered soft rock on the deeper layer.

According to the results of the geotechnical investigation, there is no possibility of liquefaction.

#### 4.2. Policy of Structural Design

The structural plan is designed to achieve structural safety, stability, and improved




human comfort. The building is designed to have sufficient structural strength and rigidity to assure continuous activity as a hospital as expected by the Trauma and Emergency Center in the event of a disaster. Serviceability and habitability to maximize the comfort of facility users, the building is designed with a spacious layout with as few walls as possible and a rigid structural slab.

#### 4.2.1. Imposed Loads (Live Loads)

Imposed loads are in accordance with NBC and IS875.

**Design Imposed Loads (Live Loads)**

Item	Uniformly Distributed Load (kN/m <sup>2</sup> )	Concentrated Load (kN)
Bedrooms	2.0	1.8
X-ray rooms Operating rooms	3.0	4.5
Office rooms	2.5	2.7
Corridors, lobbies, staircases	4.0	4.5
Boiler rooms Plant rooms	5.0	4.5

#### 4.2.2. Design Criteria for Seismic Load

The Nepal National Building Code (NBC 105:2020) is used as the principle design standard.

$$C_d(T_1) = C(T_1) / (R_u \times \Omega_u)$$

$$C(T_1) = C_h(T_1) Z I$$

**Design Horizontal Seismic Coefficient**

$C_d(T_1)$	=	Horizontal Base Shear Coefficient	By calculation
$C(T_1)$	=	Elastic Site Spectra for horizontal loading	By Spectra diagram
$T_1$	=	Period of Vibration	$= 0.075 \times H^{3/4}$
$Z$	=	Seismic Zone Factor	= 0.36
$I$	=	Importance Factor	= 1.5
Soil Type			= A
$R_u$	=	Ductility Factor	= 4
$\Omega_u$	=	Over strength Factor for ULS	= 1.5




#### 4.2.3. Foundation Type

Since the N-value is more than 20 and the soil stiffness becomes harder as the depth increases, direct foundation is suitable. As for the foundation type, a mixed foundation system of pad foundation, continuous strip foundation, and raft foundation (partially used) is suitable.

#### 4.2.4. Structural Type

Ductile moment-resisting frame with reinforced concrete retaining walls is used in this building.

#### 4.2.5. Material Grade

Materials which can be provided within the domestic area are used.  
Material Grade is as below.

**Material Grade**

Material	Specification
Concrete	Cube strength @28days $f_c=30(N/mm^2)$
	Cylinder strength @28days $f_c=24(N/mm^2)$
Reinforcing Bar	Fe500

