CITY DISASTER MANAGEMENT PLAN
2018

SHILLONG MUNICIPAL AREA

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For :
DISTRICT DISASTER MANAGEMENT AUTHORITY (DDMA),
EAST KHASI HILLS DISTRICT, SHILLONG, GOVERNMENT OF MEGHALAYA

Abbreviations

ADC	Additional Deputy Commissioner
AIR	All India Radio
BSNL	Bharat Sanchar Nigam Limited
BDO	Block Development Officer
CBDM	Community Based Disaster Management
CBO	Community Based Organizations
CBDP	Community Based Disaster Preparedness
CD & HG	Civil Defence and Home Guards
CMG	Crisis Management Group
CWC	Central Water Commission
CBRN	Chemical, Biological, Radiological and Nuclear
CCMNC	Cabinet Committee on Management of Natural Calamities
CD	Civil Defence
CDMC	City Disaster Management Committee
CEO	Chief Executive Officer
CPMFs	Central Para Military Forces
CRF	Calamity Relief Fund
CS	Chief Secretary
Com. UL	Communication Unit Leader
CR	Control Room
DC	Deputy Commissioner
DCRF	District Calamity Relief Fund
DDMC	District Disaster Management Committee
DDMA	District Disaster Management Authority
DDMP	District Disaster Management Plan
DEOC	District Emergency Operations Centre
DIO	District Informatics Officer
DMC	Disaster Management Committee
DMOB	Demobilization Unit Leader
DRMP	Disaster Risk Management Programme

DM	Disaster Management
DM/HO	District Medical and Health officer
DRDA	District Rural Development Agency
EE	Executive Engineer
EMS	Emergency Medical Service
EOC	Emergency Operations Centre
ESF	Emergency Support Function
ETA	Expected Time of Arrival
F & CS	Food and Civil Supplies
GIS	Geographic Information System
GoI	Government of India
GPS	Global Positioning System
HLC	High Level Committee
HQ	Headquarters
ICS	Incident Command System
IMD	Indian Meteorological Department
ICU	Intensive Care Unit
IOC	Indian Oil Corporation
IAP	Immediate Action Plan
IC	Responsible Officer
ICP	Incident Command Post
IDRN	India Disaster Resource Network
IEC	Information, Education and Communication
IMT	Incident Management Teams
INGO	International Non- Governmental Organizations
IRS	Incident Response System
IRTs	Incident Response Teams
ISS	Incident Status Summary
LO	Liaison Officer
LS	Logistics Section
LSC	Logistics Section Chief
LPG	Liquefied Petroleum Gas

MAH	Major Accident Hazard
MATI	Meghalaya Administrative Training Institute
MeCEL	Meghalaya Energy Corporation Limited
MOU	Memorandum of Understanding
MUDA	Meghalaya Urban Development Authority
MTC	Meghalaya Transport Corporation
NCC	National Cadet Corps
NCCF	National Calamity Contingency Fund
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NESAC	North Eastern Space Applications Centre
NGO	Non Governmental Organizations
NHAI	National Highway Authority of India
NIC	National Informatics Centre
NO	Nodal Officer
NIDM	National Institute of Disaster Management
NSS	National Service Scheme
NYK	Nehru Yuva Kendra
ORS	Oral Rehydrated Solution
OEOC	Onsite Emergency Operations Centre
OS	Operations Section
OSC	Operations Section Chief
PCR	Police Control Room
PWD	Public Works Department
PD	Project Director
PHE	Public Health Engineering
PS	Planning Section
PSC	Planning Section Chief
PUL	Procurement Unit Leader
QRT	Quick Response Teams
RAF	Rapid Action Force
RCC	Reinforced Concrete Cement

RESL	Resources Unit Leader
RPUL	Resource Provisioning Unit Leader
RTI	Regional Training Institute
RO	Responsible Officer
SATCOM	Satellite Communication
SP	Superintendent of Police
S & R	Search & Rescue
SEOC	State Emergency Operations Centre
SA	Staging Area
SBD	Service Branch Director
SDMA	State Disaster Management Authority
SDO	Sub-Divisional Officer
SDRF	State Disaster Response Force
SEC	State Executive Committee
SMP	Shillong Master Plan
SO	Safety Officer
SOPs	Standard Operating Procedures
SUL	Situation Unit Leader
TL	Team Leader
TB	Transportation Branch
TGA	Total Geographical Area
TO	Treasury Officer
TS	Technical Specialist
TUL	Time Unit Leader
UN	United Nations
UNDP	United Nations Development Programme
ULBs	Urban Local Bodies
VHF	Very High Frequency

Content

SECTION 1

EXECUTIVE SUMMARY

Shillong Municipal Area (SMA) occupies the core area of Shillong city the capital of Meghalaya. It harbours all activities- as a commercial centre, an educational hub, an administrative unit, a tourist area and many more. The area has been growing haphazardly since the British Era till data. There is an increase in the horizontal as well as vertical growth of the area thus making it vulnerable to a large number of natural as well as man-made disasters. Earthquake, flood, landslide, thunderstorm (associated with strong wind, lightning, hailstorms and cloudbursts), cold wave, fire, and climate change impact on hydro meteorological hazards. The city is located in the highest seismic zone V that is also a very high earthquake risk zone category as per the BMTPC Atlas (2006). Shillong city lies on the Shillong Plateau. The Shillong Plateau experienced the 1897 Great Assam Earthquake (also known as 1897 Shillong earthquake) of magnitude 8.1 and heightened seismicity from 1869 to 1950. Since 1951, the city and nearby areas have been experi encing moderate to high level of seismicity. In spite of the moderate to high levels of seismicity observed in and near Shillong in the last 65 years, it cannot be said that higher intensity earthquakes (VIII and above) are unlikely as the region has a potential for large to great magnitude earthquake. Recently, on Jan 04, 2016, an earthquake of magnitude 6.7 occurred 29 km west of Imphal, Manipur, which was severely felt in different parts of Shillong city causing panic and minor non-structural damages in a few buildings. Another earthquake on April 13, 2016 with a magnitude 7.2 occurred in Myanmar and its tremors were distinctly felt in Shillong city.

Shillong city is less prone to landslides as compared to its neighboring areas, including the approach roads to the city. The city experiences most of the landslides during the monsoon that cause damages to houses, roads, and sometimes to agricultural land. However, the potential of earthquake-triggered landslides cannot be ruled out, as the region has a potential for very strong earthquakes. Thunderstorms / hailstorms / squalls (broadly referred to as Nor'westers) in Shillong are vigorous and widespread with heavy downpours in a short-duration. This resulted in higher probability of flash floods in terrains with steep slopes in Shillong and the entire East Khasi Hills district in a warmer atmosphere. The city witnesses flash floods during the monsoon season, due to high intensity rainfall for prolonged hours. This causes water to overflow the banks in most of the streams causing flooding in localities in the vicinity of these streams. The city drains are not in good shape at many places along the roadside. At several places, rainwater simply flows along the roads and many of the roads are without

any drains. Floods and water logging in the low-lying areas of the city have also become common due to unplanned growth of the city. The south-west monsoon contributes a considerable portion of heavy rainfall in both onset and withdrawal phases, which generally lead to flash floods in a short time. Encroachment and clogging of the channels are the major causes of flooding. The building of settlements in the floodplain has choked the natural flow of the river, thus causing water logging and submergence of low- lying areas. The famous Polo ground area, Pynthorbah, Langkyrding, and lower part of Nongmynsong are developed on the floodplain. The water from nearby steep terrains is accumulated in the floodplain, which cause water logging in the area.

On 23 December 2005, the Government of India (GoI) took a defining step towards holistic disaster management by enacting the Disaster Management Act, 2005. With a vision to make the city safer and disaster resilient, preparation of City Disaster Management Plan was drafted for the Shillong Municipal Area covering an area of 11 km^2 and having population of 143229 (as per Census-2011).

SECTION 2

DISASTER MANAGEMENT AND ITS STAGES

2.1. CLASSIFICATION OF DISASTERS

A catastrophe, mishap, calamity or grave occurrence may take place in an area, arising from natural or manmade causes, or by accident or negligence and may results in substantial loss of life and destruction of property, or damage to, or degradation of, environment. In case such an event occurs, the nature or magnitude is beyond the coping capacity of the community of the affected area, it can be said that a disaster is taking place. Disaster means a serious disruption of the functioning of a society, causing widespread human, material or environmental losses caused due to earthquake, cyclone, flood, tsunami, landslideetc., which exceeds the ability of the affected society to cope using only its own resources. Hazards are defined as phenomena that have probaility of occurance within a specified period or time and within a given area of potentially posing a threat to people, structures or economic assets and which may cause a disaster. (United Nations-International Strategy for Disaster Reduction, 2005).

A hazard, and the diaster resulting from that can be of different types. They could be either manmade or naturally occurring in our environment. Disasters whether natural or man-made can strike at any time. The disaster and hazards classification is presented in Table 1.1.

Table 1-1 Classification of disasters and hazards

1. Water and Climate Related	1.Floods and Drainage Management 2.Cyclones 3.Tornadoes & Hurricanes 4.Hailstorm 5.Cloud burst 6.Snow Avalanches 7.Heat & Cold Waves 8.Thunder & Lightning

2. Geologically Related	10.Earthquakes 11.Landslides & Mudflows 12. Dam Bursts & Dam Failures 13. Mine Fires
3. Chemical, Industrial, Electrical and Nuclear Related	14.Chemical and Industrial Disasters 15.Nuclear Disasters 16.Fire
5. Biologically Related	17.Biological Disasters 18.Epidemics 19.Food Poisoning 20.Cattle Epidemics 21.Pest Attacks

Source: High Powered Committee Report, Indian Institute of Public Administration, Delhi.

DISASTER RISK MANAGEMENT

According to the Hyogo Framework for action 2005-2015 for building the resilience of nations and communities to disasters, the folowing actions are to be taken up as main priorities:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation;
2. Identify, assess and monitor disaster risks and enhance early warning;
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels;
4. Reduce the underlying risk factors;
5. Strengthen disaster preparedness for effective response at all levels.

2.2.1 Disaster Management Cycle

A disaster management cycle is a general strategy for disaster risk reduction. Firstly, in the cycle it is to establish the risk management context and criteria, and characterize the potential threats to a community and its environment (hazard); secondly, the social and physical vulnerability to be analysed and then to determine the potential risks from hazards in order to, finally, implement measures to reduce them (Figure 1.1). This is to achieve the goal of , reducing disaster risk. It can be achieved by combining

structural and non-structural measures that foster risk management as an integrating concept and practice and needs to be relevant and implemented during all stages of a community's development process and not just as a post-disaster response. Disaster risk management requires deep understanding of the root causes and underlying factors that lead to disasters in order to arrive at solutions that are practical, appropriate and sustainable for the community at risk (UN-ISDR, 2005).

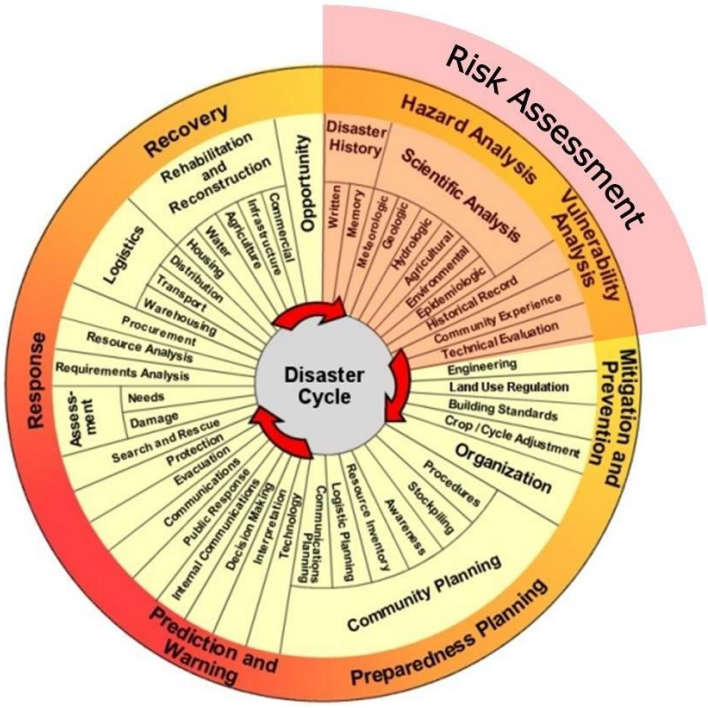


Figure 1: The traditional disaster cycle and the role of risk assessment

(adopted after Westen, 2011)

Disaster Management Cycle is a cycle that includes stages for better managemnet of disasters. But at the same time it is to be remembered that none of these stages in Disaster Management cycle are watertight compartments. If disasters are handled professionally with the perspective of a long term development and sustainability, the quantity of relief required could be halved drastically.

There is no country that is immune from disaster, though vulnerability to disaster varies. Disasters whether natural or man-made can strike at any time. Any disaster can interrupt essential services, such as health care, electricity, water, sewage/garbage removal, transportation and communications. The interruption can seriously affect the health, social and economic networks of local communities and countries. Disasters have a major and long-lasting impact on people long after the immediate effect has been mitigated. Poorly planned relief activities can have a significant

negative impact not only on the disaster victims but also on donors and relief agencies. So it is important to have a proper planning process to manage disaster. Local, regional, national and international organizations are all involved in mounting a humanitarian response to disasters. Each will have a prepared disaster management plan. These plans cover Prevention, Preparedness, Relief, Capacity building and Recovery. The general response to a disaster is in terms of relief and rescue operations - after the event. However, if adequately prepared, it's possible to reduce the after effect of a disaster through a knowledge of certain life-saving tools and techniques, which when used at the time of the event of disaster. In order to deal with disasters, this city disaster managemnet plan was commissioned by UNDP to provide support to the establishment of a multi-hazard disaster management in Shillong City under the pilot initiative of GoI-UNDP Urban Risk Reduction Project.

CONCEPT OF OPERATION

During an emergency or disaster, the District Disaster Aanagement Authority (DDMA) will take immediate and appropriate action to determine, direct, mobilize, and coordinate resourceneeds. The DDMA will suspend or cancel normal operations andredirect resources to save lives, relieve human suffering, sustain survivors, protectproperty, and repair essential facilities. The DDMA has designed, built, equipped, and staffed anEmergency Operations Center (EOC)/District Control Room, from which allemergency activities will be managed. The District Control Room/EOC willcommunicate with the State EOC to ensure close cooperation in emergenciesand disasters. The DDMA is primarily responsible for natural, technological,human caused and biological emergency preparedness, but has a sharedresponsibility with the State and the Central Governments for national securitypreparedness and for catastrophic hazards.

Disasters could, individually or in combination, cause a grave emergencycondition in any area of the district. It can vary in scope and intensity, from asmall localincident with minimal damage to a multi-district disaster with extensivedevastation and loss of life.The actions of prevention, mitigation, preparedness, and response and recoveryoperations are conducted by the District Administration. Local authorities willexhaust their resources, and then use resources of other support agencies,volunteer groups, the private sector, and/or neighbouring districts.

The Disaster Management Plan is based on the premise that the EmergencySupport Functions (ESF) performed by the various agencies and organizationsduring emergency operations generally parallels their normal day-to-dayfunctions. The same personnel and material resources will be employed in bothcases. Day-to-day tasks and operations that do not contribute directly to theemergency may be suspended or redirected for the duration of any emergencyor disaster, and efforts that would normally be assigned to those tasks will bechannelled toward emergency and disaster ESF as assigned.

ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

The Deputy CommissionerShillong (Responsible Officer) has the overallresponsibility for Disaster Management in the District. In case of emergencysituations, the Responsible Officer activates the Incident Response System(IRS). On activation of the IRS, based on the emergency situation the relevantEmergency Support Functions (ESFs) will be utilized. Since this City Disaster Management Plan (CDMP) is concerned with many hazards to which the citizens may be exposed before, during and after a disaster occurs, responsible authorities operate in accordance with thefive phases of Disaster Management:

Prevention

Preventive actions are taken to avoid an incident or tointervene to stop an incident from occurring. Such actions are primarilyapplicable to terrorist incidents. They may include the application ofintelligence and other information to a range of activities that mayinclude deterrence, heightened security for potential targets,investigations to determine the nature and source of the threat, publichealth surveillance and testing, disrupting illegal activities etc.

Mitigation

Mitigation activities actually eliminate or reduce theprobability of disaster occurrence, or reduce the effects of unavoidabledisasters. Mitigation measures include building codes; hazard andvulnerability analyses updates; zoning and land use management;building use regulations and safety codes; preventive health care; andpublic education.

Mitigation will depend on the incorporation of appropriate measures innational and regional development planning. Its effectiveness will alsodepend on the availability of information on hazards, emergency risks,and the countermeasures to be taken. The mitigation phase, and indeedthe whole

Disaster Management cycle, includes the shaping of public policies and plans that either modify the causes of disasters or mitigatetheir effects on people, property, and infrastructure.

Preparedness

The goal of emergency preparedness programs is toachieve a satisfactory level of readiness to respond to any emergencysituation through programs that strengthen the technical and managerialcapacity of governments, organizations, and communities. Thesemeasures can be described as logistical readiness to deal with disastersand can be enhanced by having response mechanisms and procedures,rehearsals, developing long-term and short-term strategies, publiceducation and building early warning systems. Preparedness can alsotake the form of ensuring that strategic reserves of food, equipment,water, medicines and other essentials are maintained in cases of national or local catastrophes.

During the preparedness phase, governments, organizations, andindividuals develop plans to save lives, minimize disaster damage, andenhance disaster response operations. Preparedness measures includepreparedness plans; emergency exercises/training; warning systems;emergency communications systems; evacuations plans and training;resource inventories; emergency personnel/contact lists; mutual aidagreements; and public information/education. As with mitigations efforts,preparedness actions depend on the incorporation of appropriatemeasures in national and regional development plans. In addition, theireffectiveness depends on the availability of information on hazards,emergency risks and the countermeasures to be taken, and on thedegree to which government agencies, non-governmental organizationsand the general public are able to make use of this information.

Response

Response actions are taken before, during, or after a disaster/disaster to save lives, minimize damages and enhance recoveryoperations. Such measures include activation of:

- Emergency Operation Centers/Control Room
- Plans and procedures
- Arrangements and agreements
- Emergency alert system
- Publicwarning

- Notification of public officials
- Provision of mass care, shelter,search and rescue, and security

The aim of emergency response is to provide immediate assistance tomaintain life, improve health and support the morale of the affectedpopulation. Such assistance may range from providing specific but limited aid, such as assisting refugees with transport, temporary shelter, and food,to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in theresponse phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found. Humanitarian organizations are often strongly present in this phase of the Disaster Management Cycle.

Recovery

There is no distinct point at which immediate relief changes into recoveryand then into long-term sustainable development. There will be manyopportunities during the recovery period to enhance prevention andincrease preparedness, thus reducing vulnerability. Ideally, there should bea smooth transition from recovery to on-going development. Recovery activities continue until all systems return to normal or better.Recovery measures, both short and long term, include returning vital life supportsystems to minimum operating standards; temporary housing;public information; health and safety education; reconstruction;counselling programs; and economic impact studies. Information resources and services include data collection related to rebuilding, and documentation of lessons learned.

SECTION 3

MULTI-HAZARD DISASTER MANAGEMENT PLAN

3.1 INTRODUCTION

As part of Multi-Hazard preparedness of Shillong City, the District Administration, East Khasi Hills District have prepared Shillong City Disaster Management Plan. The plan was used to increase the effectiveness of administrative intervention by describing and performing expected operational activities and by assigning responsibilities for effective co-ordination and implementation of emergency capabilities. Therefore, the Shillong City Disaster Management Plan addresses the city response to aMulti-Hazard Disaster Preparedness situation which may affect large areas causing extensive damage to life, property and environment and consequent epidemics which may affect a large population. In any case, the management of disaster requires extensive resources and manpower for containment by remedial action during and after the disaster.

RATIONALE

Rapid urbanization in Shillong has led to the increase in demand for land within the city area and expansion of the city along the peril-urban areas. Since there is a lack of efficient and effective public transportation in many habitations, people especially from the low socio-economic class started to gradually move towards the prime (in terms of accessibility) but highly hazard risk prone locations within the city. With inadequate public infrastructure, higher population growth rate, inadequate contingency planning, and deficient urban governance the problem of settlements within unsafe locations are steadily increasing.

Vulnerability of the Shillong towards disasters, both natural and man – made is widely recognized. The city is vulnerable towards natural and manmade calamities like, Flash Flood, Earthquakes, Wind Storms, Fire Accidents, Landslides etc. Losses caused by disasters continue to mount year after year.

The need for an effective Disaster Management strategy to reduce the impact of disaster is very much essential in many quarters and also strengthening of organizational structures fordisaster

management. Along with, regular updating of Codes/Manual/DisasterPlans on the basis of lessons learned, technological developments should be made.

Precise actions, procedures and responsibilities have to be laid down wellin advance in order to ensure timely response in case of any disaster. Therefore, amechanism that takes into account multiple hazards and basic preparednesshas to be articulated in the form of Quick Response Teams, Quick AssessmentTeams, Reporting Procedures, Checklist and Handbooks. The mechanism alsolays down crucial parameters, requirements and organizational composition of Emergency Operation Centers and Incident Response System.

NEED OF PLAN

With passing of Disaster Management Act., 2005 due importance has been given to Disaster Management apart from many state interventions, local preparedness and mitigation of Disasters is also required to have a strategy by integrate all existing resources and opportunities under unified plan for stipulate effective mitigation mechanism. Therefore each City is commissioned to make an integrated City Disaster Management Plan.

OBJECTIVES

The objective of the project are to prepare the basic CDMP encompassing the elements of the pre and post disaster management activities including capacity building. Further it describes how life, assets, infrastructure losses and adverse impacts can be mitigated and minimized with advance and proactive measures. The study envisages the roles and responsibilities of various Departments of Meghalaya and required coordination with various other organizations of the city to carry out action plans of preparedness and response strategies. Line of authority and organizational structure of various agencies is enshrined in providing personnel, equipment and other supplies during response and recovery actions. Capacity building plan of various stakeholders and community in specific with participatory approach is described to bring awareness in the city. The main objectives of the study are to:

- To prepare a comprehensive and updated picture of the possible urban disaster scenario of the city
- To mitigate impact of natural and man-made disasters through preparedness at City and

Urban Ward level

- To provide effective support and resources to all the concernedindividuals, groups and departments in disaster
- To assist the line departments, district administration, communities indeveloping compatible skills for disaster preparedness andmanagement
- To disseminate factual information in a timely, accurate and tactfulmanner while maintaining necessary confidentiality
- To develop immediate and long-term support plans for vulnerablepeople in /during disasters
- To create awareness among the people about hazard occurrenceand increase their participation in preparedness, prevention,development, relief, rehabilitation and reconstruction process
- To have response system in place to face any eventuality
- To affect or elicit the least possible disruption to the normal lifeprocess when dealing with individuals in disaster
- To ensure active participation by the Government Administration,Communities, NGOs, CBOs and Volunteers/Ward Level Task Forcesat all levels making optional utilization of human and materialresources at the time of disaster

SCOPE OF THE WORK

The study helps in identification of the key areas for action plans on pre-disaster, during and post-disaster of the disasters which have the probaility to occur in the city. It involve the preparation of basic mapping of risks and vulnerabilities areas of Shillong due to various natural or manmade disasters like flash flood, fire, landslides, earthquake, etc. of the city. Proper institutional mechanism mainly coordination of various departments and agencies in the city is suggested for appropriate utilization of personnel and equipment during emergency operations including transportation plan, evacuation, rescue and rehabilitation plans. Basic commodities like food, water, medicine etc. and critical sectors like sanitation, electricity, communication etc., shall be tied up with rescue and rehabilitation plans. Short, medium and long term mitigation measures will be identified for structural and non-structural risks. Strategic training needs across various stakeholders will be formulated and methods to reach the beneficiaries are planned in

capacity building. In the present study includes the preparation of the basic profile of the city and the organizational structure during normal state of affairs in the activities. Apart from this, it is envisaged to prepare the plans of important components of the basic CDMP of the city. The existing data base available with DDMA and several other organizations involved in the administration of city during normal days and during emergency operations will be used for the preparation of the revised CDMP. The whole exercise is to be based on HRVA of the city carried out recently by RMSI, Noida.

PERSPECTIVE

A formal plan for managing disaster would include:

- Pre planning a proper sequence of response actions
- Allocation of responsibilities to the participant agencies
- Developing codes and standards operating procedures for variousdepartments and relief agencies involved
- Inventory of existing facilities and resources
- Mechanism for effective management of resources
- Coordination of all relief activities including those of NGOs to ensure acoordinated and effective response
- Coordinating with the state response machinery for appropriate Support

The City Disaster Management Plan (CDMP) has been envisaged as a preparedness plan on the receipt of a warning of an impending disaster that wouldsimultaneously energise and activate the mechanism for response andmitigation without loss of crucial time. Identification of available resourcesincluding manpower, material, equipment and adequate delegation of financialand administrative powers are prerequisites for successful operation of the CDMP. The CDMP is in essence, the Standard Operating Procedure (SOP) in whichthe implementation of efforts on ground is well laid down. Activities such asEvacuation, Search & Rescue, Temporary Shelter, Food Drinking Water, Clothing,Health and Sanitation are given prime importance. Communication accessibilityand public information, that are important components of disastermanagement, would follow on the activation of the CDMP. These activities arecommon to all types of disasters and require subdivision and preparation of

subaction plans by each field level officials. Each sub group has been requested towork out the CDMP mechanism relevant to their group of disaster.

The CDMP requires the disaster managers to:

- Evolve an effective signal/warning mechanism
- Identify activities and their levels
- Identify sub activities under each activity/level of activity
- Specify authorities for each level of activity and sub activity
- Determine the response time for each activity
- Workout individual plans of each specified authority to achieve activationas per the response time
- Have quick response teams for each specified authority
- Have alternative plans and contingency measures
- Provide appropriate administrative and financial delegation to make theresponse mechanism functional viable
- Undergo preparedness drills

METHODOLOGY OF PLAN DEVELOPMENT

Preparation of a multifaceted plan document is neither possible with asingle agency nor an individual. District has been taken various measures toprepare this document and make it as perfect as possible. The major stepsinvolved in preparing the plan document include the following steps;

- Data collection from all line departments
- Data analysis
- Discussion with experts
- Referring national and international literature
- Preparation of action plans for departments
- Preparing draft plan document
- Mock drill to check the viability and feasibility of implementationmethodology
- Vide circulation for public and departmental comments and
- Preparation of the final plan document based on HRVA of the city

STRATEGY

The preparation of a Disaster Preparedness Plan involves the steps as presented in Table 3.1.

Table 3.1: Steps for preparatrion of Disaster Preparedness Plan

Steps	What is to be done	Who are to be involved	How it is to be done
I	Review and Analysis	Deputy Commissioner, CEO-Shillong Municipal Board, Secretary, MUDU, Urban Affairs Department, Supdt. of Police, ADC, Ward Community level workers, NGOs/CBOs,	▪ Past history of disasters to be discussed and documented ▪ Extent of severity and damage to be recorded ▪ The nature of the Warning issued to be analyzed ▪ The nature and extent of the rescue and restoration done, to be revisited
II	Situation Analysis	Line Depts., Ward Community level workers, NESAC, GSI, NGOs/CBOs	▪ Mapping the geography and topography of the risk prone areas, Circle-wise and ward-wise ▪ Demographic details to be recorded ▪ Mapping of the habitation in the concerned areas ▪ The natural resources to be marked on the maps ▪ Listing all the livelihoods and properties ▪ The existing risk prone/ safe infrastructure to be marked on the map
III	Hazard Analysis	-do-	▪ Identification of all possible hazards in the area based on

			past experience and available records ▪ Identification of the most vulnerable areas with relation to threat to life, livelihoods and property
IV	Vulnerability and Risk Assessment	-do-	▪ Locations of the vulnerable areas are to be mapped separately ▪ Identification of the vulnerable people such as, the elderly, the disabled, children and pregnant women, families living in thatched houses, fishermen (if any), ailing people, etc ▪ Identification of property or assets which are likely to be affected, such as, cattle and other livestock's, kachcha houses, weak structures, life line buildings etc ▪ Identification of weak structures ▪ Marking the drainage system in the concerned area

V	Opportunity Analysis	-do-	▪ Identification of the existing resources which may help to reduce risks to life and property ▪ Listing of the existing health, fire service, police station facilities etc ▪ Identification of the open spaces (parks/fields etc.), raised platform, safe houses and hillocks for shelter and storage ▪ Listing the existing structurally safe flood/cycloneshelters, if any ▪ Identification of the elevated and up-lands which can act as natural barriers to protect livestock ▪ Identification of the sources of funds to carry out the preparedness activities

ROLE OF THE DISTRICT ADMINISTRATION

In anticipation of any disaster, the District Administration has taken various precautionary measures. Functioning of the Control Room, rain recording and submission of rainfall report, communication of Gauge reading, installation of temporary VHF stations, arrangement for keeping telephone and telegraph lines in order, storage of food stuff, arrangement for keeping drainage clear, agricultural/health/veterinary measures, selection of flood/cyclone shelters,

etc. have been properly planned. The government officials of different departments have been apprised of their duties for pre, during and post disaster periods.

The ULBs, Executive Engineers of Water Resource Department, Executive Engineers of PWD Department, Executive Engineers of PHE, , Health, Police, A.H &Veterinary, Joint Director of Supply etc. have been requested to take all precautionary and preparatory measures and to remain alert to face the challenge of any disaster. The other government officials have also been apprised of their roles and responsibilities to be played during pre-disaster arrangement and during/post-disaster management. Every possible kind of cooperation from all the line departments has been sought for by the District Administration in combating the severe natural calamities that may occur anytime.

WHO FORMULATES AND CARRIES OUT THE PLAN

The Disaster Management Plan has been formulated at City level. The planclearly indicates the role and responsibility of each player of the team. TheDeputy Commissionerat the district level formulates and carries out this plan inthe Urban Ward level. Civil society organizations also play a vital role during theimplementation of this plan in the field.

SECTION - 4

CITY AT A GLANCE

PROFILE OF SHILLONG MUNICIPAL AREA

Shillong, located in the East Khasi Hills District, is the capital city of Meghalaya, popularly known as "The Scotland of the East". During the British regime, Shillong functioned as the administrative capital of the erstwhile Assam Province as well as being the only major tourist destination in the northeastern region. The city is situated between 25°31'26" – 25°39' 56" N Latitude and 91°47'20" – 92°0'39" E Longitude, and the altitude of the city varies between 1,400 to 1,900 m above Mean- Sea Level (MSL). The Khasi Hills range at the south descends at a slope of over 20° towards the city and acts as a water divide. The slope within the city ranges from 5^0 to 10^0, except at locations such as Happy Valley, Pynthorumkhrah, and Polo Ground area, where the slope is gentle and within the range of 0^0 to 5^0. Wah Umkhrah, Wah Umshyrpi, and Wah Umkhen are the three main streams draining the city through a number of second and third order tributaries. The National Highway (NH 40) links Shillong with Guwahati and rest of the country. There is an airport at Umroi, 35 km from Shillong. Guwahati, the largest urban center of the region is located 120 km from Shillong and is the nearest railhead and a major airport. Shillong city experiences a humid subtropical climate due to its latitude and high elevation and is characterized by moderate warm wet summers and cool dry winters. The average rainfall is about 2,200 mm, mostly from the southwest monsoon. During the rainy season when the winds are mainly from the Southwestern direction, the relative humidity is high (over 75%). The monsoons arrive in June and it rains almost until the end of September. Shillong, the capital city and hill station of Meghalaya, is the headquarters of the East Khasi Hills district. The city lies on the Shillong Plateau and is surrounded by three hills, namely, Lum Sohpetbneng, Lum Shillong, and Lum Diengiei. The area covered under the CDMP is the Shillong Municipal area (11 sq. km.) and is presented in Figure 1.

Shillong, the capital of Meghalaya occupies the northern slopes and foothills of Shillong peak at an average an altitude of 1496 metres above sea level. The city derived its name from a deity named Shillong, whose dwelling place is known as Shillong Peak. He is believed to have established the art of democratic governance and rule of justice in the formation of the princely Shillong (Hima Shillong), which subsequently bi-furcated into Mylliem State and Khyrim State in 1830. During the British rule, it consisted of a few clusters of hamlets which were scattered. The British Administration shifted the headquarters of United Khasi and Jaintia Hills District from Cherrapunjee to Shillong. In 1874 the State of Assam was created out of Bengal, the city became its provincial capital. In 1972, when the State of Meghalaya became a separate State, the city became its capital. A profile of the city is presented in Table 4.1.

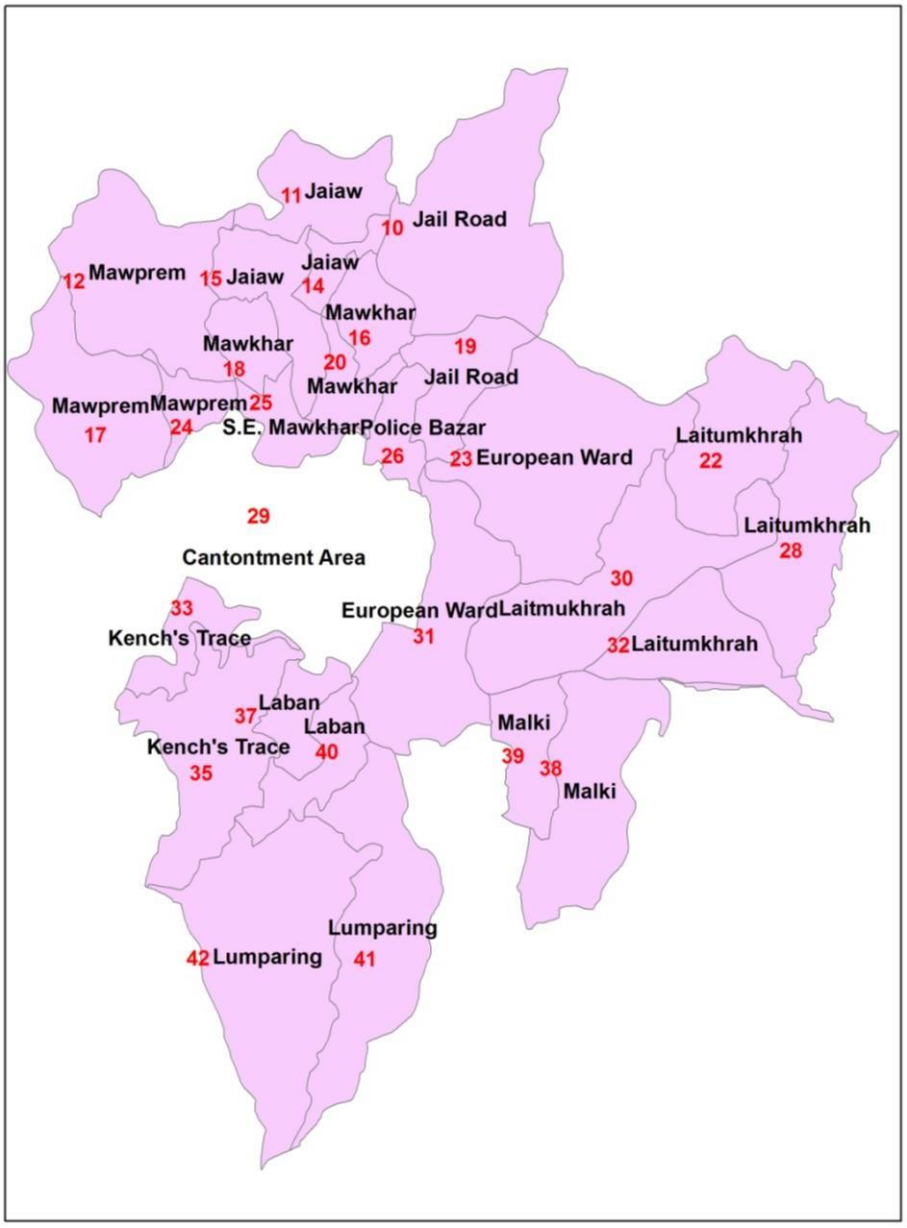


Figure 4.1: Shillong Municipal (Localities and Ward Names)

Table 4.1: Profile of Shillong City

Latitudinal and Longitudinal Extent	25°31'26" – 25°39' 56" N and 91°47'20" – 92°0'39" E
Area	10.99 sq. km
Number of wards	27 (excluding cantonment)
Weather characteristics	
Average annual rainfall	2,167 mm
Mean Annual Temp. (Minimum, Maximum)	12.9°C, 30.2°C
Rainy days (season)	112.7 days (Apr-Oct)
Mean Annual Humidity	70%
Socio economic profile	

Slums Population	3,303
No. of slum households	887
Population	162,017 (2017)
Population density	14,733 person/ sq. km
Key economic activity	Tourism, Trade and Commerce
No. of households (residential)	37,567 (2017)
Literacy rate	92.81% (Census 2011)
Infrastructure	
Road length	211 km
Industries	528 (2017)
Hospitals	28 (2011)
Educational institutions	129 (2011)

Source: Shillong Municipal Board (SMB); Census of India (2011)

POPULATION PARTICULARS

As per 2011 census, total population of Shillong Municipal Area is 184,950. Based on population, Shillong Municipal is ranked 2nd in East Khasi Hills district and ranked 3rd in Meghalaya. Out of State's total urban population as per 2001 Census, the Shillong Municipal Area represents nearly 41% of the State's urban population. The population growth of SMA shown in Table. 4.2 and Figure

Wardwise distribution of population for 2011 is shown in Table 4.3.

Table 4.2. Population Growth Data Shillong Municipal Area

Name	Population				
	1971	1981	1991	2001	2011
Shillong Municipal Area	87659	109244	131719	132867	143229

Source: Master Plan of Shillong, Table 2.2, P7 and Reports of Census of India 1991, 2001, 2011

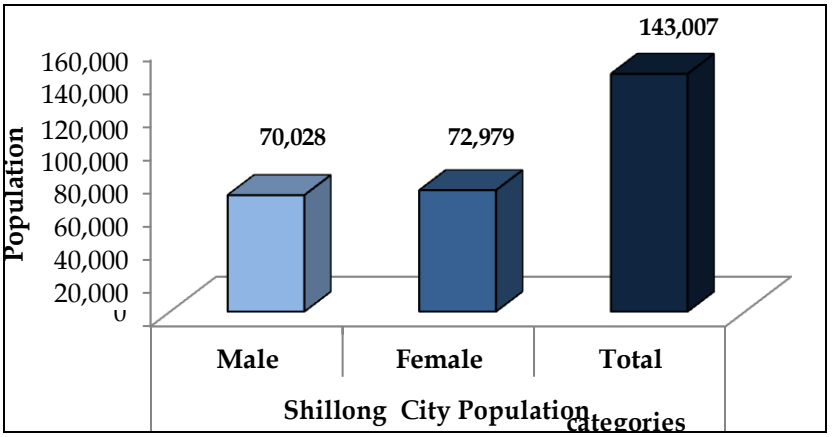


Figure 4.2: Shillong City Population- 2011

Table 4.3: Detail Ward-wise population for Shillong City for year 2011

Ward No	Ward Name	1991	2001	2011
1	LAITUMKHRAH1	7656	2397	11537
2	LAITUMKHRAH2	2177	9748	3266
3	LAITUMKHRAH3	5291	6133	5437
4	LAITUMKHRAH4	3836	2995	2753
5	MALKI1	3699	3413	4908
6	MALKI2	6526	7494	4888
7	EUROPEAN WARD1	4615	4753	4891
8	EUROPEAN WARD2	4500	4261	6009
9	POLICE BAZAR	2936	1529	2145
10	JAIL ROAD	5244	4688	5766
11	JAIL ROAD1	4654	4536	4863
12	MAWKHAR1	3606	6027	2797
13	MAWKHAR2	6602	2173	5337
14	JAIAW1	4626	3547	3032
15	JAIAW2	3898	4901	3838
16	JAIAW3	3958	2667	4067
17	S.E. MAWKHAR	4798	3375	3270
18	MAWKHAR3	5382	5189	3875
19	MAWPREM1	3557	5431	4556
20	MAWPREM2	9299	8900	10613
21	MAWPREM3	9756	12052	14009
22	KENCH'S TRACE1	1990	3589	2973
23	KENCH'S TRACE2	5722	3703	8161
24	LABAN1	3412	4501	3568
25	LABAN2	3577	3139	5218
26	LUMPARING1	6731	4148	6319
27	LUMPARING2	3671	7278	5133
	Total	**131719**	**132567**	**143229**

SHILLONG LITERACY RATIO

Shillong literacy ratio of 92.81% with 119,642 total people literated. Literacy rate for male and femle is 94.80% and 90.92% respectively. In terms of literacy, Shillong ranks at 1st in East Khasi Hills district and ranked 1st in Meghalaya (Census, 2011).

SHILLONG SEX RATIO

The sex ratio of Shillong city is 1042 per 1000 males. The sex ratio of female to male in Shillong UA was found higher with figure of 1006 females against national urban average of 926 females per 1000 males.

SHILLONG EMPLOYMENT RATIO

Shillong has total 54,807 people employed. Out of total employed people, 36,491 are male and 18,316 are female. Employment ratio of Shillong is 38%.

SECTION 5

HAZARD RISK VULNERABILITY ASSESSMENT

INTRODUCTION

The Shillong city like the whole state of Meghalaya, by its geographical location and geological setup, is highly vulnerable to natural hazards, especially earthquakes, landslides, heavy rainfall and storms. The changing topography, rapid development, as well as environmental degradation has increased the vulnerability of the area to disasters. The growth of population and increased building activity has also made the city prone to hazards like flash flood, fire, land slides, road accidents, etc. Due to the growing pressures, the water resources, the soil resources and other resources are becoming polluted, giving rise to health hazards. The risk of a disaster due to collapse of man-made structures is also high.

"Multi-Hazard Risk and Vulnerability Assessment (HRVA) for the city of Shillong, Meghalaya". was carried out by RMSI. The outputs of the project are used in the preparation of CDMP for Shillong Municipal area.

IDENTIFICATION AND ASSESSMENT OF HAZARDS

The historical hazard information shows that the city is vulnerable to earthquakes, floods, landslides, thunderstorms (associated with strong wind, lightning, hailstorms and cloudbursts), cold wave, fire, and climate change impact on hydro-meteorological hazards. Being located in seismic Zone-V, the city is highly vulnerable to earthquakes. Historical hazard information, including frequency of occurrence and damage, were considered while carrying out detailed hazard assessments. The impact of projected climate change on hydro-metrological hazards, particularly on flood, thunderstorm (including strong wind) have also been factored in for the assessment of city.

5.3.1. EARTHQUAKE HAZARD ASSESSMENT

North-East India region lies in one of the seismically active regions of the world. As per the Seismic Zoning Map of India (IS: 1893, 2002, 2014), Shillong city is located in the highest seismic Zone-V. Some of the well-known earthquakes that have occurred in North-East India include the 1869 Mw 7.5 Cachar earthquake, 1897 Mw 8.1 Great Assam earthquake (also known as 1897 Shillong earthquake; Bilham and England, 2001), 1923 Ms 7.1 Meghalaya earthquake , 1930 Ms 7.1 Dhubri earthquake, 1943 Ms 7.2 Assam earthquake, 1947 Ms 7.7 Arunachal Pradesh earthquake, 1950 Mw 8.7 Assam earthquake, 1988 Ms 7.3 Manipur earthquake, 2009 Mw 5.1 Assam earthquake, 2011 Mw 6.9 Sikkim earthquake, and the recent 2016 Mw 6.7 Imphal, Manipur earthquake. Shillong city lies on the Shillong Plateau (Figure

5.1). The plateau has experienced heightened seismicity from 1869 to 1950. Since 1951, the Shillong city and nearby areas have been experiencing moderate to high level of seismicity. In spite of the moderate to high levels of seismicity observed in and near Shillong in the last 65 years, it cannot be said that higher intensity earthquakes (VIII and above) are unlikely as the region has a potential for large earthquakes. Recently, on April 13, 2016, an earthquake of magnitude 6.7 occurred 29 km west of Imphal, Manipur, which was severely felt in different parts of Shillong city causing panic and minor non-structural damage in a few buildings.

Seismic hazard assessment identifies and demarcates areas, which are exposed to different levels of earthquake ground motion. It provides information on the expected levels of peak ground motion that might be experienced in different parts of a city for a particular value of probability of exceedance by taking into account all the seismic sources in and around the city. Most of the seismic hazard assessment studies estimate the expected hazard at hard rock level. However, it is important to understand that ground motion experienced by structures is not necessarily at the hard rock level. Hence it should be estimated at the surface level since local soil also plays an important role in ground motion amplifications, especially when Vs30 (average shear–wave velocity up to a depth of 30 meters) values are much lower than 760 meters/second. From the data analysis, it was observed that Vs30 values in Shillong city vary from about 358 m/sec to 904 m/sec. Hence, for proper estimation of the seismic hazard, modeling of local soil amplification is important. The seismic hazard assessment approach for Shillong city comprises of the following:

- Seismotectonics of the city
- Review of published probabilistic seismic hazard analyses for key return periods and choose the hazard value(s) at hard rock level
- Model the soil-amplification on a finer grid cell of 0.1 km x 0.1 km using NEHRP (2007)/HAZUS-MH soil classification scheme
- Convolute the hazard value(s) at hard rock level with soil amplification factors and generate earthquake hazard maps for 10% probability of exceedance (475 year return period)
- Compute the seismic hazard values at Uniform Resolution Grids (URG) at 0.1 km x 0.1 km for Shillong city
- Generate GIS based seismic hazard maps at ward level
- Map Seismic hazard to show expected peak ground motion (Peak Ground Acceleration, PGA) for 10% probability of exceedance (475 year return period), which is the end result of hazard assessment.

5.3.1. Seismotectonics of Area Around Shillong

As mentioned earlier, the Shillong city lies within the seismically active Shillong Plateau where moderate to strong earthquakes have occurred frequently. SP has experienced high seismicity from 1869 to 1950. During this period, the plateau has experienced two great earthquakes – the Mw 8.1, 1897 Great Assam earthquake (also known as 1897 Shillong earthquake) and the Mw 8.7, 1950 Assam earthquake.

The 1897 Shillong (Assam), northeast India, earthquake is considered to be one of the largest in the modern history and opened new vistas in observational seismology with the Oldham (1899) classic memoir (Rajendran et al, 2004). This earthquake prompted the establishment of India's first seismic observatory in Alipore (Kolkata) in 1899 (Kayal, 2008). It caused extensive damages to life and property in the plateau as well as to Shillong City. According to Gupta and Singh (1980), the plateau experienced an earthquake of magnitude 5 on June 1, 1969, with an epicentral distance of 20 km from Shillong city. In another study by Khattri et al. (1992), the Shillong Plateau shows a persistent seismic activity with an average of 10-15 small magnitude earthquakes per day. As per Biswas et al. (2013), in recent years, there has been a noticeable rise in the number of felt earthquakes whose epicenters lie in the vicinity of Shillong City. Recently, on April 13, 2016, an earthquake of magnitude 6.7 occurred 29 km west of Imphal, Manipur, which was severely felt in different parts of Shillong city causing panic and minor non-structural damages to a few buildings. Various small and large faults, shear zones and lineaments surrounding the plateau as well as existing within it have shown evidence of seismic activity (Figure 5.1).

Faults present within SP include the Barapani shear zone, the Chedrang fault, the Samin fault, the Dapsi thrust, and the Dudhnoi fault (Kayal et al, 2006; Angelier and Baruah, 2009; Figure 5.1). The faults surrounding the SP are the Dauki fault in the south, the Dhubri fault in the west, and the Kopili fault in the east (Figure 5.1). According to Biswas et al. (2013), Barapani Shear Zone is one of the major active thrust faults in this region. The Dauki fault is more than 300 km long and dips towards south as a normal fault (Srinivasan, 2005). The Ms 7.1 Meghalaya earthquake of Sept 9, 1923 occurred on this fault. As per reports, this earthquake caused heavy damage in the southern part of Meghalaya including Cherrapunji; Guwahati, Sivasagar and Borjuli in Assam, and Mymensingh and Nagrakata in West Bengal. Another major fault – the Dhubri fault is the source zone for the Ms 7.1 Dhubri earthquake of 1930. This earthquake was felt far and wide from Dibrugarh and Manipur in the east, Kolkata in the south, Patna in the west and Nepal, Bhutan and Sikkim in the north (Kayal, 2008). As per reports, Dhubri town lying in close proximity to the Dhubri fault was the worst affected region with an intensity of IX. In Tura, Meghalaya, several government buildings suffered minor to

severe damages with a reported intensity of VIII. Damage was also reported in Shillong and Cherrapunji with an intensity of VI (Kayal, 2008). However, the damage to buildings in Shillong was much less than expected due to the lessons learnt from the 1897 earthquake as several buildings constructed after the earthquake were of Assam type, which are well built timber houses.

Northeast of the plateau lies the Kopili fault, which is about 300 km long (Figure 5.1). The Mw 7.5 Cachar Earthquake of Jan 10, 1869 occurred on this fault, which caused moderate to severe damages across entire North East India, including damages in the Khasi hills. As per reports, the Kopili fault is one of the most seismically active faults in the region and a major earthquake could be expected in the future (Kayal et al., 2006, 2010).

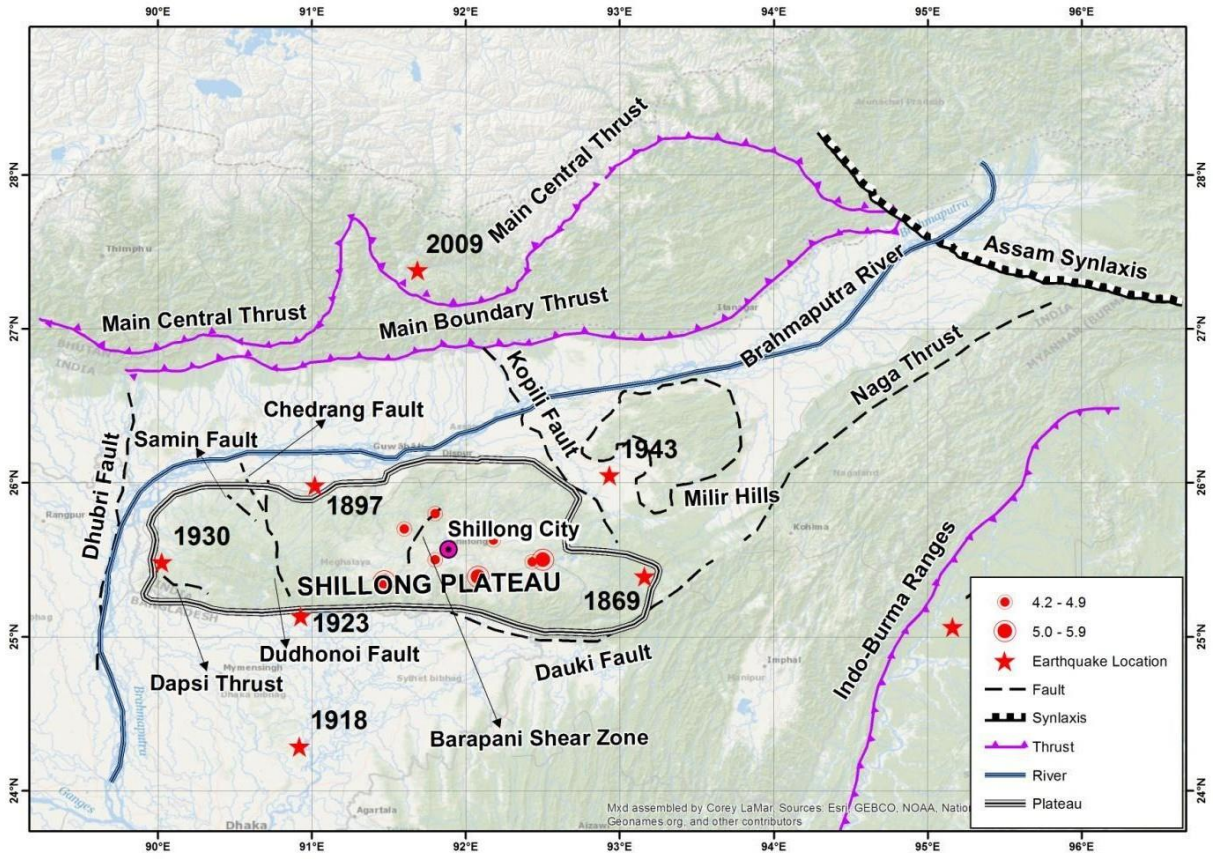


Fig u r e 5. 1 : Seismotectonic map of areas around Shillong (modified after Baro and Kumar, 2015)

5.3.1. Seismic Hazard at Rock Level

As per the study conducted by RMSI (2017) probabilistic seismic hazard values in and near Shillong city of about 0.38 g corresponding to 10% probability of exceedance in 50 years (475 years return period) at base rock level (Figure 5.2). The study clearly indicates that PGA values are almost the same for the entire city, while, in reality, different parts experience different levels of ground motion due to local soil conditions.