Annex 1-1:      SITE PLAN

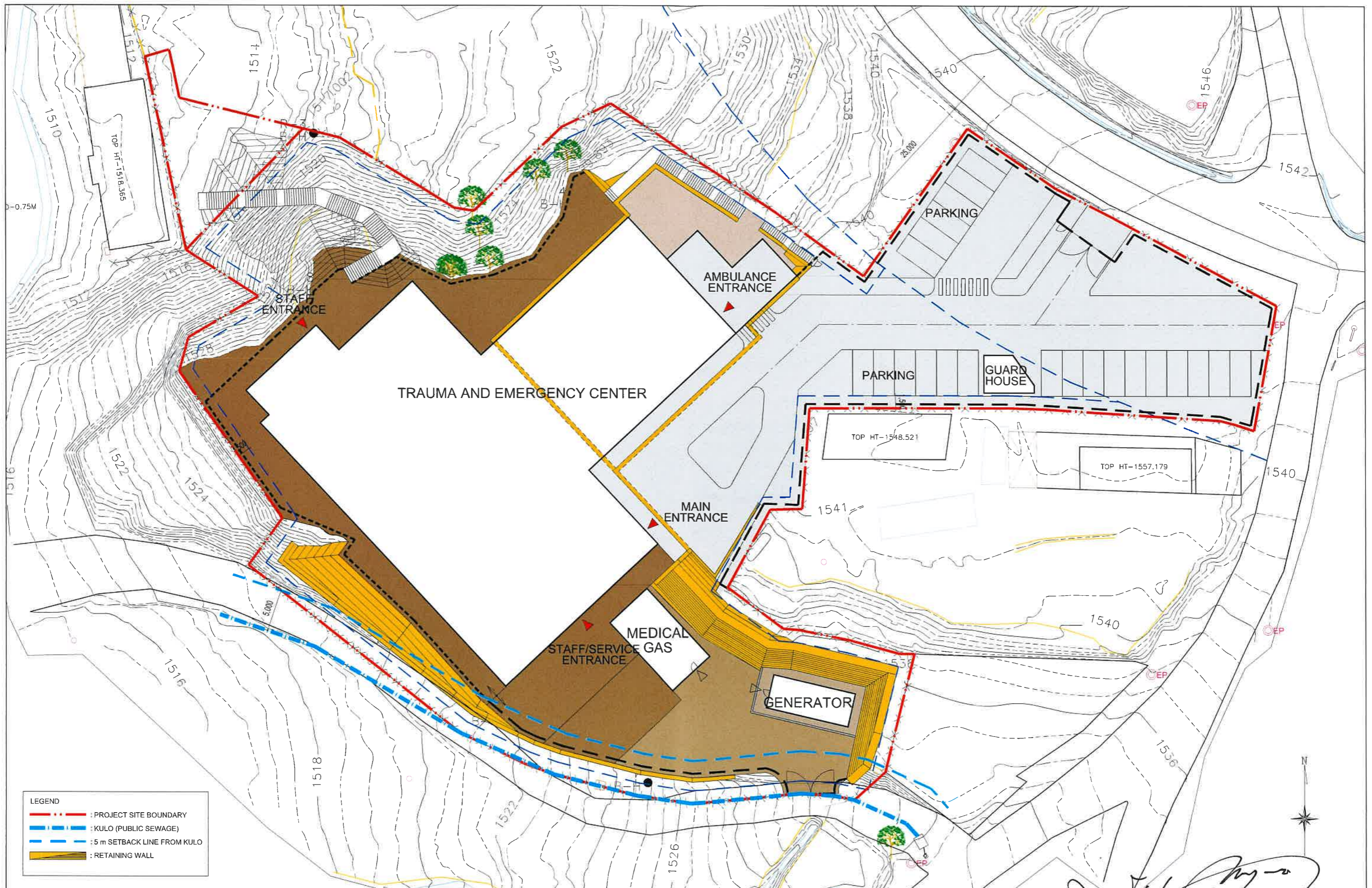
Annex 1-2:      FLOOR PLAN



Annex 1-1  
SITE PLAN

A handwritten signature in black ink, appearing to be the initials 'B.F.' with a horizontal line through the middle.A handwritten signature in black ink, appearing to be the name 'Kamen' with a horizontal line through the middle.A handwritten signature in black ink, appearing to be the name 'C. H. ...' with a horizontal line through the middle.





**LEGEND**

- - - : PROJECT SITE BOUNDARY
- - - : KULO (PUBLIC SEWAGE)
- - - : 5 m SETBACK LINE FROM KULO
- : RETAINING WALL

PROJECT TITLE  
**THE PROJECT FOR BUILDING  
 DHULIKHEL HOSPITAL  
 TRAUMA AND EMERGENCY CENTER  
 (DHEC)**

NOTES

NO	DATE	DESCRIPTIONS	BY	APP'D

SCALE	1/400 (A3)
DATE	SEPTEMBER 2021
DRAWING BY	
CHECKED BY	

DWG TITLE  
**SITE PLAN**

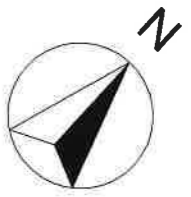
DESIGNED BY  
**THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD.,  
 INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.**