Local soil conditions can significantly affect earthquake ground motion of an earthquake. The soil's top layers act as filters that can modify the ground motion as a function of their dynamic characteristics. Soft, weak soils tend to amplify long-period seismic motions and thus generally impart large ground displacements to structures, while very stiff soil and rock tend to de-amplify the ground motion. The final seismic hazard map generated at ward-level contains seismic ground motion estimates at surface level by taking into account the local soil-amplification factors in different parts of Shillong city (Figure 5.3).

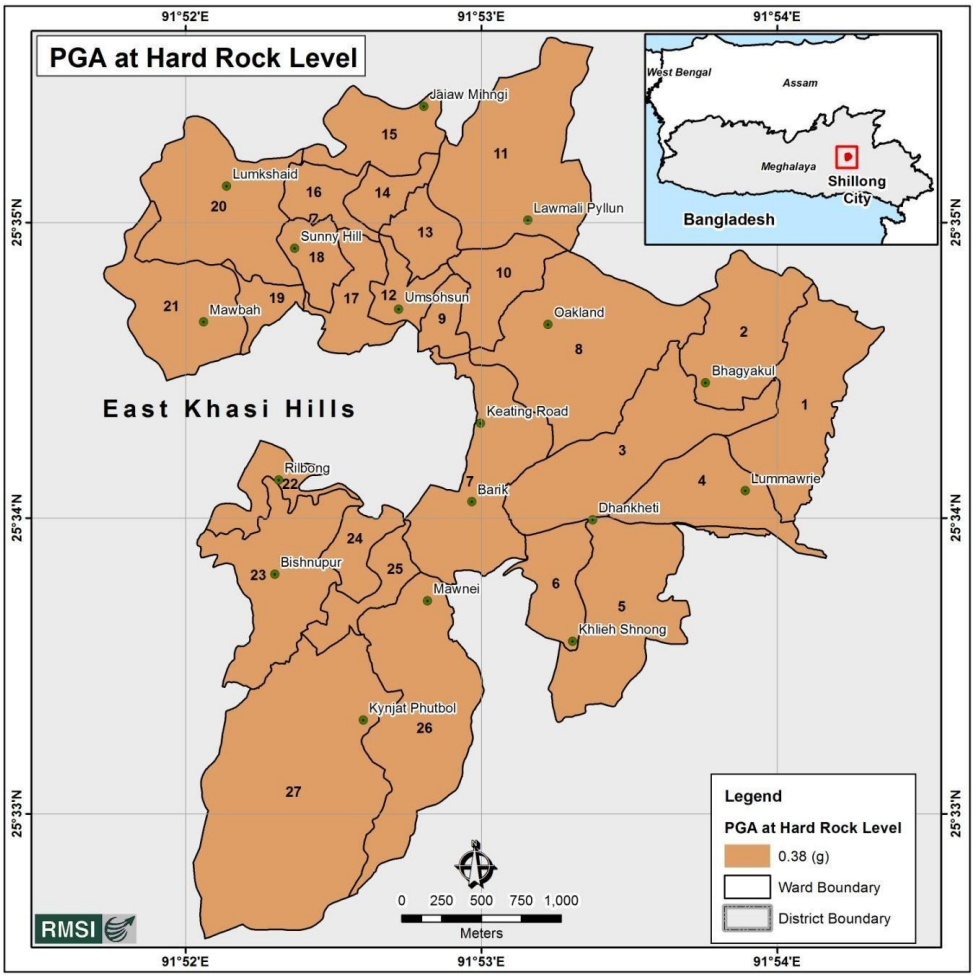


Fig u r e 5. 2 : Ward level PGA map of Shillong city at hard rock-level (after GSHAP)

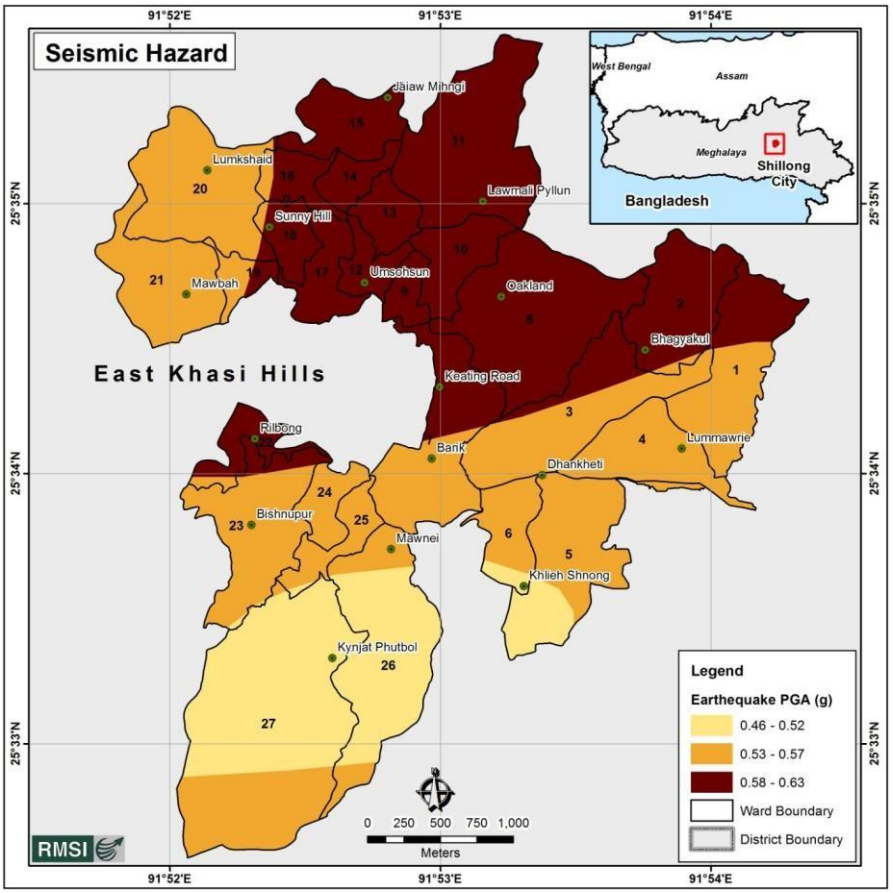


Figure 5. 3: Ward-level P GA based Probabilistic Seismic Hazard Map for 10 % probability of exceedance in 50 Years (475-Year Return Period) for Shillong c i t y

As discussed earlier, from Figure 5.2 it is clear that different parts of the city are expected to experience different levels of ground motion due to local soil amplification.

LANDSLIDE HAZARD ASSESSMENT

The municipal area of Shillong city is less prone to landslides as compared to its neighboring areas and the approach roads to the city. The city experiences most of its landslides during the monsoon that cause damages to houses, roads, and agricultural land. The occurrence of landslides in the monsoon months suggests that landslides are directly related to high rainfall intensity. The city also lies in seismic zone V (the zone of highest seismicity) and experiences tremors frequently, which, coupled with high rainfall, can act as a trigger for landslides.

In the recent past, landslide vulnerability has increased due to unplanned and unscientific development, deforestation, chocking and blocking of natural drains, poor road construction, encroachments on steep hill slopes and unstable slopes. Some of the localities, which have experienced landslides in the recent pasts, include Madanriting (2000), Nongrimbah (2007), Lawsohtun (2007), Happy valley (2007), Lumsohra, Laitumkhrah

(2008), Mccabe Road, Bethesda, Arbuthnot road, Wah kynrud, Raid Laban, Um Saw, Lumparing, Jackson Trace Road, M.E.S. Road, and Sericulture farm (CDMP, 2016).

Collection of Historical Landslides Events

Historical information on landslide occurrences is one of the most important considerations in landslide hazard assessments. It gives the following insights:

- The frequency of the phenomena
- The types of landslides involved
- The volumes, spatial distribution, and the damages they cause
- The correlation between various factors

According to CDMP (2016), some of the localities that have experienced landslides are Laitumkhrah (2008), Arbuthnot road, Lumparing, Jackson Trace Road, and MES Road, Sericulture farm, Mc Cabe Road, Streamside Road, Bethesda, Wah Kynrud Raid Laban, Nongrimbah Stream, and Um Saw Saw, Lumparing. According to GSI, there is only one natural landslide within the city, which lies on the left bank of Umshirpi River near Lumlyer. The remaining landslides occurred due to human interference. Figure 5.4 presents historical landslide locations within the city.

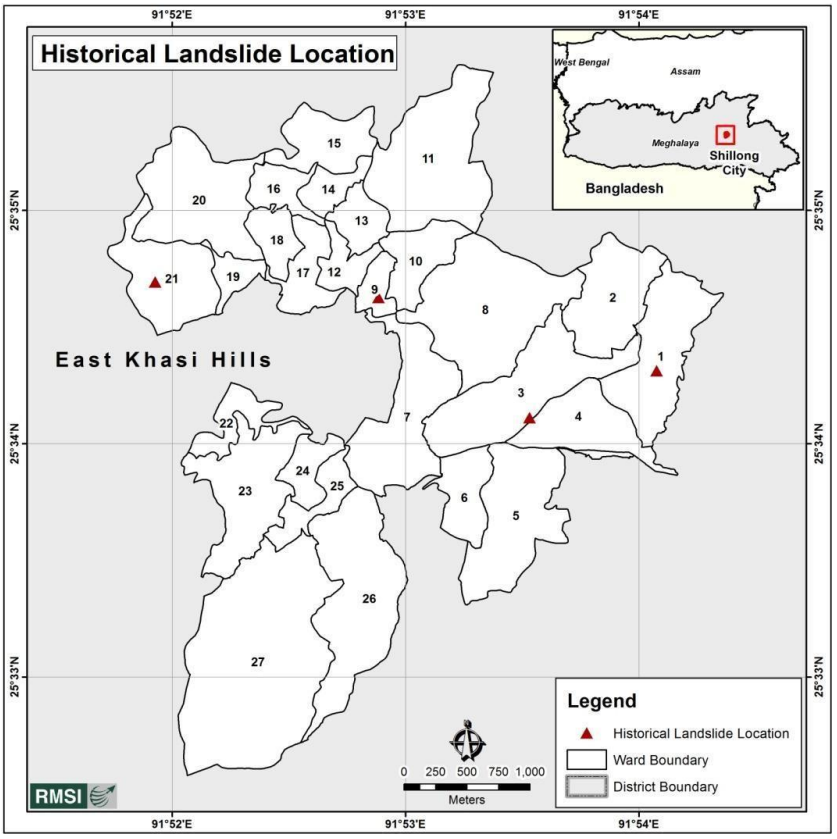


Figure 5.4: Locations of landslide events in Shillong

Landslide Hazard Mapping

In the study for landslide susceptibility mapping, the following factors were considered:

Slope Angle

Slope angle is the principal causative factor in landslide initiation. It can be numerically calculated and spatially illustrated from the Digital Elevation Model (DEM). As a rule, the steeper the slope, the higher is the risk of landslide due to the higher gravity-induced shear. This is because as the slope angle increases, shear stress in soil or other unconsolidated materials generally increases, which leads to sliding. Low frequency of landslides is observed on gentle slopes because of the lower sheer stress associated with the low gradient while its frequency is greater on steep slopes because of higher shear stress. However, it has been observed that most of the supplied historical events in city have occurred in slope angles ranging from 6 to 15 degrees

Slope data has been prepared from SRTM digital elevation model of 30-meter resolution. It has been divided into 8 classes and ranking of each slope class has been done based on their susceptibility to landslide. Here rank eight indicates the maximum susceptibility while rank one indicates the minimum susceptibility. A thematic map of slope angle is presented in Figure 5.5.

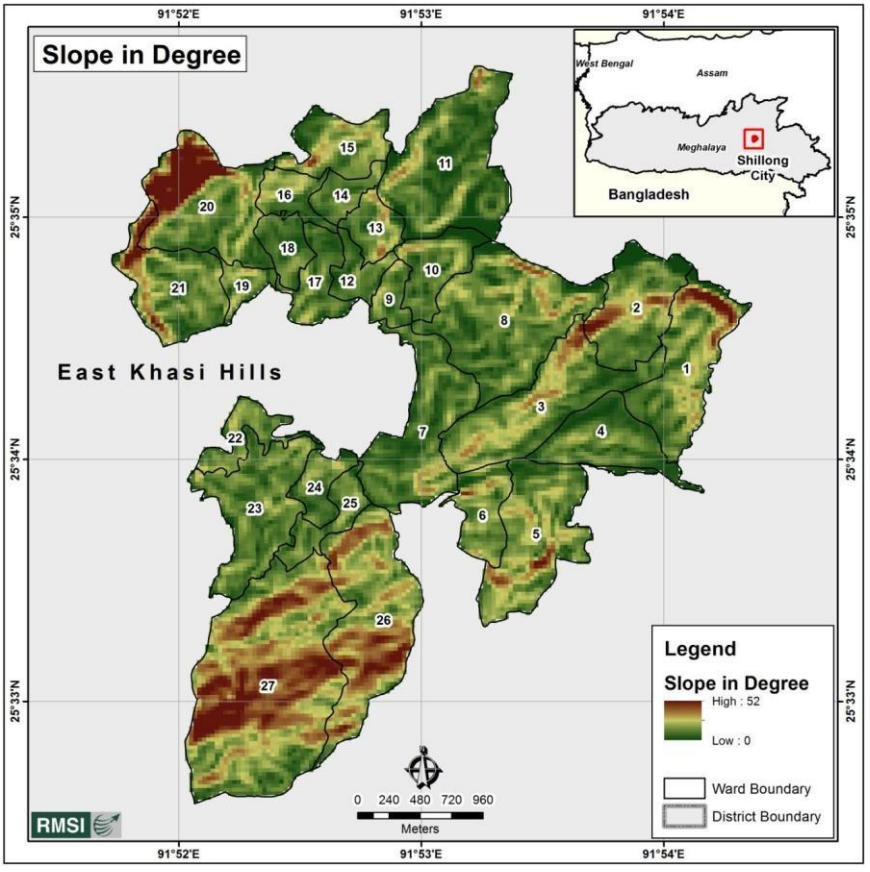


Figure 5.5 : Slope angle map of the study area

Geology

The source of geology data is Geological Survey of India (GSI), which is available at 1:2 million scale. The study area consists of low-grade metamorphic rocks of Shillong group comprising of quartzites with sub-ordinate phyllite of high foliation (*also known in geology as fissibility*), and slates and conglomerate. The rocks are highly weathered with soil cover ranging in thickness from less than 1 m to about 10 m at places.

The landslides along NH-40 are confined to the Shillong group of rocks and are more frequent where development activities have altered the slope profile. Incidentally, all the active landslides that took place during the monsoon period are encountered along NH-40, in the stretch characterized by well-bedded and jointed phyllite and the type of slide was mostly debris fall. Within the city, there are no major landslides. A thematic map for geology has been represented in Figure 5.6.

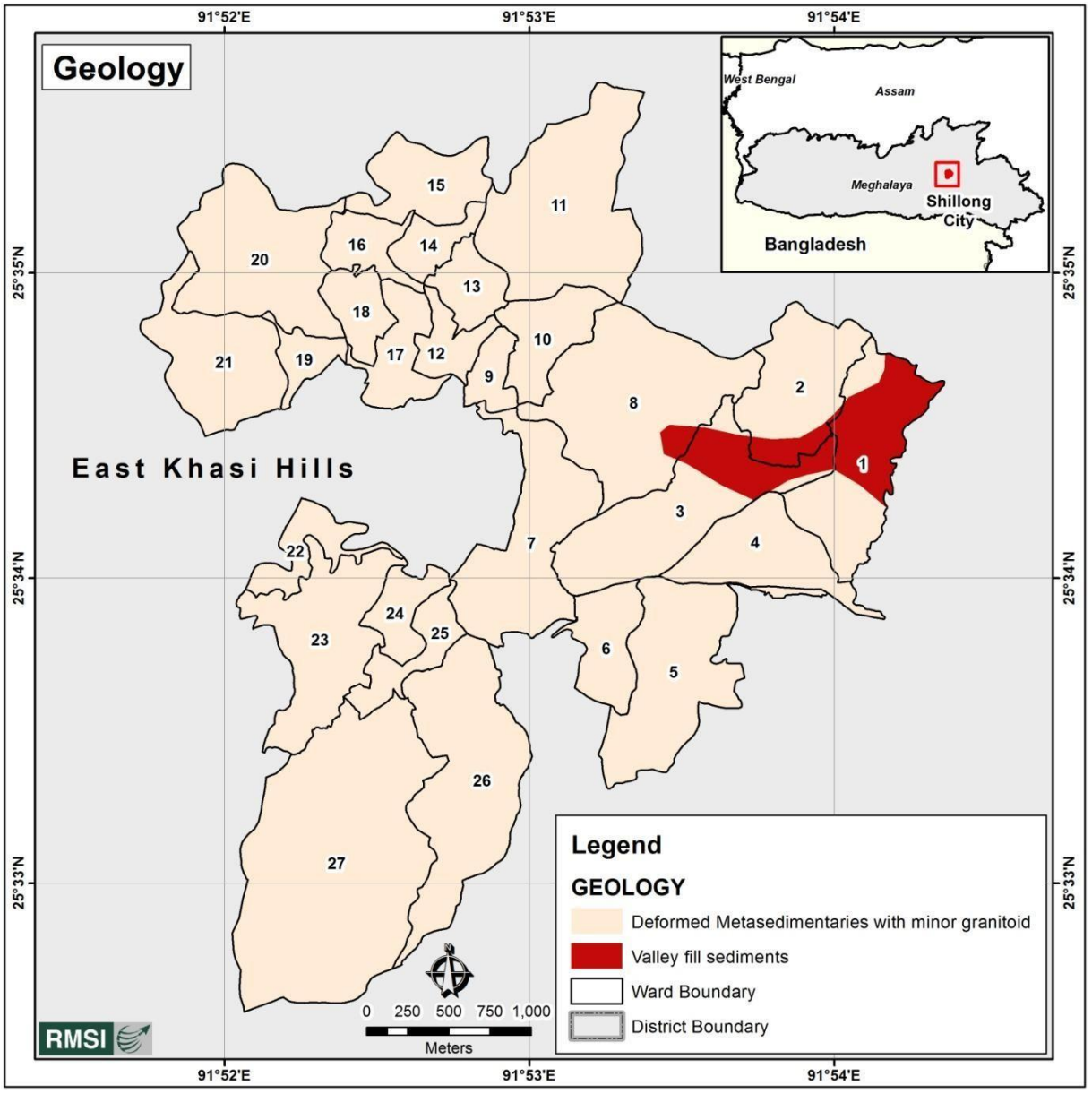


Figure 5.6 : Geology of the study area

Land use

Land use is one of the major factors influencing the occurrence of landslides. Frequently changing vegetation cover often results in modified landslide behavior. The areas with denser vegetation are less susceptible to sliding (mass movement) in comparison to areas with less or no vegetation. On the other hand, large areas of shrubs and bare hills are very conducive for landslide occurrences. Based on historical events, it has been observed that thickly populated slopes are more susceptible to landslides. A thematic map for the land use has been presented in Figure 5.7.

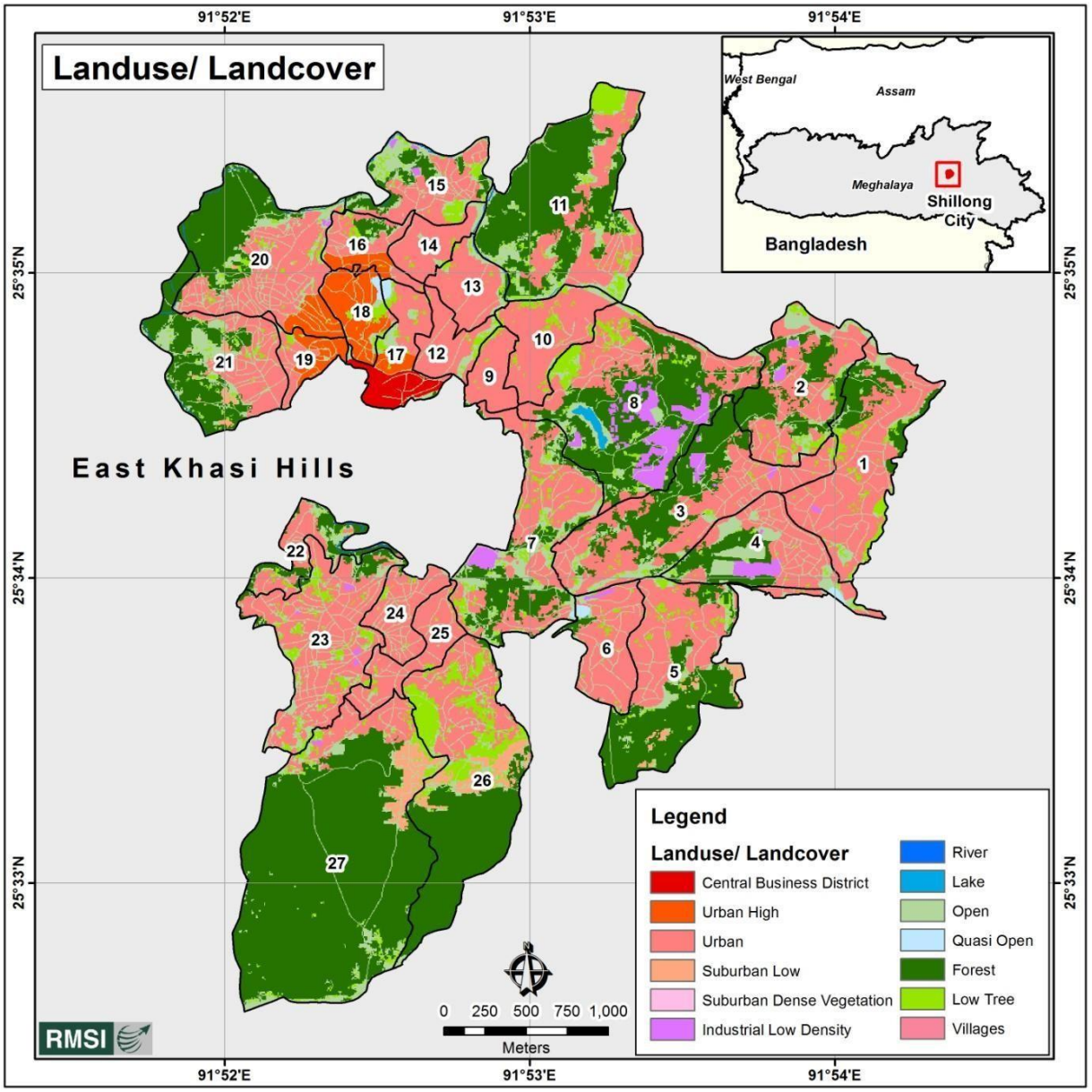


Figure 5.7: Landuse/Landcover map of the study area

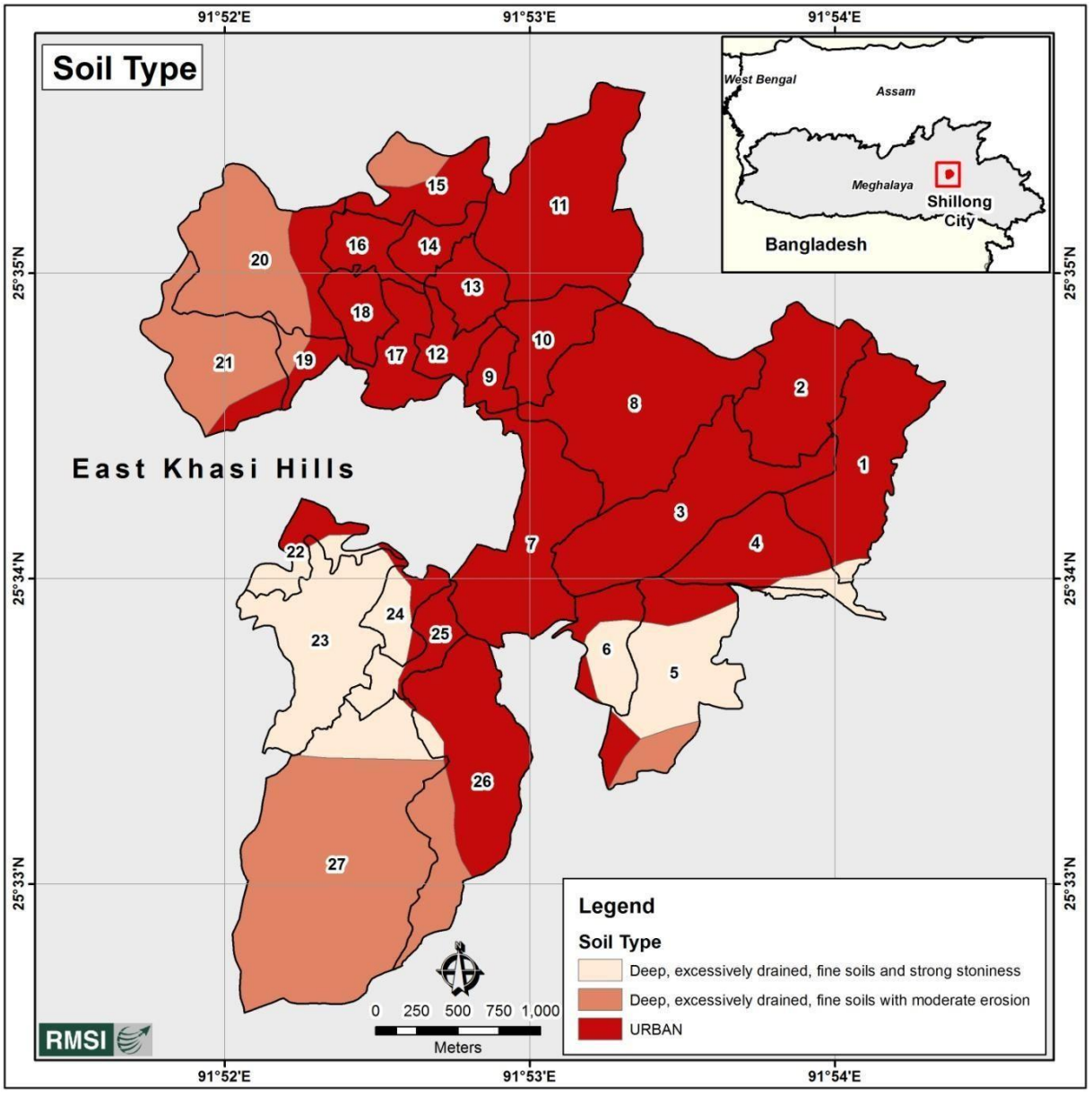
Soil

Soil texture and depth influence slope stability. Data from the National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) provided three classes for study area based on the soil texture, depth, and drainage capacity. Ranking of each soil class has been done based on their susceptibility to landslide where rank three indicates the maximum

susceptibility (valley-filled sediments) while rank one indicates the minimum susceptibility (Deep, excessively drained, fine soils on moderately steep side-slopes of hills having loamy surface with moderate erosion hazard and strong stoniness). A thematic map for soil has been presented in Figure 5.8.