DWG NO



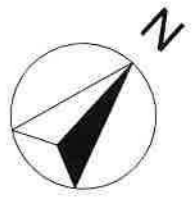
Annex 1-2  
FLOOR PLAN

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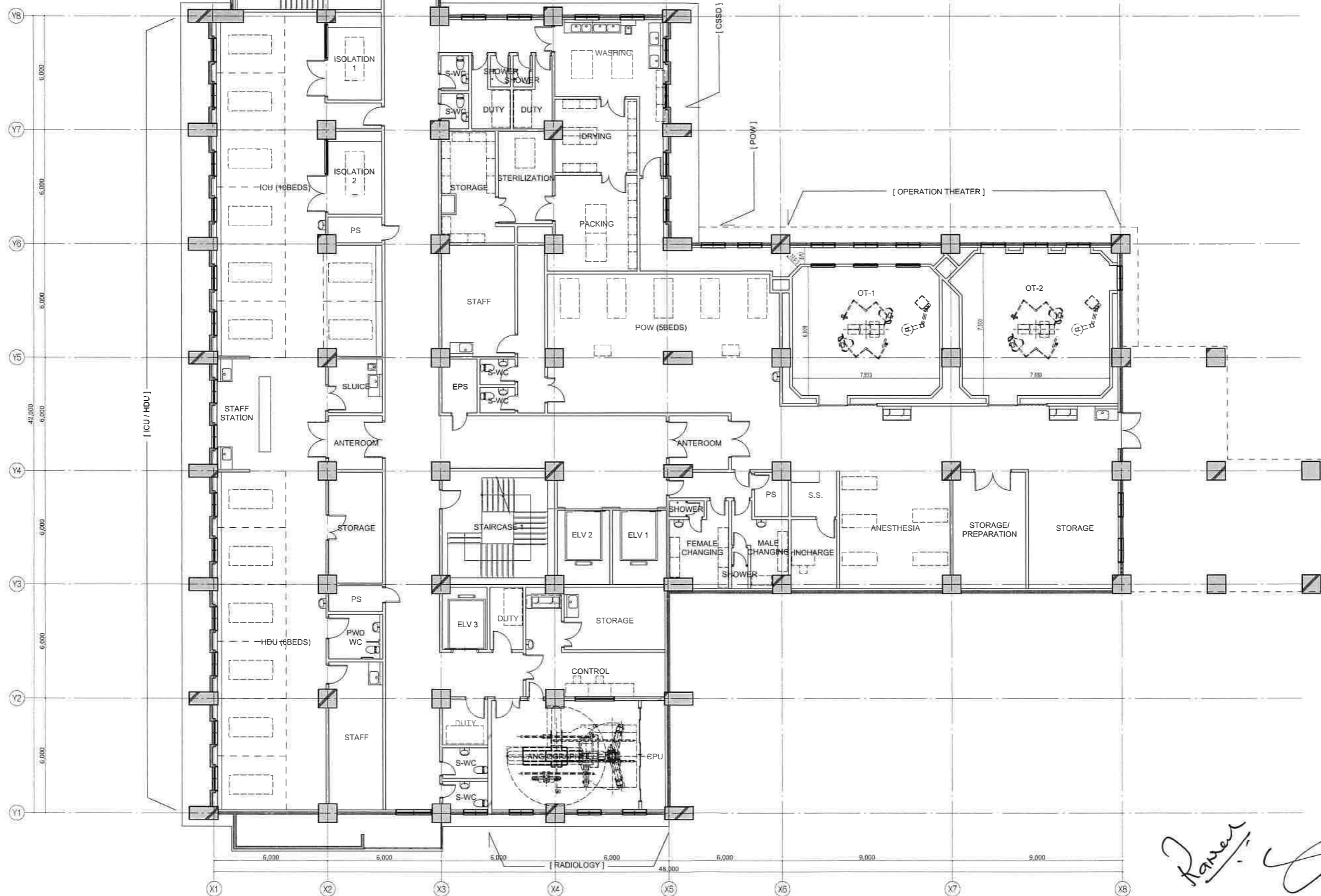
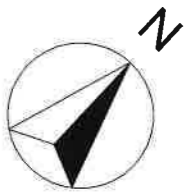
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PROJECT TITLE THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTER (DHTEC)	NOTES	SCALE	1/200 (A3)	DWG TITLE	BASEMENT 3RD FLOOR PLAN	DWG NO	A-11
		DATE	SEPTEMBER 2021	DESIGNED BY	THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.		
		DRAWING BY		CHECKED BY			
		NO	DATE	DESCRIPTIONS	BY	APP'D	
		REVISIONS					