Seismicity

One of the major factors in triggering landslides is seismicity. Based on the peak-ground acceleration value, the entire city has been categorized into three zones using natural



Figur 5.8 : Soil map of the study area

breaks. Zones having high PGA values have been ranked higher as compared to zones having lower PGA values (Figure 5.3).

Rainfall

Spatial patterns of rainfall and its intensity are closely associated with landslide initiation as they generate pore water pressure in unstable slopes. It is considered a triggering factor for landslide. Based on rainfall, the entire city has been divided into 3 zones. Ranking of each rainfall zone is done based on their susceptibility to landslide. Here rank three indicates the maximum susceptibility (zone having highest rainfall) while rank one indicates the minimum susceptibility (zone having least rainfall). A thematic map for rainfall has been presented in Figure 5.9.

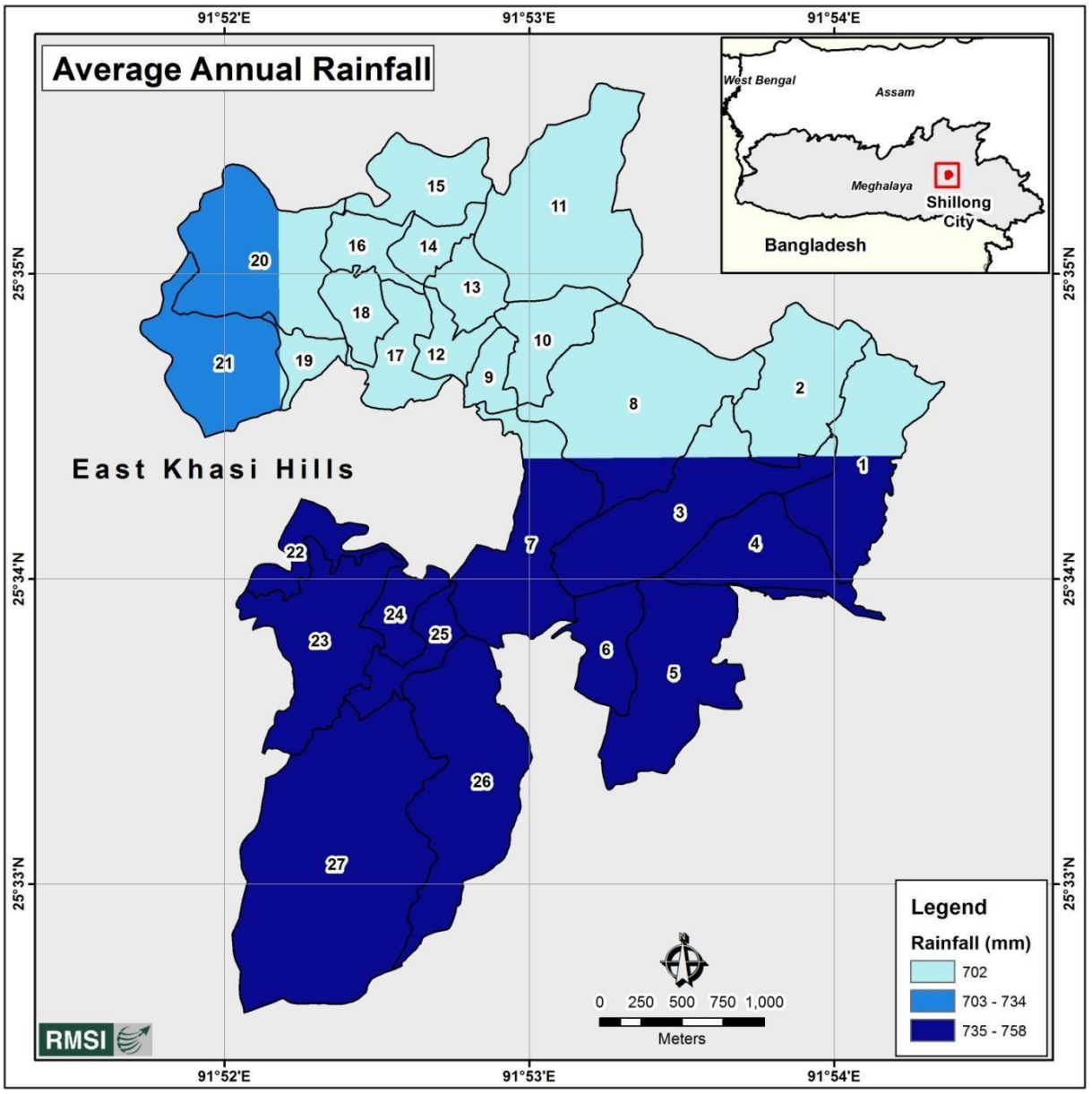


Figure 5 . 9 : Rainfall map of t he s t udy area

As described in sub sections 2.3.4.1 to 2.3.4.6, thematic maps of each factor have been generated based on their susceptibility to landslide which have been used further to determine landslide susceptibility of the city.

Landslide Susceptibility Mapping

To get the final landslide susceptibility zones, the six factors described above were compared pair wise. Five susceptibility classes were identified. Areas with the highest weight value of 5.03 or more have been designated as falling under the Very High landslide susceptibility zone. Similarly, areas with weight values between 4.05- 5.03 have been designated as falling under the High landslide susceptibility zone; those falling between 3.15-4.05 as falling under the Medium landslide susceptibility zone; and those falling between 2.35-3.15 as falling under the Low landslide susceptibility zone. Areas with weight values <2.35 are considered as Very Low landslide susceptibility zones. The landslide susceptibility map for Shillong city is shown in Figure 5.10.

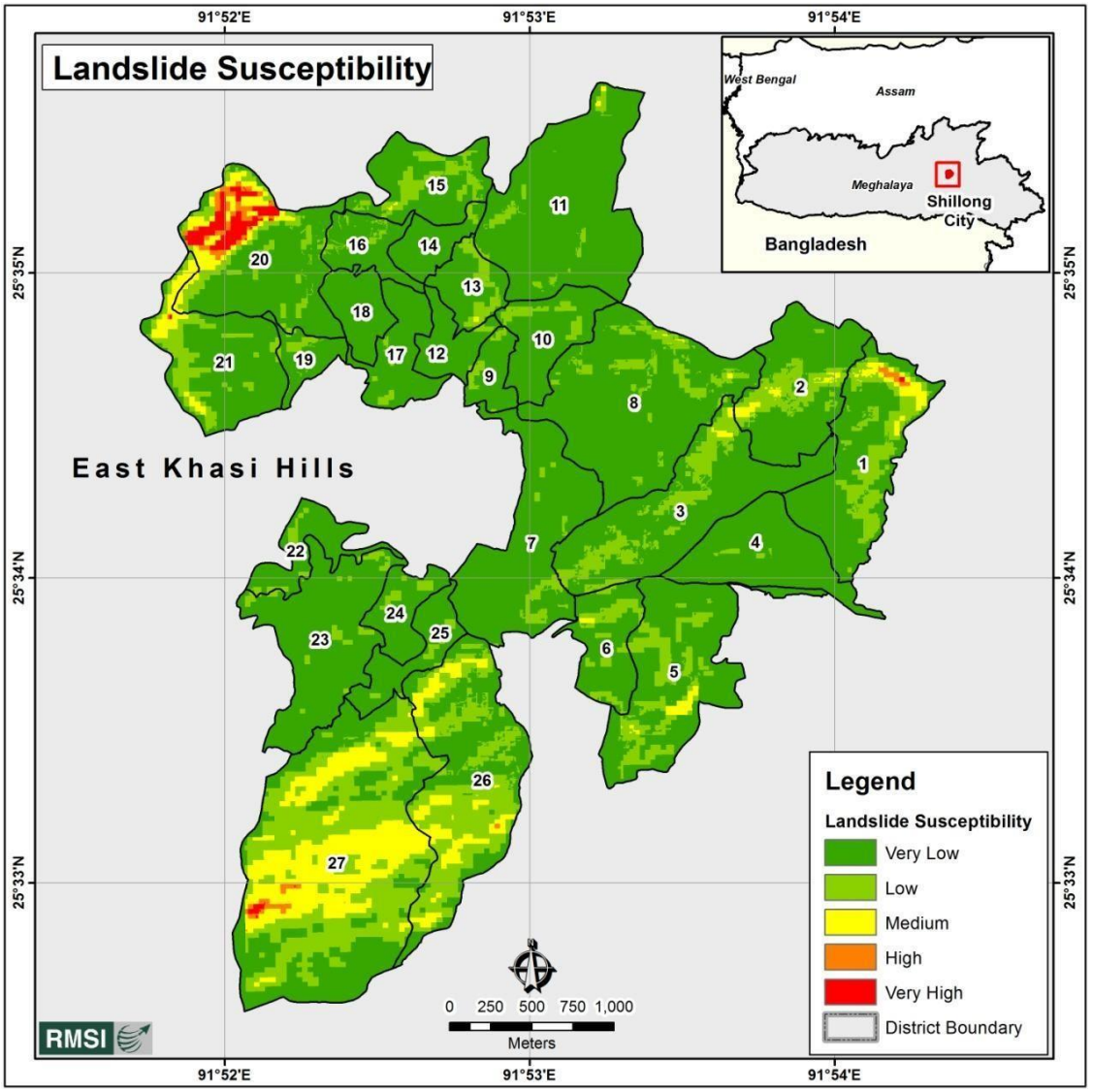


Figure 5.10 : Landslide susceptibility map of Shillong

THUNDERSTORM AND STRONG WIND HAZARD ASSESSMENT

Before the monsoon sets in, there is considerable thunderstorm activity in and around Shillong city in the month of April and May that are the cause of high rainfall (HRF) events.

Many of these HRF events occur associated with the pre-monsoon Nor'westers (tornadoes). In and around Shillong city, these thunderstorms reach severity when continental air meets warm moist air from ocean in the lower troposphere. Thunderstorms in Meghalaya are locally named as "Er-langthari". These localized thunderstorms are generally accompanied by strong squally winds and torrential rainfall. Maximum destruction occurs in terms of lightning, thunderstorm, hailstorm and rainfall. Maximum thunderstorm activity is observed over Guwahati and Shillong (*in Assam and Meghalaya States as against Kolkata in Gangetic West Bengal*) with about 66–70 days of thunder in a year. Shillong city represents a zone of convergence between the pre-monsoon and southwest monsoon season. The pre-monsoon months of March, April, and May account for about 40% of annual total Thunderstorm days in Meghalaya State (Figure 5.11). The directions of these squalls (Nor'westers), although predominantly north–northwesterly, vary from west- northwesterly to northeasterly. Sometimes, squalls coming from southerly or southeasterly directions, attaining a maximum speed of 50 knots, have been observed. Majority of thunderstorms are observed to occur during the afternoon to early night over Shillong and the surrounding locations (Chaudhuri and Middey, 2013).

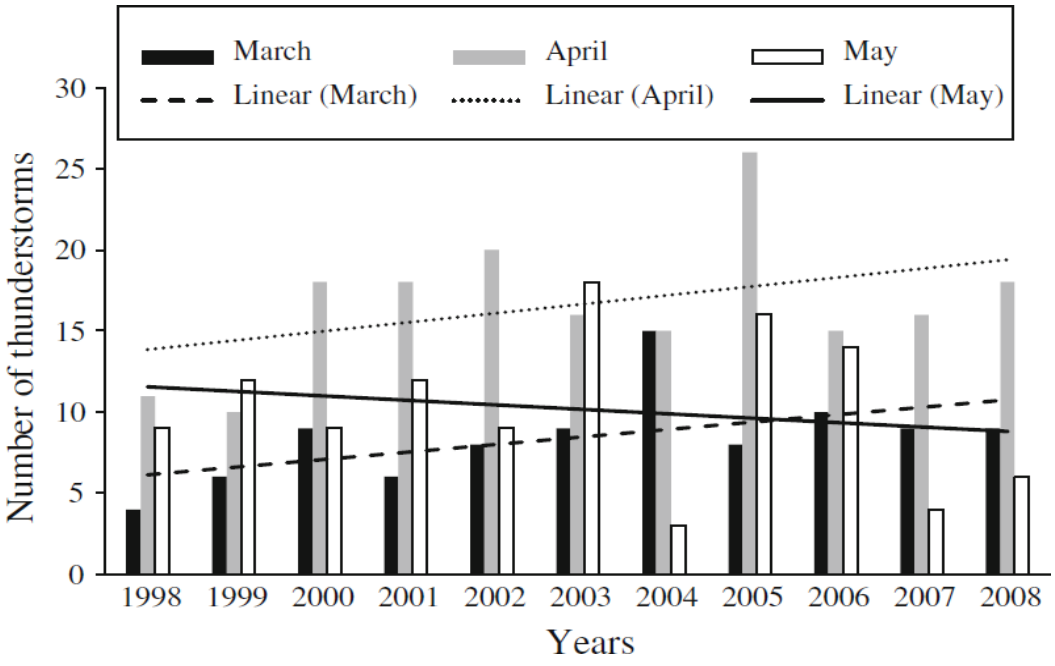


Figure 5.11: Trends in thunderstorm occurrences over Meghalaya state during the pre-monsoon season for the period 1998-2008 (Source:Chaudhuri and Middey, 2 013)

For Shillong, even though the average number of rainy days in a season is large, its average rainfall on a rainy day is around 14 cm. Figure 5.12 above depicts a comparison of climatological annual total and March to May (MAM) pre-monsoon rainfall averaged over Assam and Meghalaya to that in the Gangetic West Bengal and for All India Rainfall. It is interesting to see that Assam and Meghalaya get significantly more rainfall during the pre-

monsoon season as well as in the monsoon season relative to Gangetic West Bengal. Monthly distribution of rainfall over Shillong is depicted in Figure 5.13. It can be seen that Shillong gets a maximum precipitation of 469 mm in the month of June and minimum of 9 mm in December. The difference in precipitation between the driest month and the wettest month in Shillong is 460 mm.

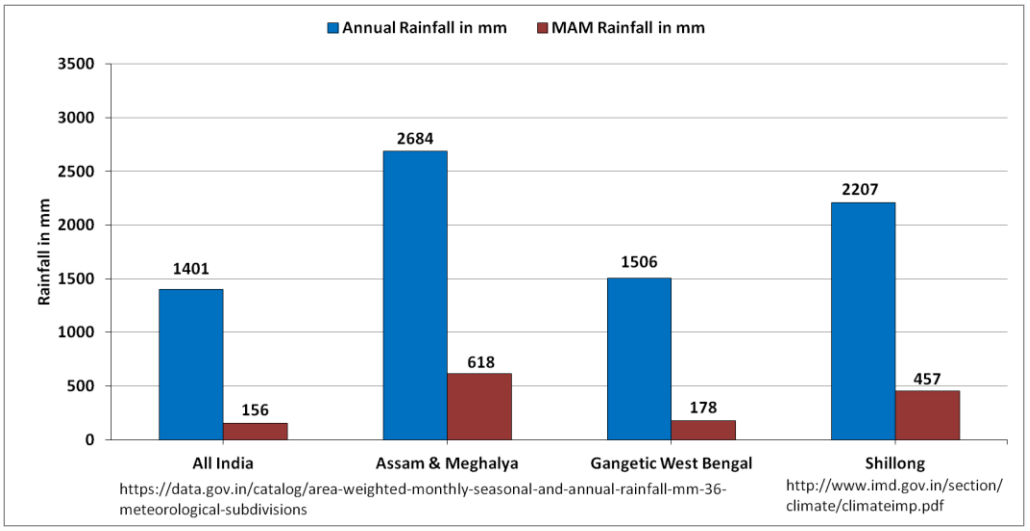


Figure 5.12: Comparison of climatological annual total and March to May (MAM) pre-monsoon rainfall over Shillong to that in Assam and Meghalaya, the Gangetic West Bengal and for All India Rainfall

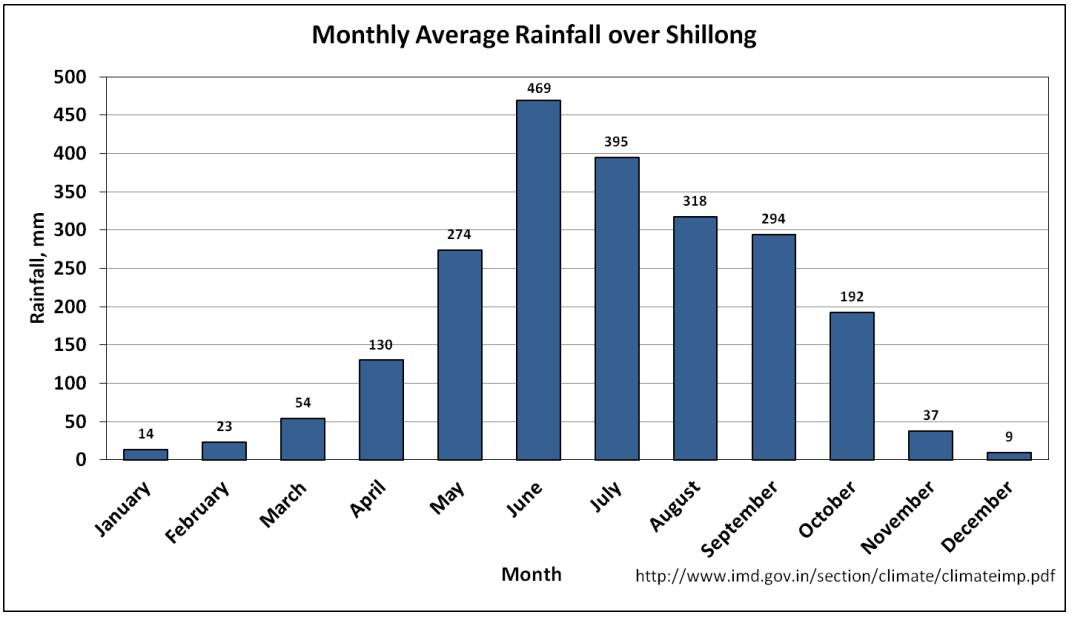


Figure 5.13: Monthly distribution of rainfall over Shillong city

During first fortnight of April in 2016, heavy thundershowers accompanied by a hailstorm hit Shillong and its surrounding areas. The all-India weather bulletin had forecast heavy rain and thunderstorms, accompanied by squalls at isolated places in Meghalaya and Assam for 5th April 2016. The capital city wore a whitish look with pebble-sized hail on the roads and the lanes and on rooftops. Several houses were damaged in and around Shillong

when strong wind accompanied with rain and hailstones lashed the capital city (Figure5.14). There was disruption of power supply in most parts of the city in the squall. Several trees were uprooted by the storm, which disrupted the movement of both vehicular traffic and the pedestrians. Similarly, heavy rain occurred in association with thunder squall with wind speeds exceeding 60 km/h accompanied with hail at isolated places over Arunachal Pradesh, Assam and Meghalaya on April 18, 21, and 22, 2015 and Shillong recorded 39.5 mm of rain.

The damage caused by the storm to Saint Nanak Secondary School in the Pynthorbah area. Telegraph pictures

A classroom of Saint Nanak Secondary School

A house in Nongmynsong, Shillong, with its roof blown off

Figure 5.14: Damages due to pre-monsoon squall and associated wind gusts in Meghalaya (Source: Daily Telegraph News of 6 April 2016)

As per the stuay carried ouy by RMSI, the following conclusions can be drawn:

- The thunderstorms, hailstorms, and squalls (broadly referred to as Nor'westers) in Shillong and surrounding areas are likely to be more vigorous and widespread in the future.
- The rainfall intensity in these thunderstorms would be more pronounced resulting in flash floods and associated landslides in terrains with steep slopes in Shillong and the entire East Khasi Hills district.
- The hailstorm events may become more frequent as the vertical extent of the thunderstorm cells developing in a warmer atmosphere are likely to reach higher (sub- freezing) levels in the

atmosphere.

- More instances of flash floods associated with the thunderstorms are likely to occur in the future, which are linked to stronger and deeper vertical updraft in Cumulonimbus cloud cells.
- Lightening discharges associated with deep convective thunderstorms in Shillong and in the entire Meghalaya state may be more severe in a warmer atmosphere.

URBAN FIRE HAZARD ANALYSIS FOR SHILLONG CITY

In Shillong city, the old buildings are made up of wood. Some of the new buildings as well the flooring of these buildings is also made up of wood. Certain localities of the city are very congested and the density of population is also very high. In such congested localities, fire incidences are very common. Every winter household fires take place due to overheating, electrical faults, burning of charcoal etc. (CDMP, 2016). The Fire and Emergency Service Headquarters in Shillong is located in near Madan Iew Rynghep (Figure 5.15). In addition to this, there are three other fire stations serving the city. These are the Barabazar Fire and Emergency Service Station, the Mawlai Sub-Fire and Emergency Service Station and the Upper Shillong Fire and Emergency Service Station. The narrow roads in the city make the operation of dousing fires challenging in case of fire incidents.

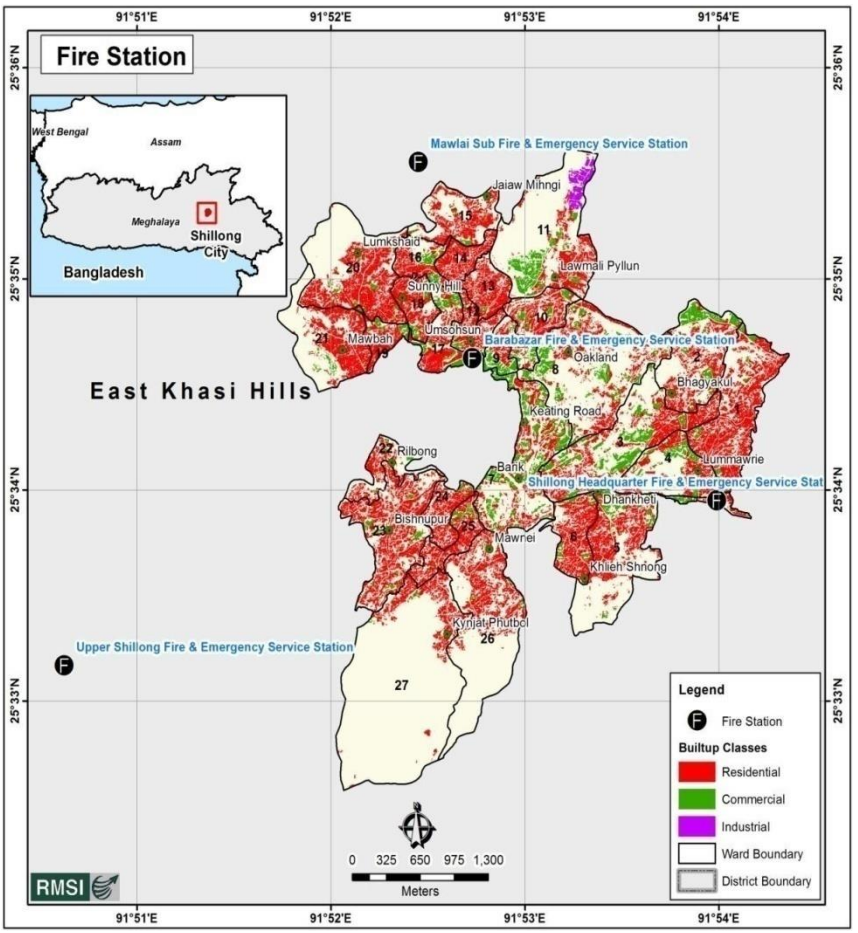
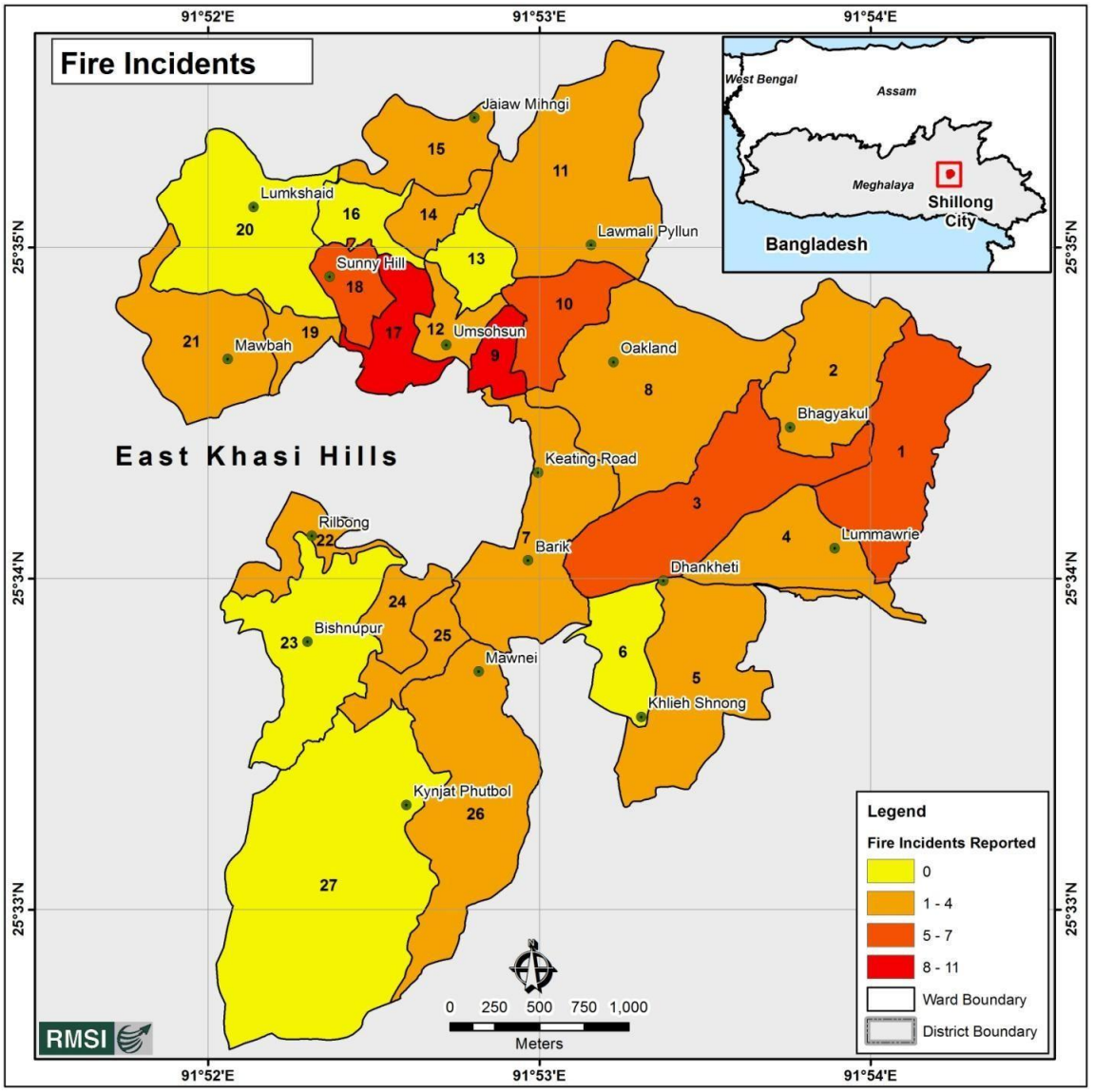


Figure 5.15 : Location of fire stations in Shillong city

Urban Fire Hazard Analysis

Historical event data (Figure 5.16) shows that the occurrence of fire events is higher in commercial buildings as compared to residential and industrial buildings. More events are reported in 2014 as compared to the 2015-2016. The Shillong fire station is located in the most densely populated area, which has a high density of residential and commercial buildings. As presented in Figure 5.16, Ward numbers 9 and 17 have the maximum number of fire incidents followed by wards 1, 3, 10, and 18.