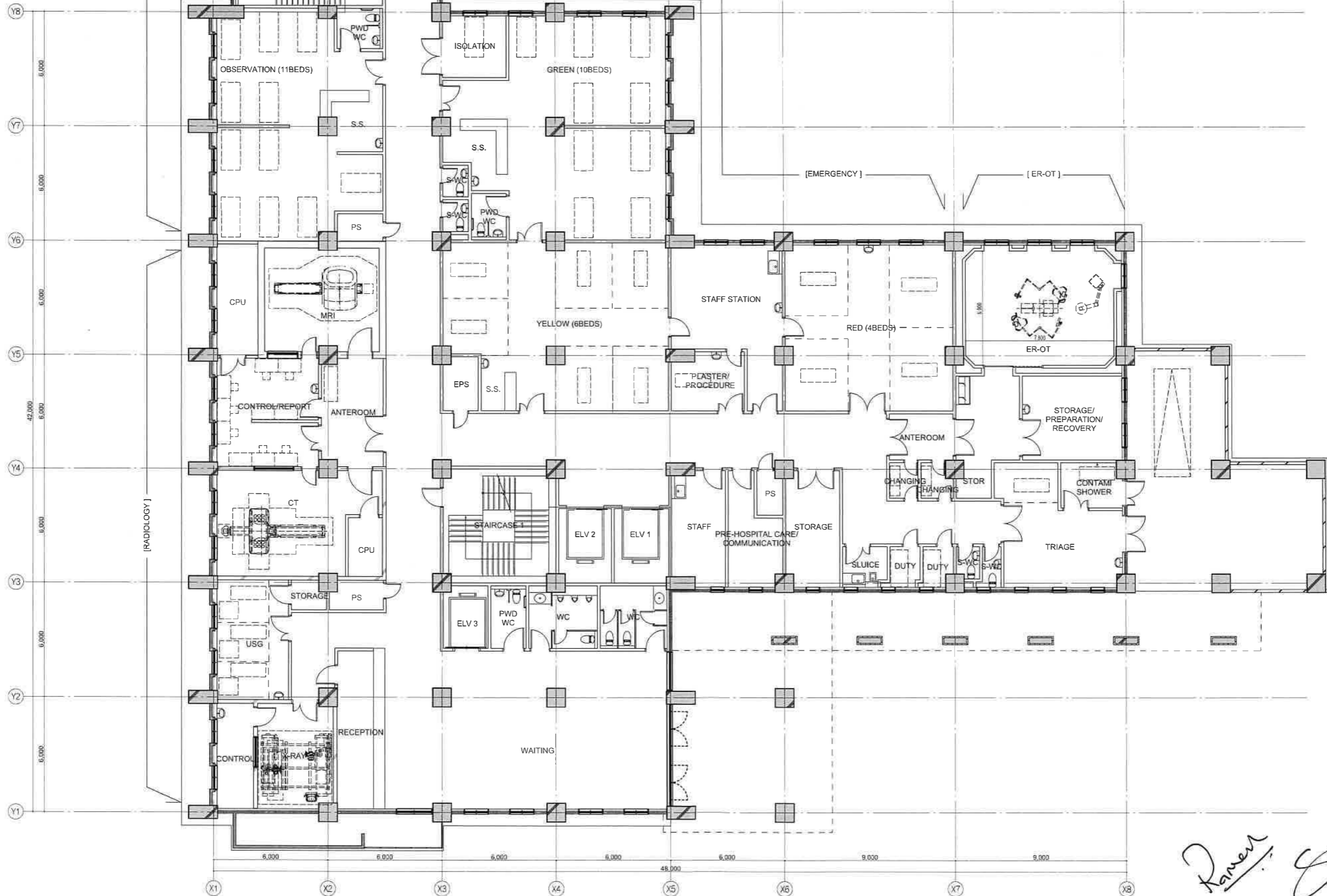
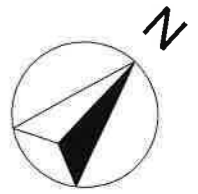
*Ramen*  
*[Signature]*

PROJECT TITLE THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTER (DHTEC)	NOTES	SCALE	1/200 (A3)	DWG TITLE	BASEMENT 2ND FLOOR PLAN	DWG NO	A-12
		DATE	SEPTEMBER 2021	DESIGNED BY	THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.		
		DRAWING BY					
		CHECKED BY					
		NO	DATE	DESCRIPTIONS	BY	APP'D	
		REVISIONS					



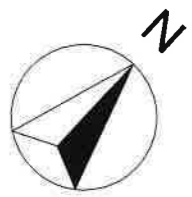
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PROJECT TITLE <b>THE PROJECT FOR BUILDING          DHULIKHEL HOSPITAL          TRAUMA AND EMERGENCY CENTER          (DHTEC)</b>	NOTES	SCALE 1/200 (A3)	DWG TITLE <b>BASEMENT 1ST FLOOR PLAN</b>	DWG NO <b>A-13</b>
		DATE SEPTEMBER 2021	DESIGNED BY THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	
		DRAWING BY	CHECKED BY	
		NO. DATE DESCRIPTION BY APPD.	REVISIONS	



*Ramen*  
*[Signature]*

PROJECT TITLE THE PROJECT FOR BUILDING DHULIKHEL HOSPITAL TRAUMA AND EMERGENCY CENTER (DHTEC)	NOTES	<table border="1"> <thead> <tr> <th>NO</th> <th>DATE</th> <th>DESCRIPTIONS</th> <th>BY</th> <th>APP</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO	DATE	DESCRIPTIONS	BY	APP											SCALE 1/200 (A3)	DATE SEPTEMBER 2021	DWG TITLE GROUND FLOOR PLAN	DWG NO A-14
			NO	DATE	DESCRIPTIONS	BY	APP														
DESIGNED BY THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD., INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.	CHECKED BY																				



Y8  
6,000  
Y7  
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Y6  
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Y5  
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Y1

INPATIENT WARD (46 BEDS)



*Ramen*

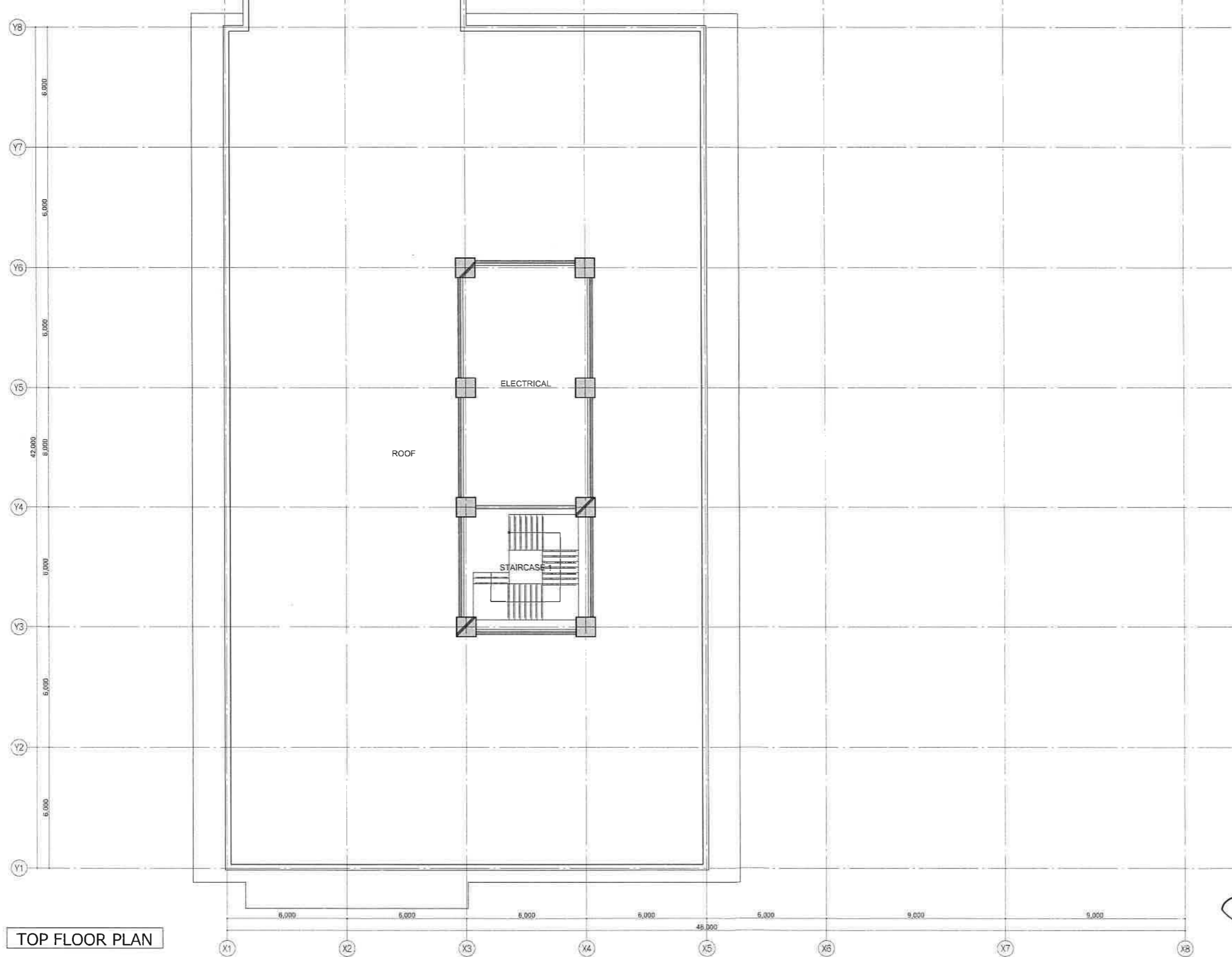
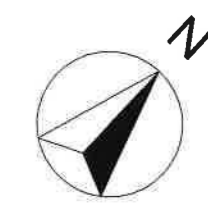
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THE PROJECT FOR BUILDING  
DHULIKHEL HOSPITAL  
TRAUMA AND EMERGENCY CENTER  
(DHTEC)