Fi gure 5.16 : Ward-level number of fire incidences during 2014-2016

FLOOD HAZARD ASSESSMENT

5.7.1. Flood Prone Areas Around Shillong City

Shillong is a major city of the northeastern region of India with an average elevation of 1,525 m. As a hilly city, it is prone to various natural disasters. One of the disasters that affect the city is flash flooding. The city witnesses flash floods during the monsoon season, due to high intensity rainfall for prolonged hours. Other important factors responsible for flooding in the city are the clogging of drains and insufficient capacity of the rivers flowing through the city

area. Due to heavy downpours during the monsoon season, the water tops the banks along most of the streams causing flooding in localities in the vicinity of these streams. This is aggravated by a drastic reduction in channel capacities in most streams due to encroachments along their banks by buildings. The city is drained mainly by the upstream reaches of Wah Umiam, Wah Umkhen, and Wah Tamdong Rivers. Most of the drainage lines in the area are first, second, and third order reaches of these rivers. During the inception phase, the RMSI team collected various information regarding the nature, causes, and history of flooding. The team also collected information regarding the places that experience regular flooding. According to the Shillong CDMP (2016), the following areas have drainage congestions causing flash floods:

- Wah Umkhrah Mc Cabe Road
- Polo Market
- Don Bosco Road
- NH 40 Weiking Pdengshnong
- Budha Mandir Road
- Veronica Road
- Dhankheti Junction

It has also been observed that drains are not in good shape at many places along the roadside. At several places, rainwater simply flows onto the roads and many of the roads are without any drains. Dumping of garbage and waste materials at unauthorized sites and on roads clog the drains, which subsequently cause water logging and increasing the flooding problem. Figure 5.17 shows the flood hazard map and municipal ward boundaries overlaid on the Google Earth view of Shillong City.

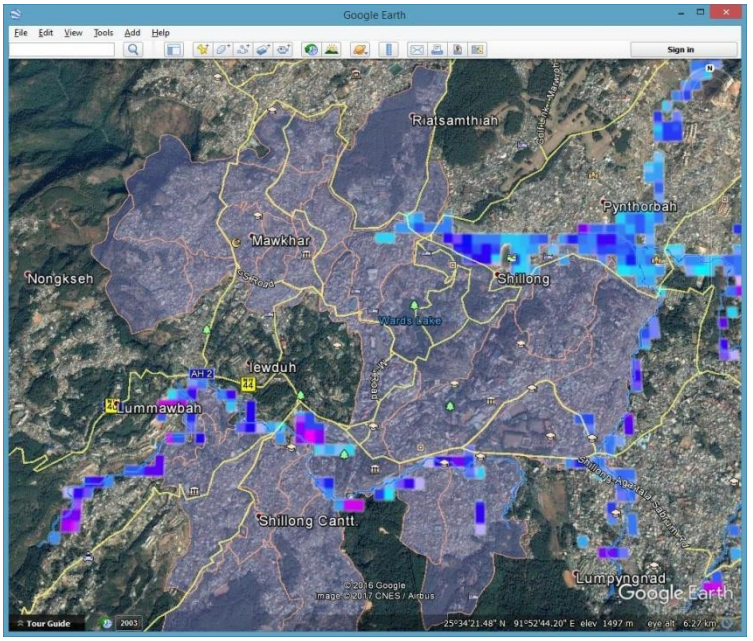


Figure -5.17 : 100-year return p eriod flood hazard map over laid on Google Earth

Flood Hazard Mapping Under Current Climatic Conditions

Based on return period rainfall and corresponding flow values, the team determined the boundaries of the flood plains by using 2D hydraulic modeling. Flood extent maps have been prepared by integrating model results with GIS data to produce maps with varying flood depths. The maps show the flood extents and flood water depths for various return periods. The flood hazard map for a 100-year return period event is shown in Figure 5.18.

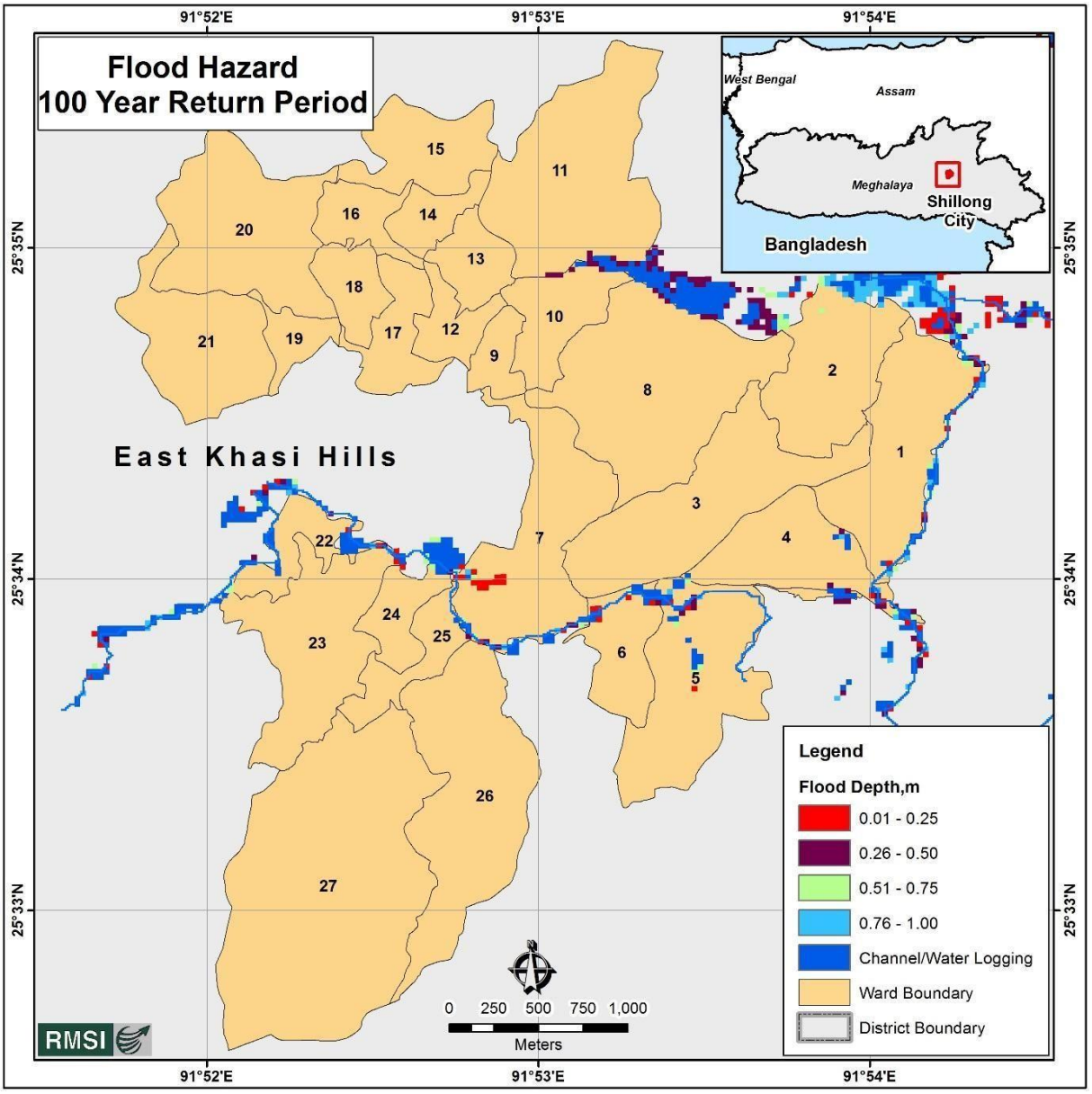


Figure 5.18: Flood Hazard Map for 100-year return period

Flood Hazard Mapping Under Projected Future Climatic Conditions

In order to understand the possible impact of future climate change scenarios on the rainfall and discharge patterns, flood hazard mapping has been carried out. For flood inundation modeling under future climatic conditions, three return periods, namely, 25, 50, and 100-year flows have been considered. Figure 5.19 shows a 100-return period event under

scenario 2 (26.7%) of the future climatic conditions.

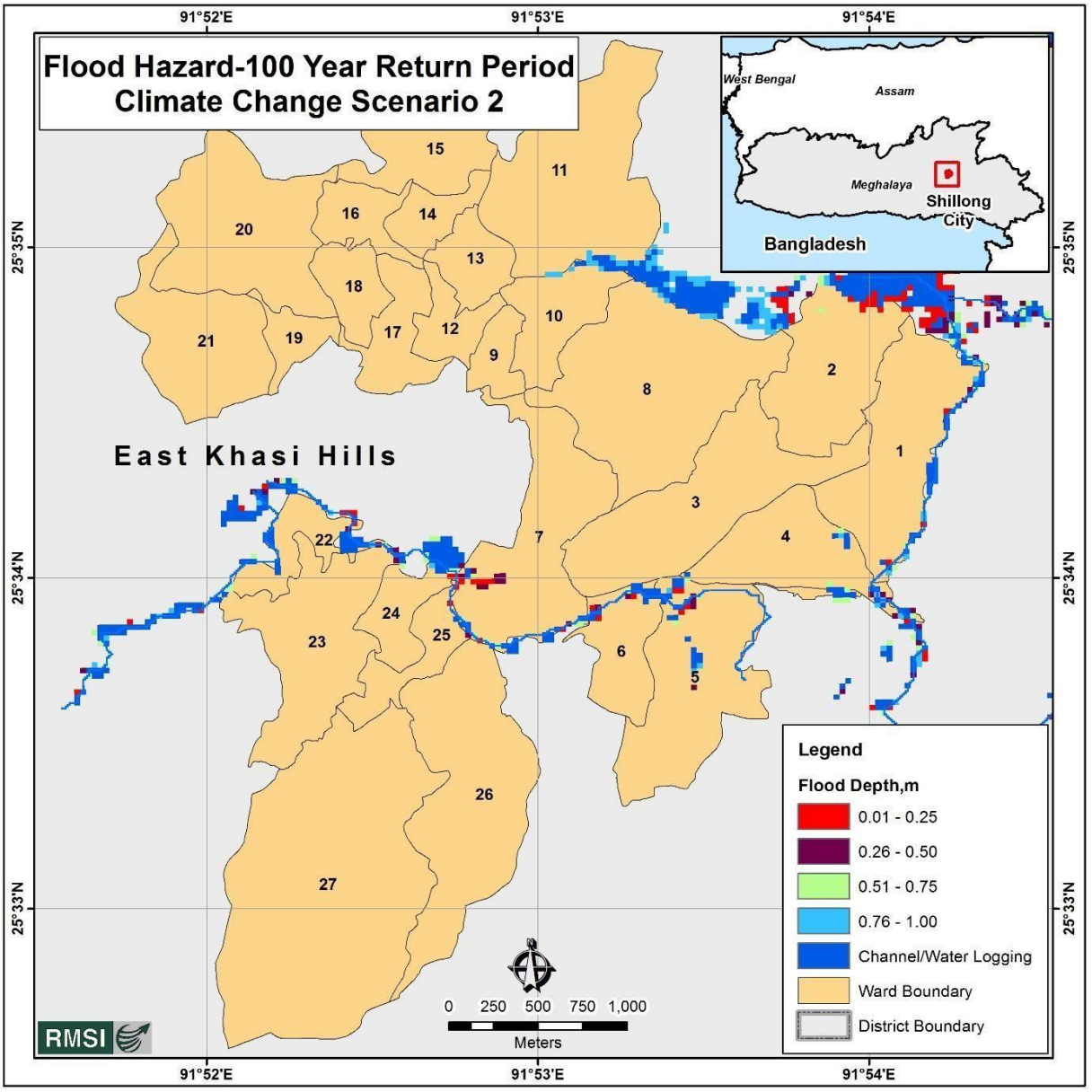


Figure 5.19 : Flood Hazard Map for 100 - year return under projected future climate scenario 2

ELEMENTS AT RISK

A detailed analysis of each exposure element that was collected is presented in the following subsections.

Demography

As per Census 2011, the total population of Shillong city is about 1.43 lakhs, which is approximately 17% of the district population. To estimate 2017 population, the decadal growth rate at municipal level (Census 2011 and 2001) was used to determine annual average growth rate, which was applied to Census 2011 population to arrive at the ward level populations for 2017. After applying the growth rate, the projected population for 2017 is

estimated at 1.62 lakhs. Figure 20 indicates that Ward No 19 of Shillong city has the highest population density of about 52,934 persons/ sq. km, followed by Ward No 13 with more than 39,973 persons/ sq. km. Ward No 11 and 27 are sparsely populated wards.

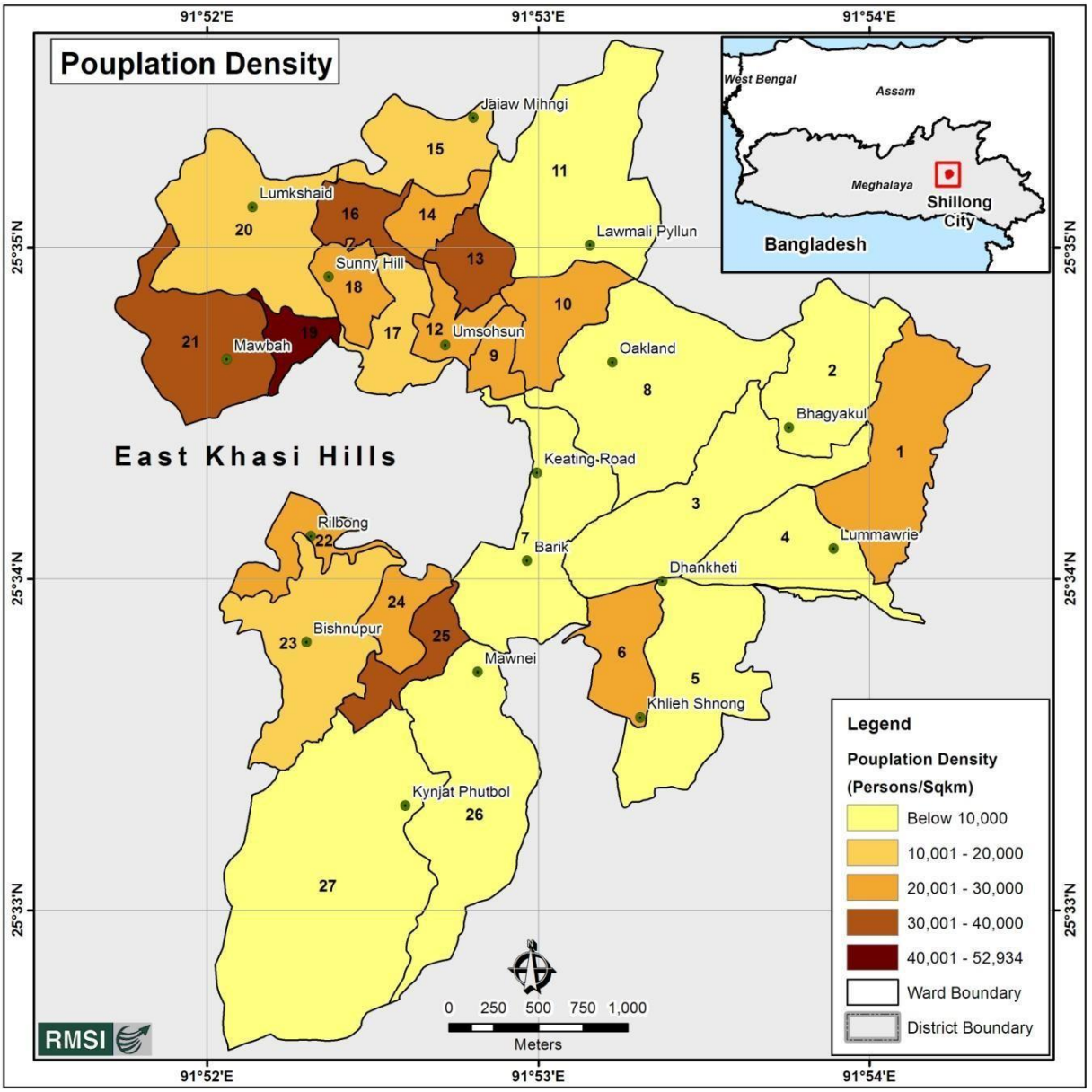


Figure 5 . 20 :Population density across v arious wards of S hillong

5.8.2. Exposure Values of Element at Risks

The total exposure values have been estimated for each type of exposure element. This estimation has been carried out by multiplying the unit replacement cost with corresponding asset length/area to get the total replacement cost for each exposure type. This data will be usefull to assess damage and decide the compensation if required. Table 5.1 provides details of estimated values for aggregated and site-specific exposures in the city of Shillong. Residential building exsposure level in terms of valu is presented in Figure 5.21. Wards 1 (Laitumkhrah), 20 & 21 (Upper and Lower Mawprem) are having the higer values interms of residential building exposure.

T a b le 5.1 : Estimated exposure values for aggregated and site specific exposures

Sl. No.	Exposure Layer	Total Replacement Cost (INR Crores)
1	Residential	1,098.96
2	Commercial	506.90
3	Industrial	310.73
4	Educational institutions	546.06
	Health facilities	232.63
5	Religious places	86.76
6	Police Stations	20.18
7	Fire Stations	3.11
	Administrative Headquarter	16.21
8	Bridges	39.06
9	Roads	705.11
10	Potable Water	97.75
11	Waste Water	102.92
	Communication System	12.38
12	Electric Power Network	214.34
13	Grand Total	3,992.10

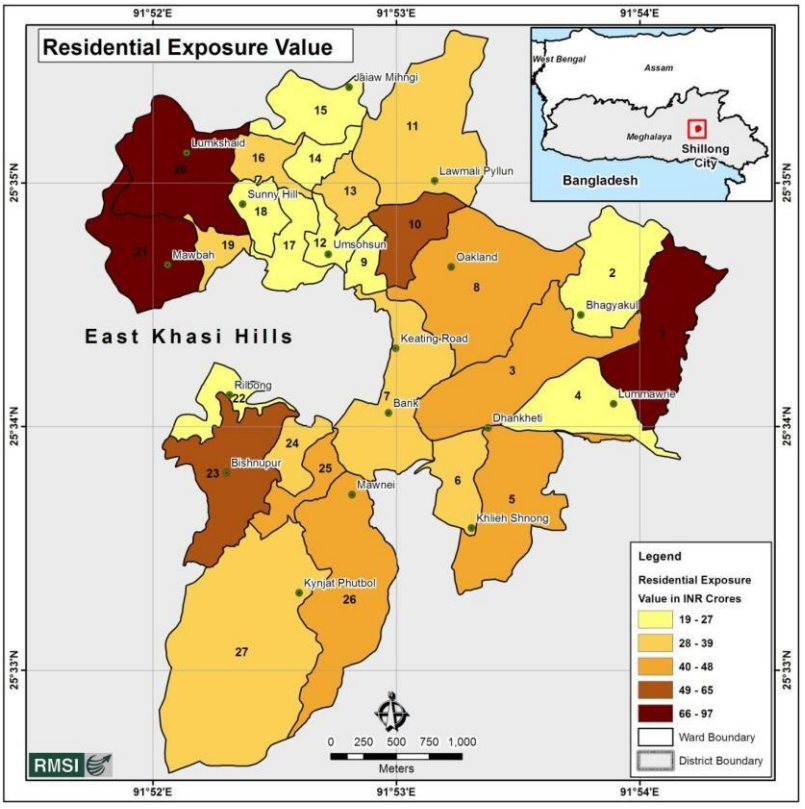


Figure 5.21: Ward-level distribution of total estimated exposure values for residential buildings

Industrial building exsposure level in terms of value is presented in Figure 5.22. Wards 11 (Jail Road and part of Lawmali) is having the higer values interms of industrial building exposure.

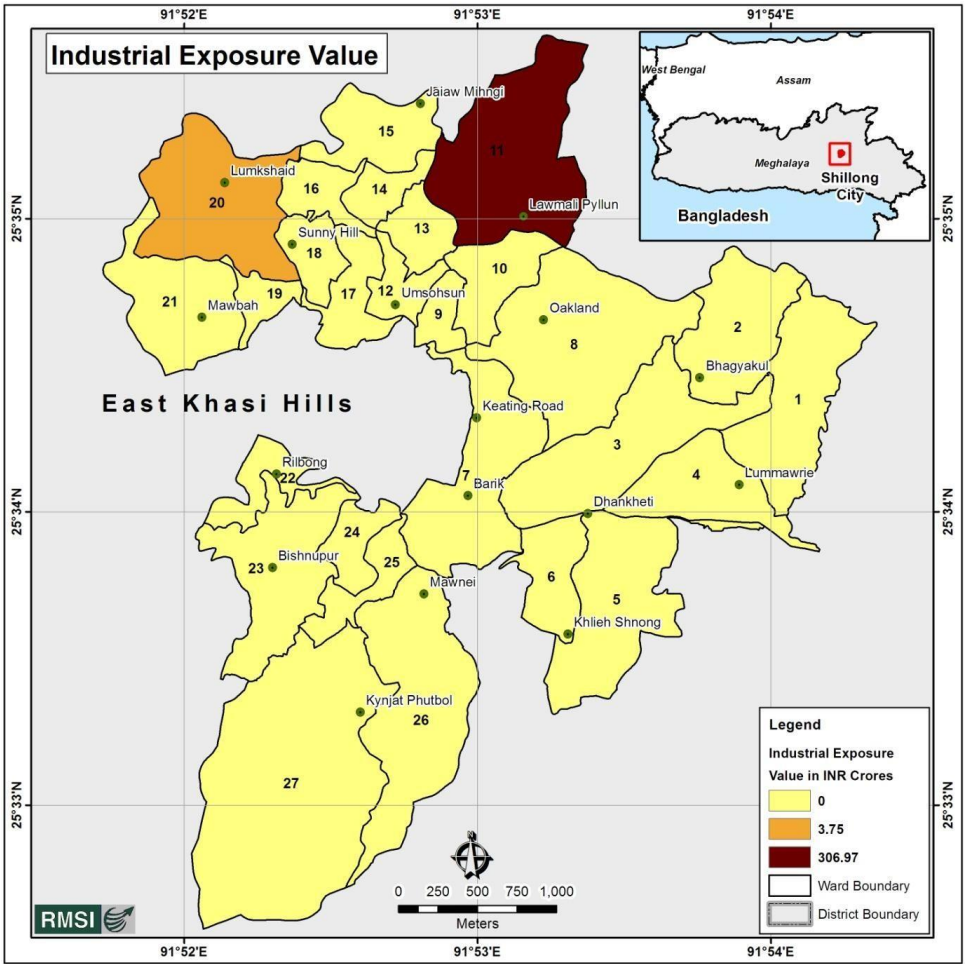


Figure 5.22:Ward-level distribution of total estimated exposure values for industrial buildings

VULNERABILITY ASSESSMENT

Physical Vulnerability

Most of the houses in Shillong are not designed to the building codes requirements and the average performance scores are lower than the base score for several buildings. From the surveyed buildings, the following buildings given in Table 5.2 have very low scores and may need further detailed investigations. The RMSI team also reviewed the reports of the detailed RVS, which was conducted by DDMA, Shillong in 2016. DDMA has done detailed RVS of 11 institutional as well as commercial buildings listed below:

1. Christian Academy
2. Woodland Hospital
3. Children's Hospital

4. Supercare Hospital
5. Bethany Hospital
6. Dr. HG Roberts Hospital
7. State Central Library
8. Pine Mount School
9. Nazareth Hospital
10. Government Boy's Hr. Secondary School
11. DTO's Office

With reference to the RVS surveyed forms received from DDMA, Shillong, it has been observed that the following buildings needed retrofitting based on their performance score:

1. Christian Academy Riatsamthian
2. Woodland Hospital (Annex Block, New Block, Front Block, Rear Block)
3. Children's Hospital (Block A & B)
4. Supercare Hospital

Social Vulnerability Assessment

The ward level SoVI of Shillong city is presented in Figure 5.23. W ard number 1, 13, 14, 18, 20, 21, 26 and 27 located in the e outskirt of the city have a higher SOVI.