NOTES

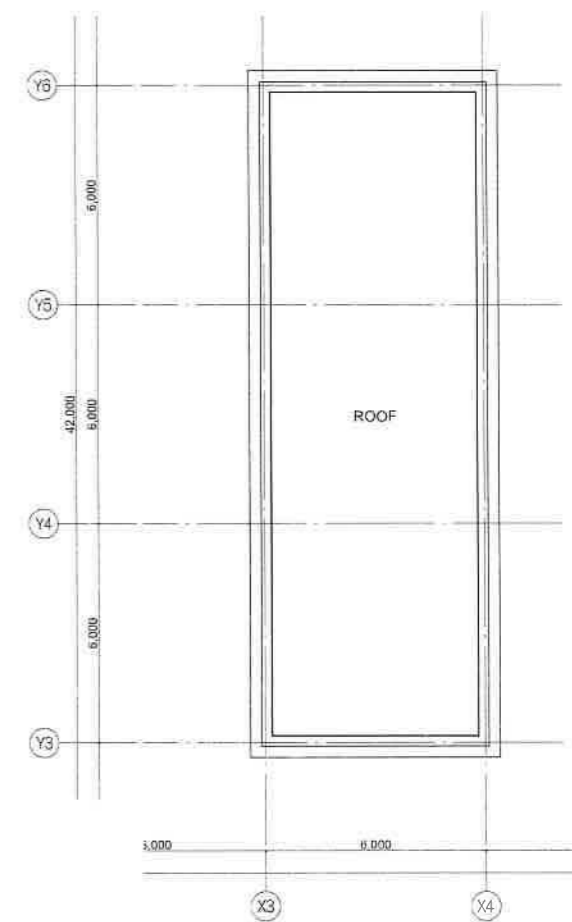
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SCALE  
1/200 (A3)  
DATE  
SEPTEMBER 2021  
DRAWING BY  
CHECKED BY

DWG TITLE  
FIRST FLOOR PLAN  
DESIGNED BY  
THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD.,  
INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.  
DWG NO  
A-15



TOP FLOOR PLAN



ROOF FLOOR PLAN

*Ramen*  
*[Signature]*

PROJECT TITLE  
 THE PROJECT FOR BUILDING  
 DHULIKHEL HOSPITAL  
 TRAUMA AND EMERGENCY CENTER  
 (DHTEC)

NOTES

NO	DATE	DESCRIPTIONS	BY	APP'D

SCALE  
 1/200 (A3)  
 DATE  
 SEPTEMBER 2021  
 DRAWING BY  
 CHECKED BY

DWG TITLE  
 TOP FLOOR AND ROOF FLOOR PLAN  
 DESIGNED BY  
 THE CONSORTIUM OF ORIENTAL CONSULTANTS GLOBAL CO., LTD.,  
 INTERNATIONAL TECHNO CENTER CO., LTD. AND K.I.TO ARCHITECTS & ENGINEERS INC.

DWG NO  
 A-16