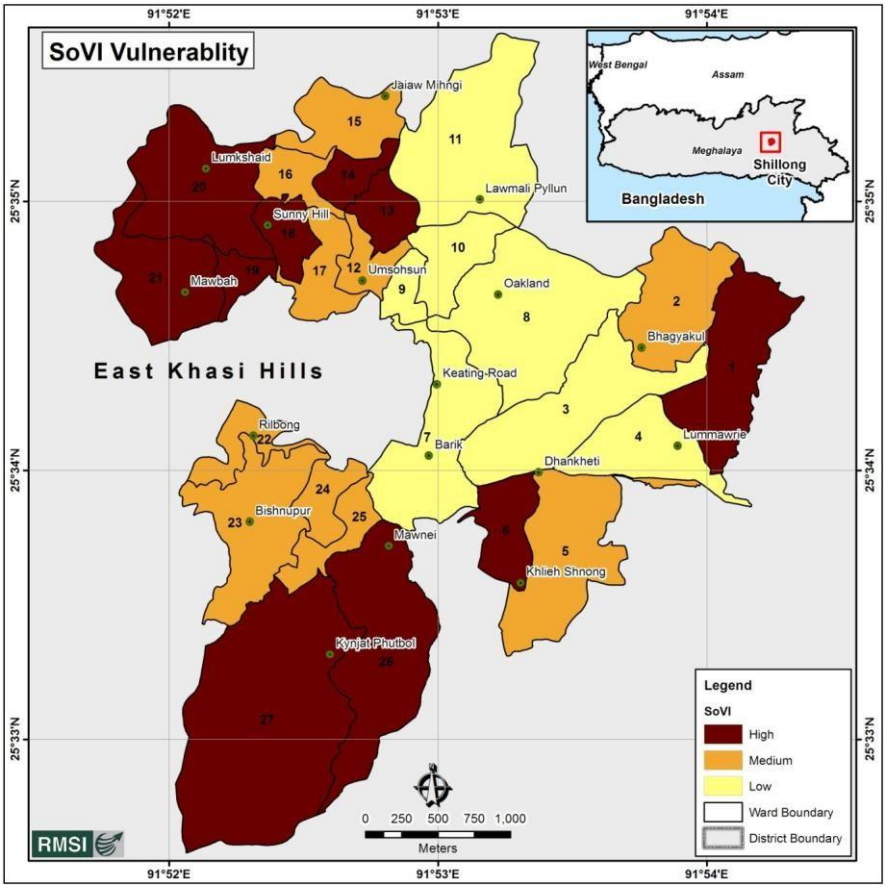


Figure 5.23 : So c i a l vulnerab i l i t y i nd ex Shillo ng c i t y

RISK ASSESSMENT

Risk assessment can be used for understanding the potential impacts of each hazard and allowing a comparison of hazards by quantified potential impacts. The potential impact, loss and damage estimates of various building usage, infrastructure and socio-economic for diiferent hazards.

Earthquake Risk Assessment

Shillong city has experienced major earthquakes in1869 and 1950 and every now and then tremors of medium and low scale are also felt. Based on the study, risk assessment for earthquake hazard estimates and loss have been presented. Table 5.2 below provides estimates of Probable Maximum Loss (PML) for general occupancy (residential, industrial, and commercial) classes due to Earthquake hazard scenario of 475-years return period. Accordingly, losses are presented at ward-level for this scenario-event (Figure 5.24, Figure 5.25 and Figure 5.26 for residential, commercial, and industrial structures, respectively).

Table 5.2: PML for the Earthquake Hazard in Shillong city

Return Period Years	Losses (INR Crores)		
475	Residential	Commercial	Industrial
	1,303	602	271

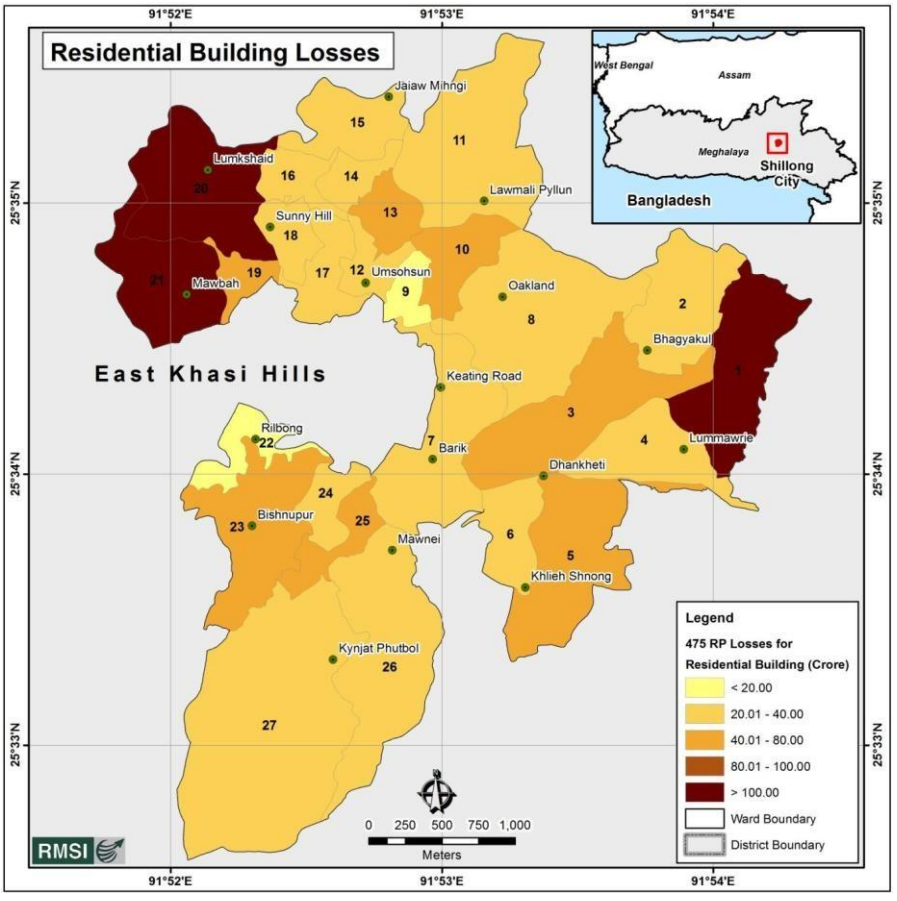


Figure 5- 24: Distribution of Structural (PML) Losses corresponding to 475-years return period hazard scenario event for residential buildings in Shillong city

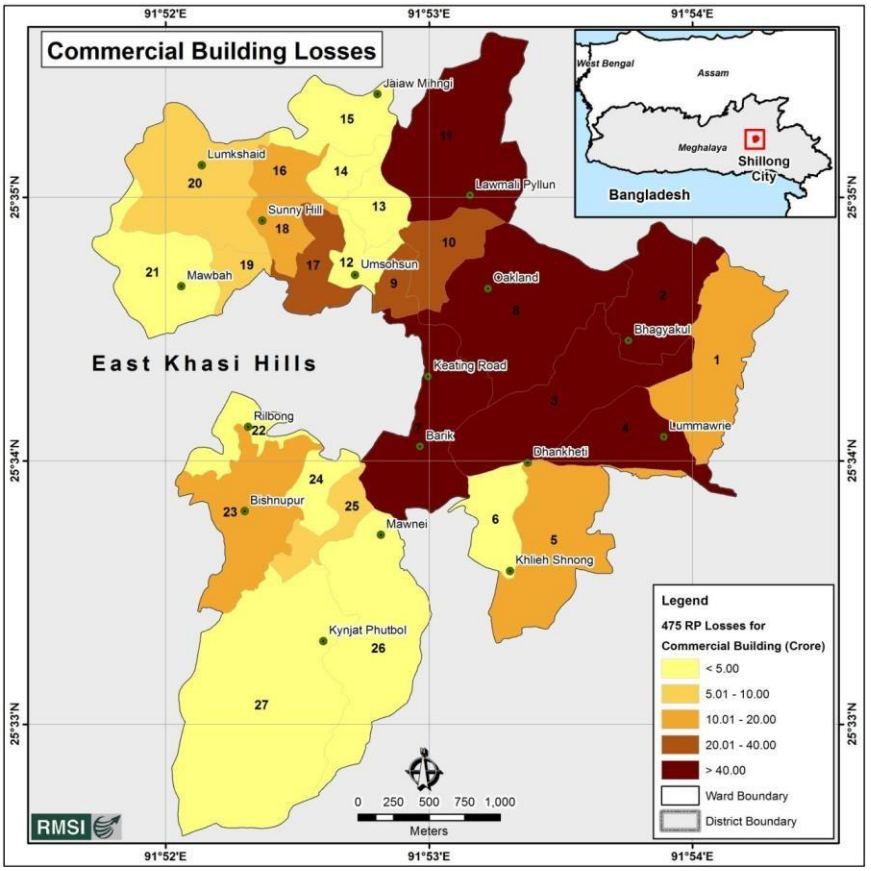


Figure 5 .25: Distribution of Structural Losses (PML) corresponding to 475-years return period hazard scenario event for commercial buildings in Shillong city

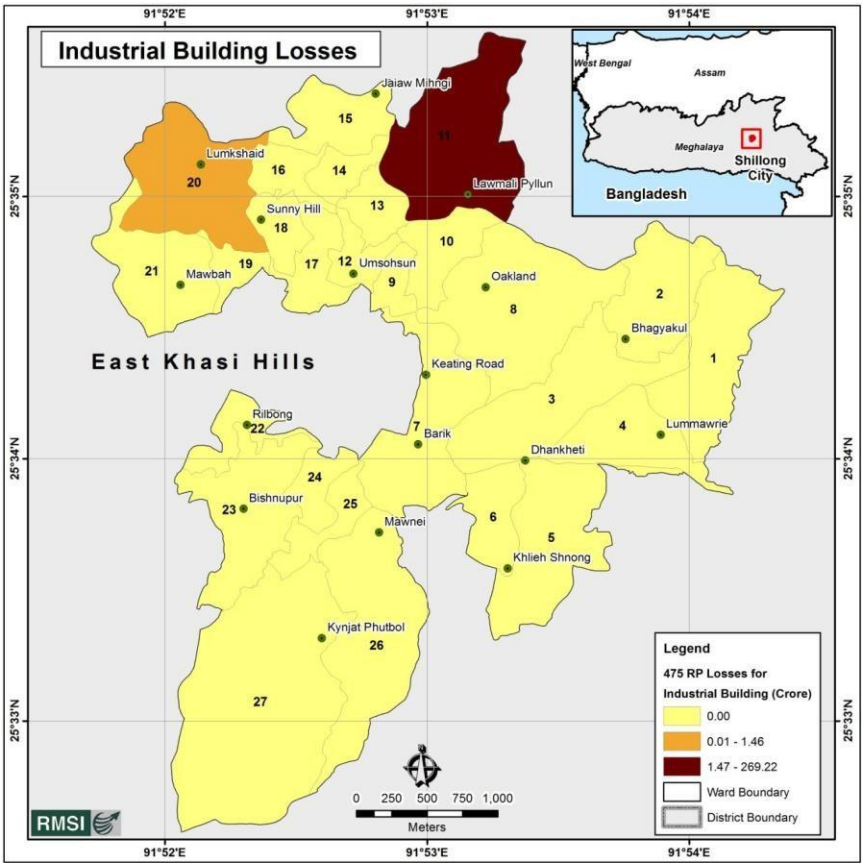


Fig ure 5 .26: Distributio n of Structural Lo sses (P ML) correspo nding to 475 - yea rs return period ea rthq uake ha za rd scena rio event for in dustrial b uildings in Shillo ng city

Table 5.3 provides estimates of projected losses to various sectors for the earthquake hazard for 475-year return-period. These sectors include transport (roads, railway lines), utility networks (electric lines, water lines, sewerage lines), and other facilities (schools, hospitals, places of worship) etc. From this table, it can be seen that maximum losses are expected in the education sector, which is to the order of INR 132 crores.

Table 5.3: Estimation of projected losses to various sectors for the earthquake hazard for a 475-year return period hazard

Facility/Sectors	No. of facilities/ length	Losses corresponding to 475 Year period INR Crores
	Facilities	
Hospitals	28	57
Schools/Colleges	129	132
Places of Worship	53	20
Administrative Headquarters	1	4
Fire stations	1	0.06
Police Stations	11	5
Government Buildings	183	122
	Transport	
Road, km (National Highway)	7	11
Road, km (Major Road)	54	54
Road, km (Minor Road)	86	40
Road, km (Other Road)	65	23
Bridges	16	5.4
	Utility Networks	
Water Lines, km	195	7.3
Sewerage Line, km	206	8
Electricity System	-	42

Earthquake's most damaging impacts are in terms of structural losses and number of casualties (injured requiring hospitalization and fatalities). Majority of the fatalities *(number of deaths)* and injuries are caused due to structural failure. As a part of the study, while estimating the probabilistic losses for a 475-year return-period earthquake scenario event and its associated economic impacts, casualties (injuries requiring hospitalization and fatalities) were also estimated as, at this level of ground motion, the entire population of the city is likely to get affected. Table 5.4 provides the estimates of earthquake-affected injuries (requiring hospitalization) and fatalities in Shillong city. However, the injuries and casualties due to earthquake hazard is also a function of the time of occurrence and hence two typical scenarios (daytime 2:00 PM and nighttime 2:00 AM) were considered. If the floating population i s considered also (daily commuting population) the numbers can be significantly higher. From this analysis, the estimated fatalities are in the range of 938 - 963, while in night

time-scenario, the estimated fatalities are between 2,335 – 2,399 people. In night time scenario, the number of fatalities and seriously injured are significantly higher as compared to the daytime scenario, as most people are likely to be asleep.

Table 5.4: Estimated numbers of seriously injured and fatalities (number of deaths) for 475-year return-period earthquake hazard scenario event

Type of Casualty	Number of Casualties
Expected Fatalities (Day time scenario, 2:00 PM)	938 - 963
Injured (Daytime scenario, 2:00 PM)	8,347 – 8,575
Expected Fatalities (Night time scenario, 2:00 AM)	2,335 - 2,399
Injured (Night time scenario, 2:00 AM)	22,186 - 22,791

Strong Wind Risk Assessment

The estimates of potential losses due to strong wind hazard for the present, middle and end of this century thunderstorm events for general occupancy (residential, commercial, and industrial) classes are summarized in Table 5.5. From the table, it is clear that residential buildings contribute the highest losses followed by commercial and industrial building losses for all the three scenarios of strong wind. The estimated losses for 2080s event are to the tune of INR 2.33 crores, 1.35 crores and 0.61 crores for residential, commercial, and industrial occupancies respectively. The analysis indicates that losses for 2050s event are more than double of present day thunderstorm events.

Table 5.6 presents distribution of ward-level potential losses to residential buildings for the most affected wards in Shillong city. The table clearly shows that ward numbers 21 and 1 suffer the most losses. The losses have been sorted based on present day event. Similarly, Table 5.7 summarizes the ward-wise distribution of potential losses to commercial buildings. The table clearly shows that ward numbers 3 and 4 suffer the most losses. In case of industrial occupancy (Table 5.8), the losses are almost negligible except in ward numbers 11 and 20.

Table 5.5: Potential maximum losses due to strong wind hazard in Shillong city

Scenarios	Estimated potential losses to general occupancies (INR Crores)		
	Residential	Commercial	Industrial
Present Scenario (5th April 2016 event)	0.30	0.19	0.16
Scenario 1 (2050s event)	1.56	0.87	0.38
Scenario 2 (2080s event)	2.33	1.35	0.61

Table 5.6: Structural loss matrices corresponding to various scenarios of strong wind events for residential buildings in Shillong city

Ward No.	Ward wise estimated potential losses (INR Lakhs) for residential buildings		
	Losses for 5th April, 2016 event	Losses for mid-century (2050s) event	Losses for end-century (2080s) event
21	5.92	21.72	32.59
1	3.07	16.36	24.54
13	1.96	9.08	13.89
3	1.91	9.94	14.91
25	1.79	8.89	12.72
19	1.46	7.04	10.41
6	1.34	7.14	10.00
5	1.29	6.51	9.96
20	1.19	8.32	12.67
26	1.07	6.52	10.11
14	0.91	4.87	7.35
24	0.88	4.55	6.82
11	0.87	4.18	5.98
23	0.84	4.39	6.61
17	0.83	3.31	5.02

Table 5 .7 : Structural lo s s matrices corresponding to various scenarios of s t ro ng win d events for commercial buildings i n Shillong c i t y

Ward No.	Ward wise estimated potential losses (INR Lakhs) for commercial buildings		
	Losses for 5th April, 2016 event	Losses for mid-century (2050s) event	Losses for end-century (2080s) event
3	5.54	18.36	27.69
4	1.82	7.19	11.07
2	1.80	6.73	10.45
7	1.77	11.76	17.78
11	1.57	7.78	11.67
8	1.49	7.54	11.61
5	1.04	4.63	7.23
17	0.59	4.01	6.21
10	0.47	2.73	4.05
6	0.42	1.71	2.64
9	0.41	2.27	3.56
16	0.38	1.85	2.98
25	0.31	1.22	1.90
1	0.31	2.12	3.13
23	0.31	1.38	2.22

Table 5 .8 : Structural lo ss matrices corresponding to various scenarios of s t rong win d events for industrial buildings in Shillong c i ty

Ward No.	Ward wise estimated potential losses (INR Lakhs) for commercial buildings		
	Losses for 5th April, 2016 event	Losses for mid-century (2050s) event	Losses for end-century (2080s) event
11	16.15	37.17	58.36
20	0.28	1.19	2.31

For better understanding of distribution of estimated potential losses to various occupancy classes, the ward-wise spatial distribution of estimated potential losses to residential, commercial, and industrial occupancy classes for strong wind associated with thunderstorm of the 5th April 2016 event are presented in Figure 5.27, Figure 5.28 and Figure 5.29 respectively. Figure 5.27 clearly shows the high residential building losses in various parts of Shillong city in ward numbers 21, 1, 13, 3, and 25. Map also shows significant losses in wards 19 and 6 of the city. Figure 5.27 shows the high commercial building losses in Shillong city in ward numbers 2, 3, 4, 7, and 11. Figure 5.28 shows industrial losses only in ward numbers 11 and 20 while losses in other wards are negligible. Figure 5.30 depicts the scenario of combine potential loss due to strong winds associated with thunderstorm of pre-monsoon by around end of 21st Century and Combine losses due strong winds because of different scenarios in the city is presented in Table 5.9

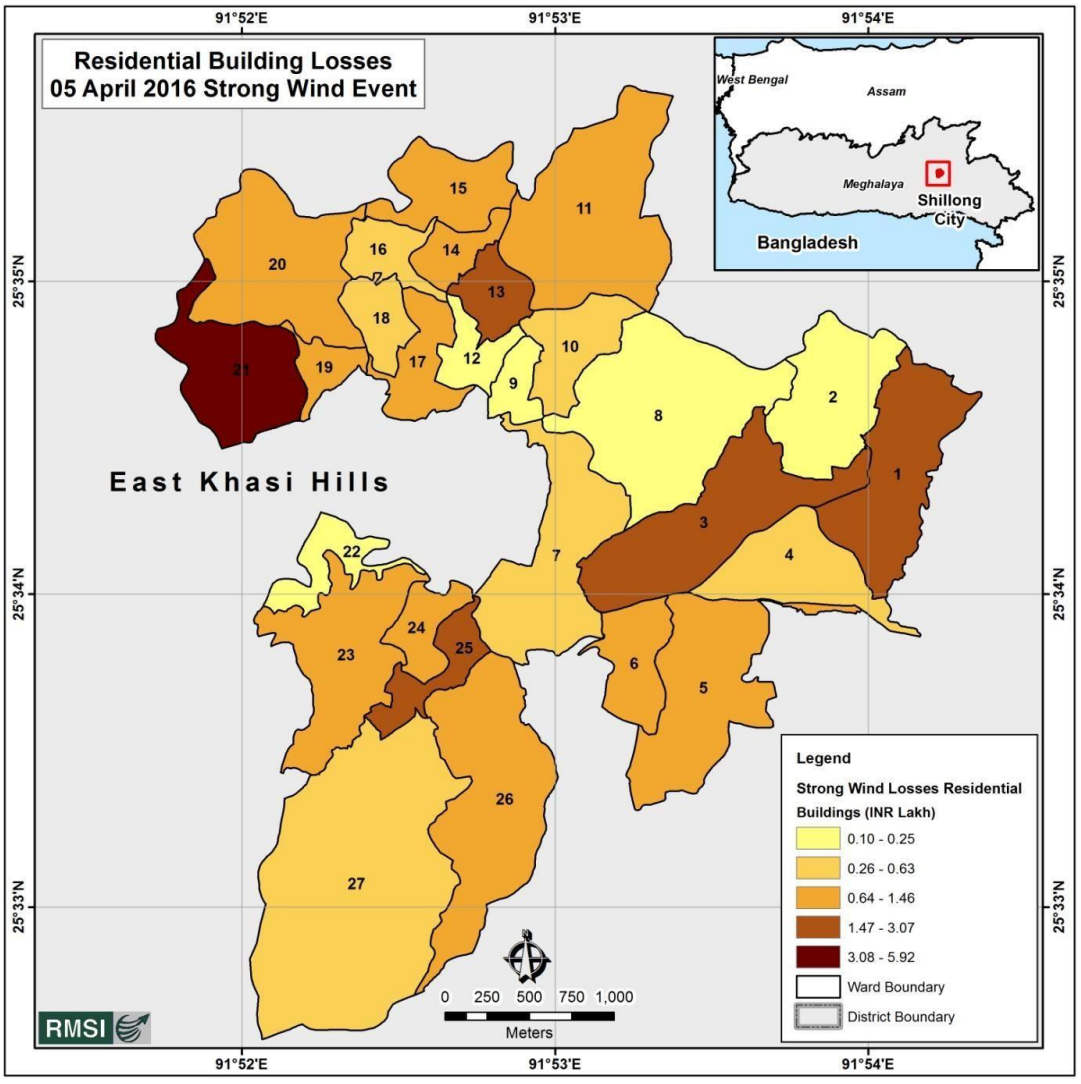


Figure 5-27: Ward-level distribution of estimated potential losses for residential occupancy due to s t rong wind associated with 5 t h April 2016 thunderstorm event

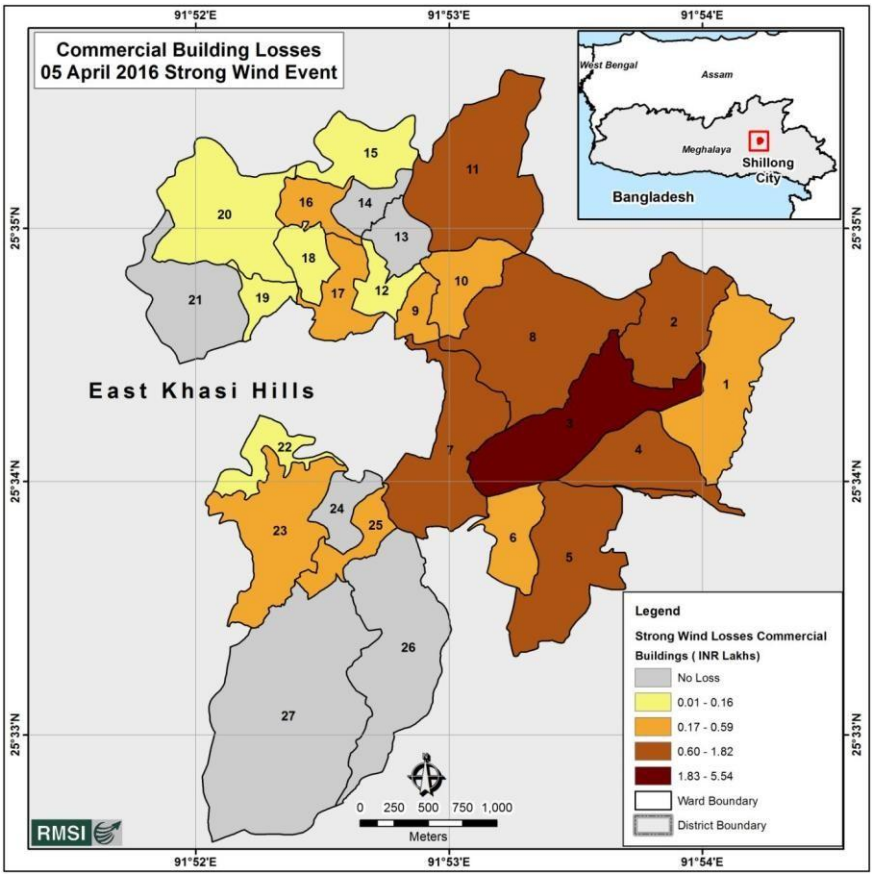


Figure 5 - 2 8: Ward- level d i s t ribution of estimated potential lo sses for commercial occupancy due to s t rong wind associated with 5 t h April 2016 thunderstorm event

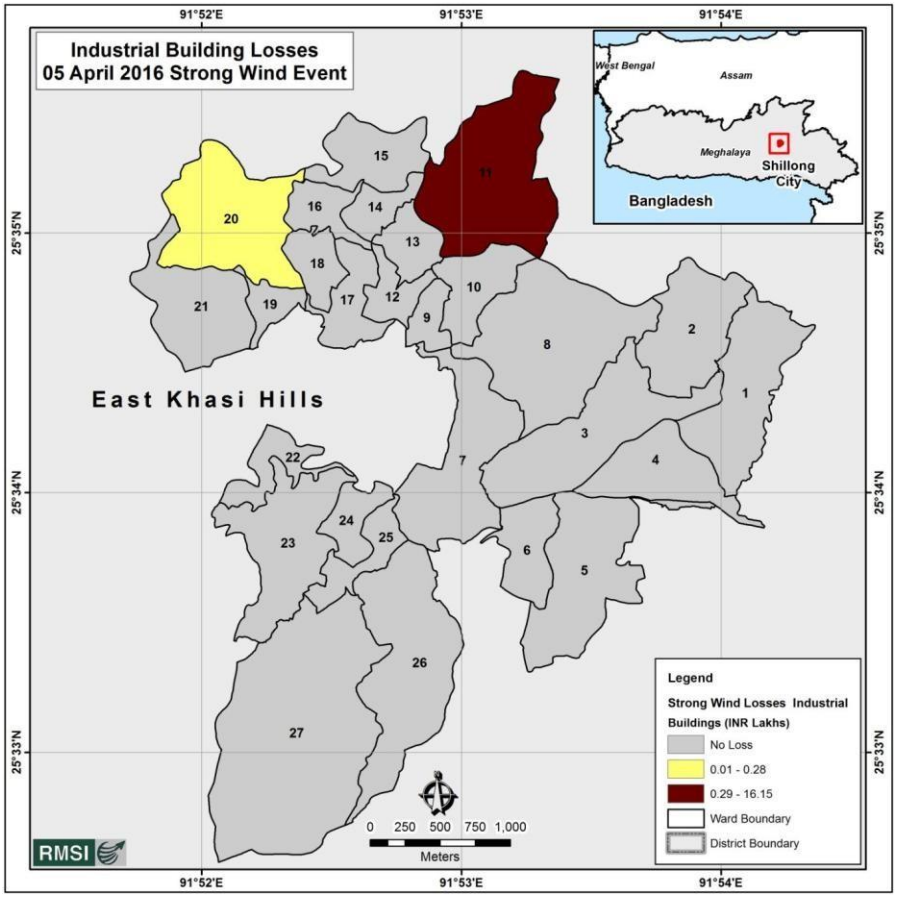


Figure 5 - 29: Ward- l evel d i s t ribution of estimated potential lo sses for industrial occupancy due to s t rong wind associated with 5 t h April 2016 thunderstorm event

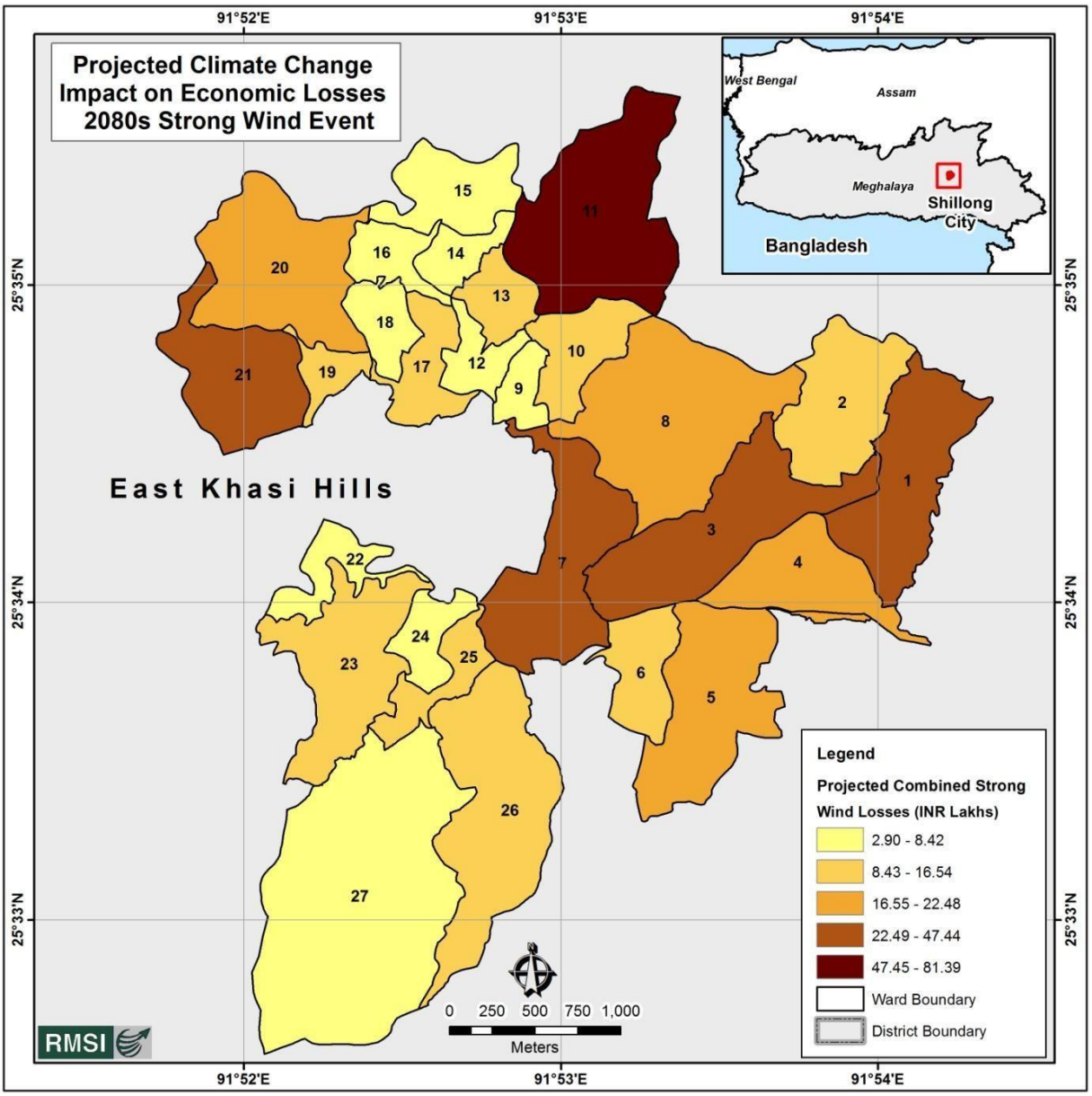


Figure 5 - 30: Ward- l evel distribution of estimated combined potential losses due to st rong wind associated with thunderstorm of pre - monsoon season by around end of 21 s t century (2080 s)

Table 5 - 9 : Combined losses due to s t rong wind due to various scenarios in Shillong c ity

Exposure Class	Combined Losses for various strong wind event scenarios for Shillong city (INR lakhs)		
	Present event	2050s event	2080s event
Residential	29.83	156.18	233.30
Commercial	18.91	86.82	134.84
Industrial	16.43	38.36	60.67
Essential Facilities	3.26	11.05	26.50
Utilities	6.49	18.15	27.41
Combined Losses	74.92	310.57	482.72

Flood Risk Assessment

Flood hazard associated loss assessment was carried out for various flood events at different return period scenarios (2, 5, 10, 25, 50, and 100 years) and six climate change scenarios (two each for 25, 50, and 100) and risk assessment have been considered. All the estimated potential losses due to flood hazard have been analyzed for Shillong Municipal Corporation. The estimated potential losses for various scenarios or annual probabilities are given in terms of INR lakhs. Table 5.10 for general occupancy (residential, industrial, and commercial) classes, clearly indicates that PML from the flood hazard are significant for residential and commercial occupancies as compared to the industrial losses. The losses in both the residential and commercial occupancies are consistently increasing from higher probabilities of occurrence to the lower probabilities of occurrence. The losses are expected to be more than double from 50% probability to 1% probability. For the flood event with 1% annual probability of occurrence, the losses are estimated to be INR 78.24 lakhs for residential, INR 45.60 lakhs for commercial, and negligible for industrial occupancies.

Table 5.11 presents distribution of ward-level potential losses to residential buildings for the most affected wards in Shillong city. The table clearly shows that ward numbers 5 and 1 show maximum losses. The losses have been sorted based on highest to lowest frequency of occurrences.

Similarly, Table 5.12 summarizes the ward-level distribution of potential losses to commercial buildings. The table clearly shows that ward numbers 5 and 6 show maximum losses. In case of industrial occupancy, the losses are almost negligible.

Table 5 .10 : Potential m aximum losses d ue to f lood ha zard in Shillong city

Probability of occurrence	Estimated potential losses to general occupancies (INR lakhs)		
	Residential	Commercial	Industrial
50%	31.64	21.06	Negligible
20%	39.23	24.51	Negligible
10%	42.46	27.43	Negligible
4%	56.87	37.57	Negligible
2%	62.03	41.33	Negligible
1%	78.24	45.60	Negligible

Table 5 .11 : Structural loss matrices correspo nding to va r ious a nnual f lood probabilit i es for residential building s in Shi l lo ng c ity

Ward No.	Ward level estimated potential losses (INR lakhs)					
	50%	20%	10%	4%	2%	1%
5	6.98	8.39	8.71	10.56	10.99	11.44

1	6.16	8.08	8.08	11.05	11.15	11.88
6	5.49	6.19	6.93	7.78	8.03	8.81
4	4.50	6.01	6.06	6.99	7.01	7.38
22	3.93	5.05	5.92	7.25	8.52	9.67
7	3.10	3.46	3.63	3.89	4.06	4.27
25	0.78	0.80	0.85	0.92	1.03	1.07
2	0.51	0.59	0.62	0.68	0.71	0.74
24	0.19	0.52	0.97	1.36	1.38	1.38
8	0.00	0.14	0.50	1.17	1.33	5.29
10	0.00	0.00	0.00	0.31	0.83	2.12
11	0.00	0.02	0.17	4.55	6.55	13.22
23	0.00	0.00	0.00	0.36	0.44	0.96
26	0.00	0.00	0.00	0.00	0.00	0.00

Table 5 - 12 : Structural loss m atrices correspo nding to va r ious a nnual f lood probabili t i es for co m m ercial buildings in Shillo ng c i ty

Ward No.	Ward level estimated potential losses (INR Lakh)					
	50%	20%	10%	4%	2%	1%
5	9.47	11.02	11.68	15.97	17.18	17.82
6	9.30	9.70	9.86	10.20	10.30	10.63
7	2.15	2.38	2.48	2.77	3.16	3.27
4	0.12	0.48	0.48	0.99	0.99	1.15
2	0.02	0.07	1.23	1.66	1.86	2.12
10	0.00	0.00	0.00	3.74	5.47	7.95
11	0.00	0.00	0.00	0.00	0.00	0.22
22	0.00	0.00	0.00	0.00	0.10	0.11

Figures 5.31 and 5.32 show the ward-level spatial distribution of estimated potential losses to residential and commercial occupancy classes for flood with 1% annual probability of occurrence, respectively. High residential building losses in various parts of Shillong city especially in ward numbers 11, 1, 4, 5, and 6. S ignificant losses in wards 7 and 8 of the city. High commercial building losses in Shillong city in ward numbers 5, 6, and 10.

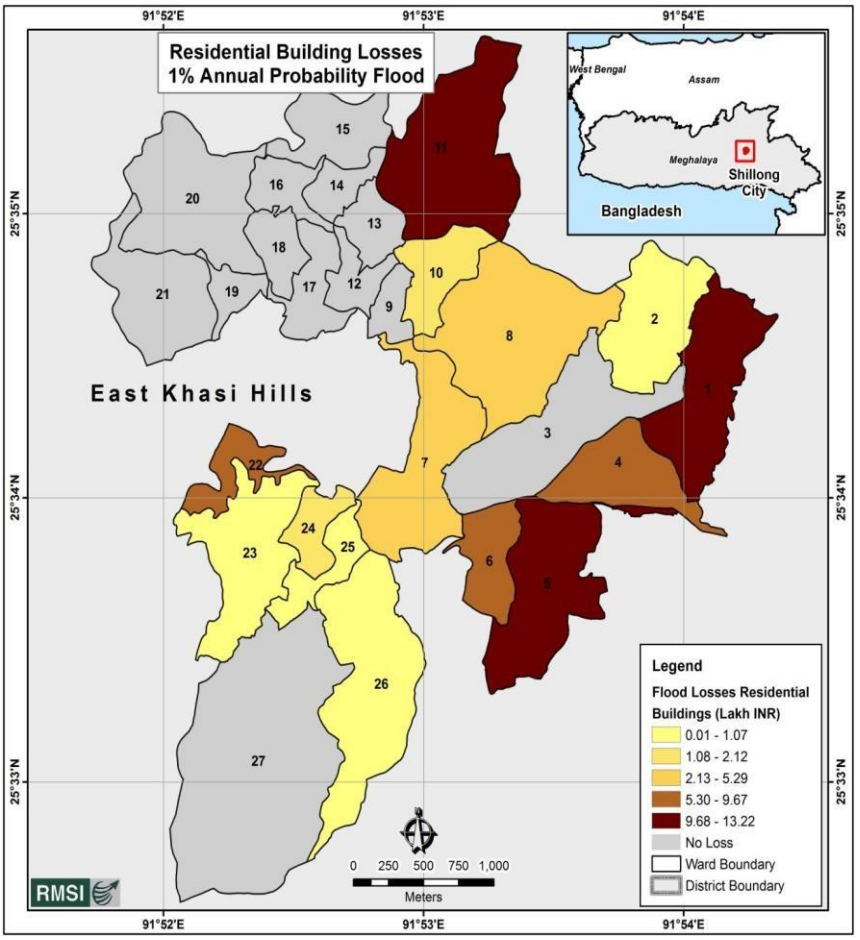


Figure 5-31: Ward-level distribution of estimated potential losses for residential occupancy due to 1% annual probability flood

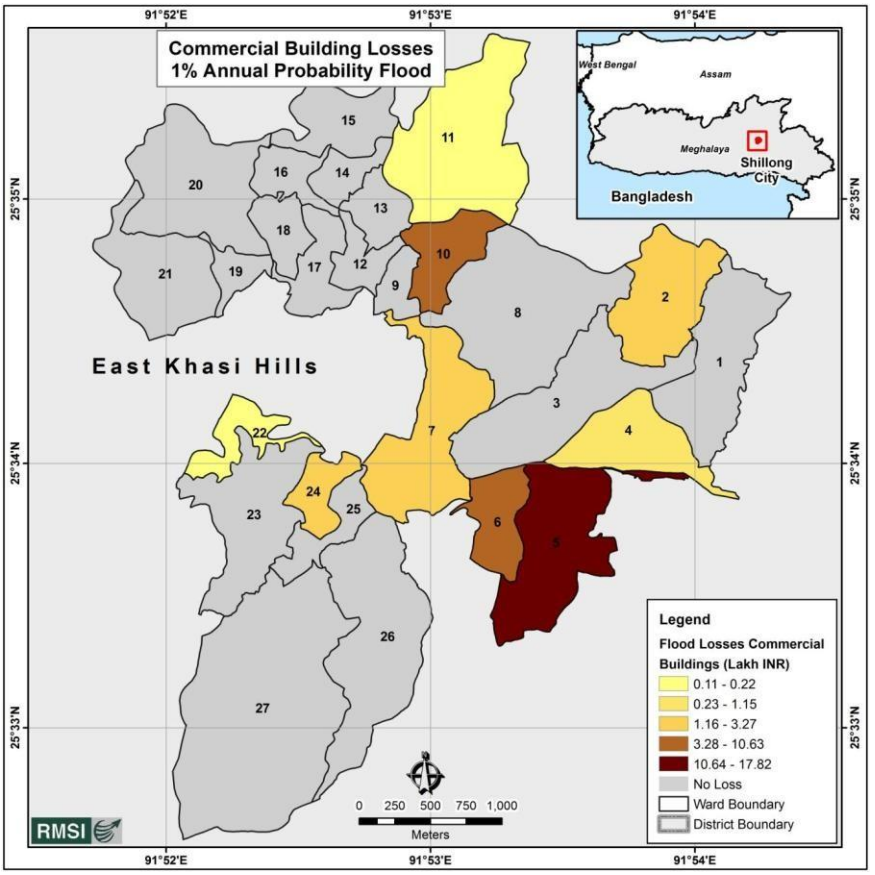


Figure 5-32: Ward-level distribution of estimated potential losses for commercial occupancy due to 1% annual probability flood

Estimated Potential Flood Hazard Losses to Affected Essential Facilities and Utilities

Similar to estimating the potential losses to general occupancies, the potential losses to various utilities and essential facilities have also been estimated. These exposure classes include utility classes (electricity, communication, potable water, and waste water) and essential facilities (schools, hospitals, fire stations, police stations, and places of worships) etc. Table 5.13 summarizes the estimated potential losses to these exposure classes due to floods of various annual probabilities of occurrences (50%, 20%, 10%, 4%, 2%, and 1%). It is inferred from the table that most of the losses are caused in affected schools as compared to losses in other classes. The flood losses to utility exposure classes are negligible as compared to other classes. It can be seen from the table that estimated potential losses are dominated by road losses. In fact, the losses to roads are highest amongst essential facilities, utilities, and transportation structures.

Table 5 .13: Estim ated losses co rresponding to various a nnual f lood probabilities fo r essential facilities and utility cla sses in S hillo ng c i ty

Essential facility/ utility classes	Estimated potential losses in Shillong city (INR lakhs)					
	50%	20%	10%	4%	2%	1%
Essential facilities						
Electricity	0.03	0.03	0.03	0.64	1.23	2.44
Hospitals	-	-	0.06	0.84	1.28	1.35
Religious Places	0.92	1.15	2.16	4.57	4.64	4.86
Schools	12.81	13.06	13.15	14.32	14.37	15.05
Utilities						
Communication	-	-	-	-	-	-
Potable Water	0.01	0.01	0.01	0.03	0.07	0.29
Waste Water	0.01	0.01	0.01	0.03	0.08	0.32
Transportation structures						
Bridges	-	-	-	-	0.49	4.44
Roads	16.48	22.64	24.42	36.42	40.52	47.87

Estimated Damages to Essential Facilities and Transportation Structures

Table 5.14 summarizes the estimated potential damages to essential facilities and transportation structures due to various flood event occurrence scenarios. The potential affected road lengths have also been estimated for various road types and summarized in Table 5.14. The table clearly indicates that minor roads are affected largely due to regular flooding.

Table 5 - 14 : Estimated da mage corresponding to various a nnual f lood probabilities f

or diffe rent essential facilities and t ra nspo rtation structures cla sses

Essential facilities/ transportation structures	Estimated potential damages for various flood event scenarios for Shillong city (Nos.)					
	50%	20%	10%	4%	2%	1%
Number of affected facilities and structures						
Hospitals	-	-	1	1	1	1
Religious Places	1	1	2	2	2	2
Schools	1	1	1	2	2	2
Govt. Buildings	-	1	1	1	1	1
Bridges	-	1	1	3	3	4
Affected road lengths, km						
Major Roads	0.18	0.30	0.30	0.43	0.50	0.74
Minor Roads	0.56	0.67	0.70	0.89	0.96	1.07
National Highways	0.19	0.25	0.25	0.28	0.28	0.30
Other Roads	0.36	0.46	0.49	0.54	0.56	0.58

Estimated Affected Population and Households Due to Flood Hazard

Flood affects the city by not only causing economic losses and damages to buildings, essential facilities, and transportation structures, but also by affecting the population and households living in the flood-inundated areas. The affected population and households are a function of the residential units in the inundation areas. Table 5.15 provides a statistical summary of the affected households and population, total population, and the percentage of affected population in the Shillong city. It can be seen from the table that around 1,283 persons (0.79%) and 323 households are likely to be affected due to a very frequent flood event (50% chance of occurrence in any year). However, affected population increases almost by twice for floods with a rare annual chance of occurrence. Almost 1.54% population is expected to get affected in the case of a rare event with a 1% annual chance of occurrence.

Table 5-15: Total, affected, and percentage affected population corresponding to various a n nual f lood probabilities in Shillo ng city

Population	Affected population and households in Shillong city					
	50%	20%	10%	4%	2%	1%
Affected Population	1,283	1,452	1,481	1,945	2,029	2,495
Total Population	1,62,017	1,62,017	1,62,017	1,62,017	1,62,017	1,62,017
% of Total Population	0.79%	0.90%	0.91%	1.20%	1.25%	1.54%
Affected Households	323	369	381	506	552	710

For understanding the social vulnerability due to floods in Shillong city, ward-level total affected population was estimated corresponding to various annual flood probabilities. Table 5-16 presents a list of wards that are most likely to get flood-affected in Shillong city based on affected population. The list is sorted based on the affected population for the most

frequent flood event. The table provides a comprehensive summary of the wards, which are likely to be affected due to flood events with different annual chances of occurrence. The list clearly shows that the population residing in ward numbers 22, 5, 4, 1, 6, and 7 are most prone to regular flooding caused by rare flood events.

Table 5 - 16 : Ward-level total affected populations corresponding to various annual flood probabilities in Shillong city

Ward No.	Total affected population for 15 most affected wards in Shillong city					
	50%	20%	10%	4%	2%	1%
22	252	252	252	283	283	293
5	247	253	253	294	302	303
4	217	238	238	238	238	238
1	189	273	273	336	336	336
6	163	163	180	213	219	244
7	143	151	153	156	159	164
25	49	49	49	49	95	95
2	14	14	16	16	16	16
24	8	31	40	40	40	40
8		20	20	30	30	137
10				19	37	139
11		9	9	256	257	450
23				16	17	38
26					2	2

Combined Losses, Average Annual Losses (AAL), and Loss Exceedance Curve (LEC)

Once the potential losses to various exposure classes in the city were estimated, a combined loss matrix was also prepared by combining all the expected losses in a ward. Table 5-17 provides a gist of estimated potential losses spread across the various exposure classes corresponding to various annual flood probabilities of occurrences. It provides a comparative view of sector-specific losses and can be useful for administrators and the city authorities for decision-making regarding fund allocation for long-term and short-term mitigation strategies.

Table 5 - 17 : Combined losses due to flood with various annual probabilities in Shillong city

Exposure Class	Combined Losses for various flood event scenarios for Shillong city (INR lakhs)					
	50%	20%	10%	4%	2%	1%
Residential	31.6	39.2	42.5	56.9	62.0	78.2
Commercial	21.1	24.5	27.4	37.6	41.3	45.6
Industrial	0.0	1.0	2.0	3.0	4.0	5.0

Essential Facilities	13.7	14.3	15.5	21.8	22.4	23.6
Utilities	0.0	0.0	0.0	0.7	1.4	3.1
Transportation Infrastructures	16.5	22.6	24.4	36.4	41.0	52.3
Combined Losses	82.9	101.7	111.9	156.4	172.1	207.8

Figure 5.33 shows the ward-level spatial distribution of combined losses for a probable flood event with 1% chances of occurrence annually and ward numbers 5 and 6 are most vulnerable to flood events, followed by ward numbers 1, 4, and 11.

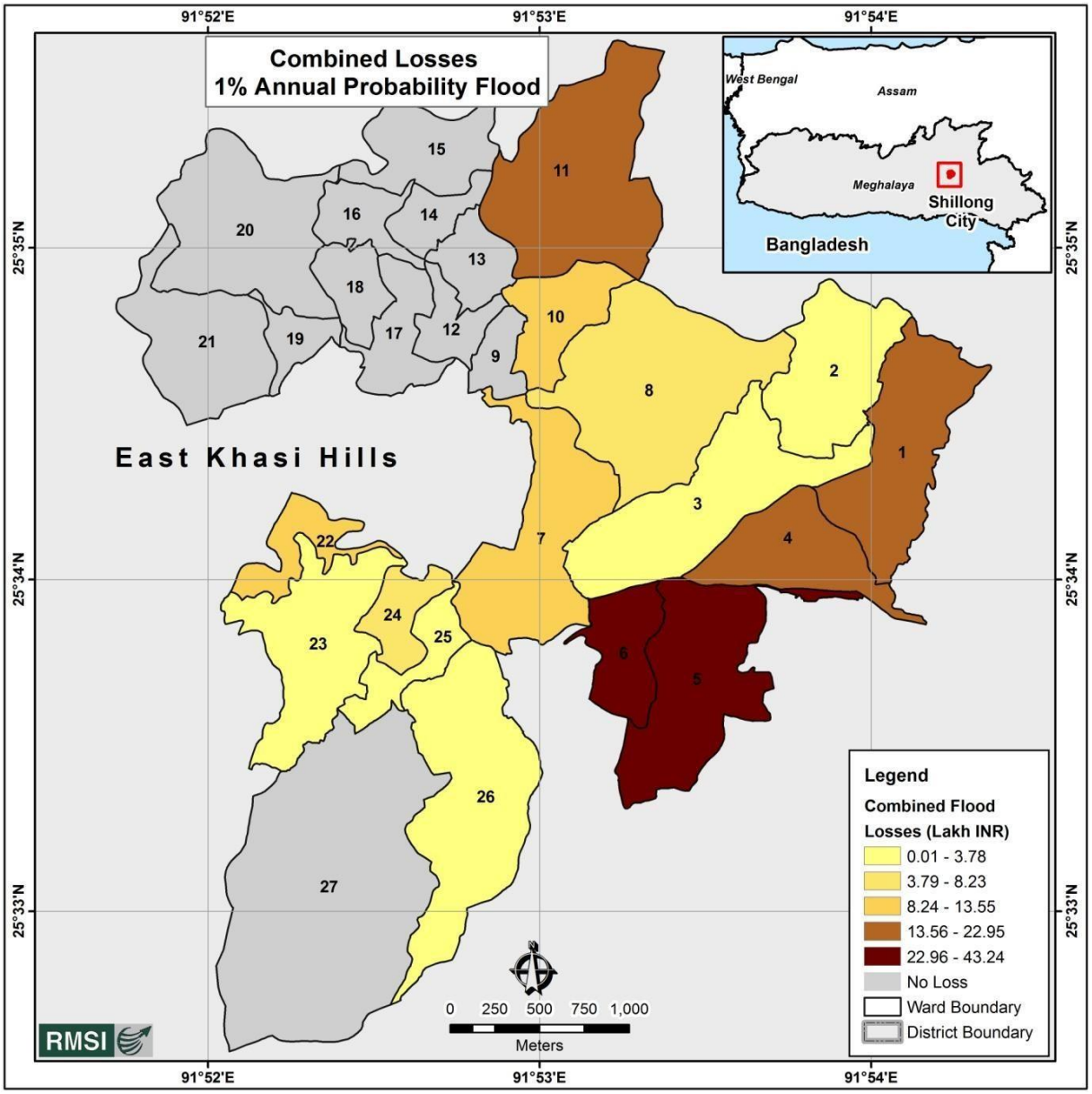


Fig ure 5 .33: Wa rd- l evel distribution of estim ated com bined potential losses due to 1% annual proba bility f loo d

Spatial distribution of ward-level average annualized losses for Shillong city shows that ward numbers 6 and 5 are most vulnerable as per the combined losses followed by ward numbers 1, 4, 7, and 22. Combined potential losses are dominated mainly by residential and road losses (Figure 5.34).

Table 5.18 provides a comparative distribution of various components contributing to the combined AAL and AAL as a percentage of the total corresponding value of exposure.

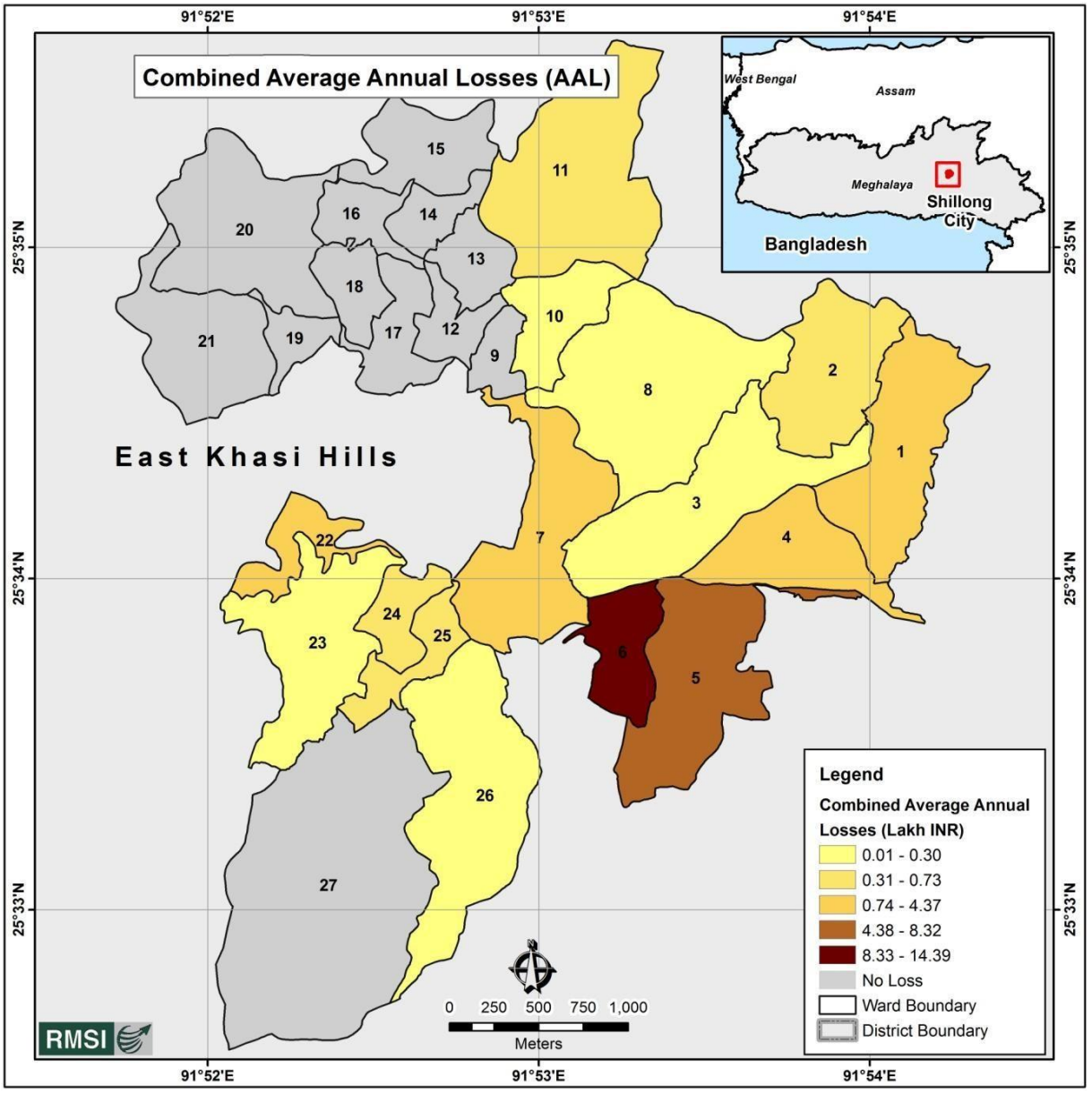


Fig ure 5 . 34 : Spa t ial distribution of wa rd - level average a nn ualized losses for Shillong city

Table 5 - 18 : Average Annua l i zed Lo sses (AALs) correspo nding to different exposure c la sses

Exposure classes	AAL (INR lakhs)
Residential	14.96
Commercial	9.70
Industrial	0.00
Essential Facilities	5.88
Utilities	0.07
Transportation Infrastructures	8.44
Combined Exposure	39.07

Landslide Risk Assessment

For landslide risk analysis, the landslide susceptibility map is directly overlaid with

exposure data and all exposure that falls within the high hazard zone is considered to be at high risk. Table 5.19 represents the probable maximum losses to various sectors in the worst-case scenario due to landslide. Similarly, maximum affected population and households in the worst-case scenario have been estimated due to landslides across various wards of Shillong have been projected (Table 5.20).

Table 5 . 1 9 : Estim ated probable m axim um losses to va rio us expo sure types due to land sl ide in wor st- case scena rio (INR cro res)

Ward No.	Residential	Government	Road	School	Total
1	3.23	-	1.50	-	4.73
2	0.17	-	0.95	-	1.12
3	0.02	-	0.21	-	0.23
4	-	-	-	-	-
5	0.07	-	0.14	3	2.86
6	0.01	-	0.10	-	0.11
7	-	-	-	-	-
8	0.02	-	0.20	-	0.21
9	-	-	-	-	-
10	0.14	-	0.01	-	0.14
11	0.02	-	0.05	-	0.07
12	-	-	-	-	-
13	0.29	-	0.04	-	0.34
14	-	-	-	-	-
15	0.00	-	-	-	0.00
16	-	-	-	-	-
17	-	-	-	-	-
18	-	-	-	-	-
19	-	-	-	-	-
20	0.70	1	0.71	-	2.29
21	0.17	-	0.97	-	1.14
22	-	-	-	-	-
23	-	-	-	-	-
24	-	-	-	-	-
25	-	-	-	-	-
26	0.79	-	0.56	-	1.35
27	0.44	-	3.46	-	3.90

Table 5 - 20 : Estimated affected population a nd househo lds due to la ndslides in worst - case scenario

Ward Number	Affected Population	Affected Household
1	436	114
2	23	6
3	3	1
4	0	0
5	9	2
6	1	0
7	0	0
8	2	1
9	0	0
10	15	4
11	3	1
12	0	0
13	46	12
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	106	23
21	28	6
22	0	0
23	0	0
24	0	0
25	0	0
26	140	34
27	74	19

Risk Hotspots in Shillong

Based on the intensity of hazard, each ward has been ranked from 1 to 3 categories where rank 1 indicates low, rank 2 indicates medium, and rank 3 indicates high hazard intensity. Table 5.21 presents composite hazard index across various wards. Ward-level composite hazard index information will help in city planning, including deciding upon new investments.

Table 5 - 21 : Composite haza rd index

Ward No.	Earthquake Hazard Index	Flood Hazard Index	Cyclone Hazard Index	Landslide Hazard Index
1	2	1	2	2
2	2	2	2	1
3	2	3	3	1
4	2	1	3	1
5	2	1	3	1
6	2	1	3	1
7	2	1	3	1
8	2	3	2	1
9	3	1	2	1
10	3	2	2	1
11	3	2	2	1
12	3	1	2	1
13	3	1	2	1
14	2	1	2	1
15	2	1	2	1
16	2	1	1	1
17	2	1	2	1
18	2	1	1	1
19	2	1	1	1
20	2	1	1	3
21	2	1	1	2
22	2	2	3	1
23	2	2	3	1
24	2	2	3	1
25	2	3	3	1
26	2	2	3	2
27	2	1	3	3

The “Composite High Risk hotspots analysis” categorizes the city into high, medium, and low vulnerability areas based on the cumulative score of all the hazards considered for the analysis. Wards with high risk need priority interventions. Figure 5.35 represents ward level composite risk wards. About 22% of the city’s population is living in high composite risk wards.

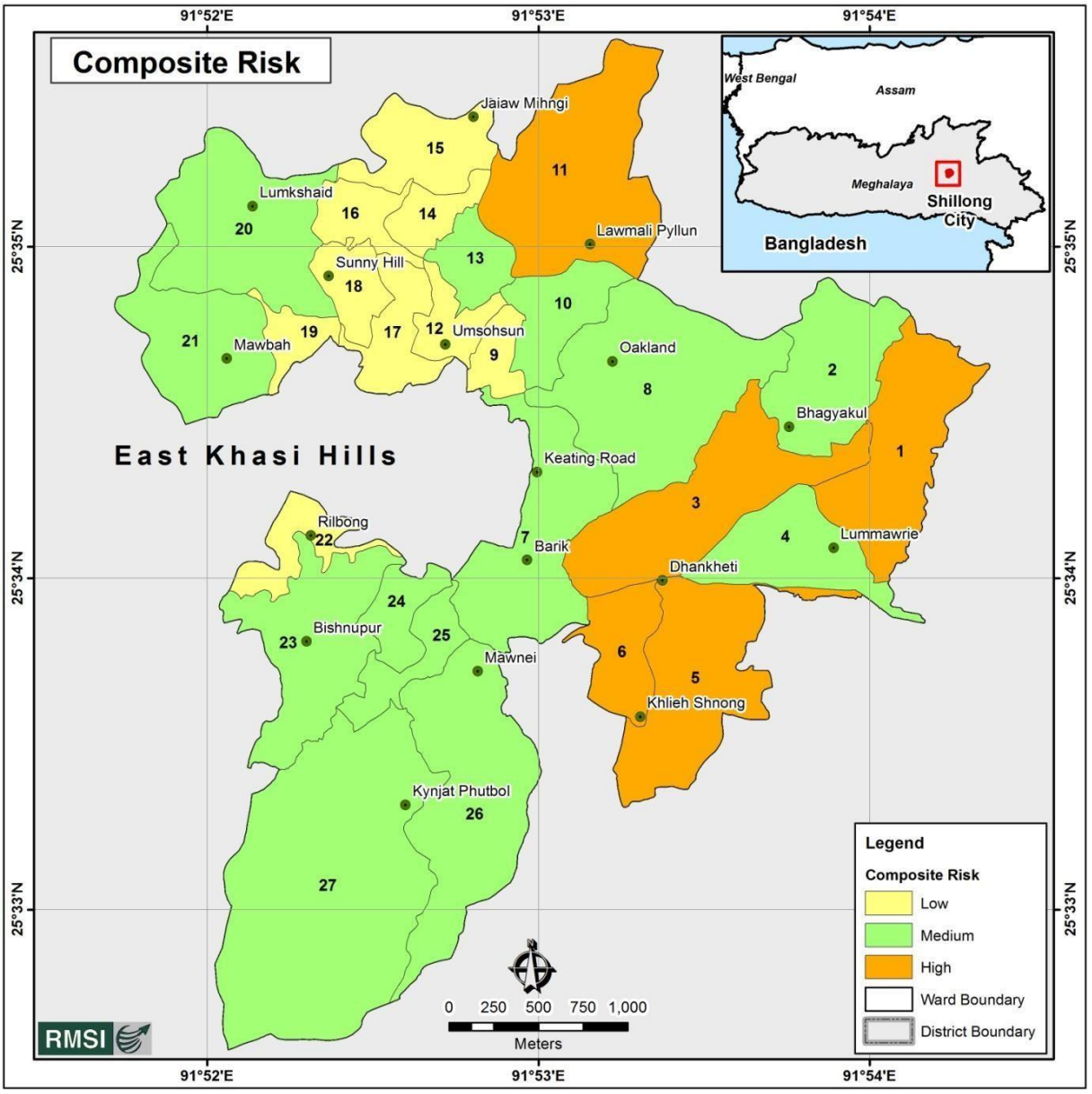


Fig ure 5 - 35: Wa rd lev el com posite risk zo nes

SECTION 6

INSTITUTIONAL ARRANGEMENT

DISASTER MANAGEMENT COMMITTEE AT THE CITY LEVEL:

The City Disaster Management Committee (CDMC) came into currency because of the frequent occurrence of disasters in the city. The primary aim of the committee is to have proper coordination among all the line departments. The Deputy Commissioner is the Chairman of the CDMC and the city level response is coordinated under his guidance. The City Disaster Management Committee exists to assist the ADC (DM) in:

- Reviewing the threats of disaster
- Strengthen Capacity of City Disaster Management Authority
- Analyzing the vulnerability of the city to such disasters
- Evaluating the preparedness and Response
- Considering suggestions for the improvement of the City Disaster Management Plan

CITY DISASTER MANAGEMENT COMMITTEE- SHILLONG

	Designation of the Personnel	**Designation in the Committee**
1.	Deputy Commissioner	Chairperson
2.	Additional Deputy Commissioner (DM)	Secretary
3.	Project Director, DRDA	Member
4.	Secretary, MUDA	Member
5.	Chief Executive Officer, Shillong Municipal Board	Member
6.	Chief Executive Officer, Cantonment Board	Member
7.	Superintendent of Police, Shillong	Member
8.	Superintendent of Police, F&ES	Member
9.	EE, PWD (R), Shillong Central Division	Member
10.	EE, PWD (R), National Highway Division	Member
11.	EE, PWD (R), Shillong South Division	Member
12.	EE, PWD (B), Shillong	Member
13.	Chief Engineer, MeCEL	Member
14.	DM&HO, East Khasi Hills District	Member
15.	District Transport Officer, East Khasi Hills District	Member
16.	Deputy Controller, Civil Defence, Shillong	Member
17.	District Home Guards Commandant, Shillong	Member
18.	District Schools Education Officer, East Khasi	

	Hills District	Member
19.	District Forest Officer, Territorial Division	Member
20.	EE, PHE, Investigation Division	Member
21.	EE, PHE, Greater Water Supply Shillong Division-I	Member
22.	EE, PHE, Electrical Division, Shillong	Member
23.	EE, Water Resources, Shillong	Member
24.	Representative from Army Head Quarter 101 Area, Shillong	Member
25.	Representative from Easter Air Command, Upper Shillong	Member
26.	Representative from Assam Rifles, Shillong	Member
27.	Representative from Border Security Force, Shillong	Member
28.	Representative from Central Reserve Police Force, Shillong	Member
29.	Honorary Secretary, Indian Red Cross Society, Shillong	Member
30.	Representative from local body	Member

This Committee function as the main decision making cum advisory body for any kind of disaster in the Shillong city. This body will be at the apex of all initiatives for the urban vulnerability reduction in the City with jurisdiction within the limits of Shillong.

ROLES AND RESPONSIBILITIES OF CITY MANAGEMENT COMMITTEE

The City Level Disaster Management Committee will meet every six months. However, the committee may meet more frequently if the situation requires so. The areas of concern for the Committee will be:-

- Create awareness among Government functionaries, technical institutions, NGOs, CBOs, and Communities about Hazard, vulnerability and possible preventive actions
- Create City Disaster Mitigation Fund.
- Capacity building for certification by Government functionaries and professionals (engineers and architects)
- Development and Institutionalizing of Disaster preparedness and response plans and practice these through mock drills
- Development of a regulatory framework (techno-legal regime) to promote safe construction Practices to ensure structural Safety
- Networking knowledge on best practices and tools for effective Disaster Risk Management, including creation of information systems containing inventory of resources for emergency operations.

- The committee will meet in January and July every year to review emergency preparedness in the city. The committee will discuss threats and vulnerabilities in the city, identify potential sources of trouble and disturbances, and take necessary decisions for prevention and preparedness.
- The committee will appraise the capacity and preparedness of all the first responder agencies: police, fire brigade and Civil Defence.
- The Committee will discuss the on-site emergency plans prepared by all the important installations in the city and decide upon safety and security measures to be taken by private and public sector companies and undertakings.
- The committee will appraise state of critical infrastructure: roads, drainage and sewerage, water supply, electricity, and telecommunications.
- The committee will take appropriate decisions for the continuity and maintenance of the essential infrastructure and develop necessary backup plans
- The committee will convene immediately following any emergency, natural or man-made. The committee will decide upon specific steps to be taken for dealing with the disaster.

SECTION 7

EMERGENCY RESPONSE PLAN

INTRODUCTION

The need for an effective Disaster Management strategy is to lessen disaster impact which can be achieved through strengthening the existing organizational and administrative structure at city level. The Emergency Response Plan is a first attempt to follow a multi-hazard approach to bring out all the disasters on a single platform and incorporates the 'culture of quick response'. Under the plan, common elements responsible for quick response have been identified and a set of responsible activities has been articulated. It provides a framework to the primary and secondary agencies and departments, which can outline their own activities for disaster response. The plan will also include specific disaster action plans along with modal scenarios in detail to conduct practice drills at city level.

METHODOLOGY OF RESPONSE PLAN

- Identification of disasters in the city depending on:
  - -Past records
  - -Geological settings
  - -Vulnerability associated in context to the disaster
  - -Risk assessment according to the socio-economic conditions
- Identification of emergency response functions in consultation to the guidelines provided by SDMA/Revenue and Disaster Management Department.
- Identification of responsible government and non-government agencies depending upon response functions
- Identification of responsible officers, manpower and resources
- Identification of primary and secondary agencies and demarcation of roles and responsibilities as per their functions
- Conducting regular trainings, meetings and mock drills

RESPONSE LEVELS

Most of the disasters are to be managed at the State and District level. The Centre plays a supporting role in providing resources and assistance. It will mobilize supportin terms of various emergency teams, support personals, specialized equipmentsand operating facilities depending upon the scale of the disaster. Active assistance would be provided only after the

declaration of national emergency level (National Disaster Response Plan, 2001). State, District and City Emergency Operations Centre would activate in case of emergency. District Authority of affected area will establish an Onsite Emergency Operations Centre. Teams of all three levels would establish their link with each other for mobilizing resources and manpower based on situation analysis.

Response Plan

The Response plan establishes an organized setup to conduct ESF operations for any of the Natural and Manmade Disasters. It outlines an implementing framework of sharing resources as per the requirement within National and State level department who will be engaged to provide support during an emergency situation. The Response Plan has structured the response of concerned department's i.e. primary and supporting departments to be organized and function together with grouping capabilities, skills, resources, and authorities across the State and district with the ESF plan. The plan unifies the efforts of State Departments and supporting agencies to be involved in emergency management for a comprehensive effort to reduce the effects of any emergency or disaster within the state. Such plan can be prepared at city level.

Incident Response System (IRS)

The Incident Response System (IRS) is an effective mechanism for reducing the scope for ad-hoc measures in response. It incorporates all the tasks that may be performed during DM irrespective of their level of complexity. It envisages a composite team with various Sections to attend to all the possible response requirements. The IRS identifies and designates officers to perform various duties and get them trained in their respective roles.

Emergency Support Functions (ESFS)

Emergency Support Functions (ESFs) are the essentials of Emergency Management comprising of various coordinating agencies, which manage and coordinate specific kinds of assistance common to all disasters types. The plan establishes an organized set-up to conduct ESF operations for any of the Natural and Manmade Disasters. It outlines an implementing framework of sharing resources and coordinating, preparedness, Mitigation, response and recovery as per the requirement. The Plan has structured the activities of concerned agencies i.e. Primary/nodal and support agencies into an organized manner according to their capabilities, skills, resources and authorities across the state and district government. It also attempts to unify efforts of state departments so that they are involved in emergency

management comprehensively to reduce the effects of any emergency or disaster within the state.

Primary and Secondary Agencies

The designated primary agency would be assisted by one or more supporting agencies (secondary agencies) and will be responsible to manage activities of the Emergency Support Functions and ensuring the mission accomplished. The primary and secondary agencies have the authority to execute response operations to directly support the city needs.

Situation Reports

Situation reports provide an update of relief operation at regular intervals. These reports are crucial for planning out response actions to the affected areas. The situation reports provide information about the disaster status, casualties, status of flow of relief materials, arrival/departure of teams etc.

Quick Response Teams (QRTS)

The QRTs should leave for the affected site within 3 to 6 hours of the event after the declaration of emergency. They have been adequately briefed by their respective departments. Team should be self-sufficient in terms of resources, equipments, survival kits and response work.

Emergency Operations Centre (EOC)

EOC is a nodal point for the overall coordination and control of response work in case of any disaster situation. In case of any disaster, city levels EOC have to be activated. The primary function of EOC is to facilitate smooth inflow and outflow of relief and other disaster related activities. These EOCs act as bridges between City, District and State Govt.

OPERATIONAL –COORDINATION STRUCTURE

Each organization generally has a framework for direction of its operation and coordination between its different units. Disaster Management generally requires partnership between organizations and stakeholders. An effective and early response requires mobilization of manpower, equipments and materials belonging to different organisation which may not be working together during normal times. Therefore, a framework needs to be prescribed as a part of emergency planning for operational directions and coordination during response phase. This plan recognizes role of Deputy Commissioner in providing overall operational direction and

coordination for all the response functions. With the help of City Disaster Management Committee and Emergency Operations Centre, Deputy Commissioner will formulated following coordination structure for response plan.

Trigger Mechanism

As soon as Emergency Operations Centre would get the information about any event, the staff on duty in EOC will pass the information the concerned authority and seek for his instruction for further actions. If the information pertains to the occurrence of a disaster in any part of the city, the staff on duty will also try to inform District Disaster Management Authority, City Disaster Management Committee members, Emergency Support Functions-team leaders, Major hospitals etc. The staff on duty will also be responsible to reclaim information related to type, magnitude and location of the disaster and also inform it to responsible authorities. The EOC in-charge will also inform all the details to Deputy Commissioner and State EOC. All the desk officers/team leaders and Incident Response Team members will also be informed to immediately report to District EOC (Figure 5.1). Incident Command team and Desk officials would respond as per their standard operating procedures and directions of Responsible Officer (RO).

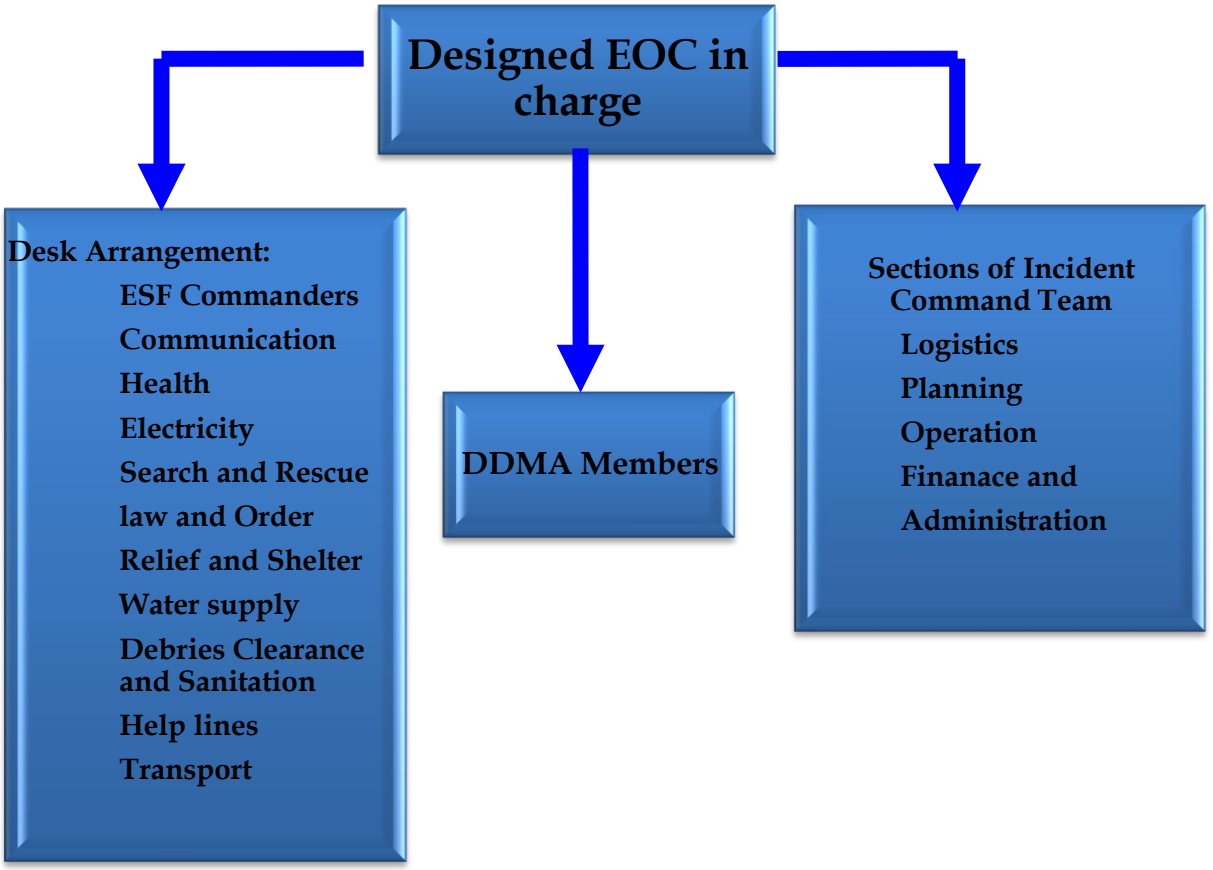


Figure 7. 1 : Trigger Mechanism for City EOC

ACTIVATION OF INCIDENT RESPONSE SYSTEM

Depending upon the location and degree of disaster, Responsible Officer would be appointed. The DC has been designated as the RO in the District. The heads of different departments in the District will have separate roles to play depending on the nature and kind of disaster. The roles and responsibilities of the members of the DDMA will be decided in advance in consultation with the concerned members. The roles of other line departments also have to be clearly delineated in various disaster situations in the District DM Plan which will be duly approved by the State Government, so that there will be no ambiguity about their functions during response.

The IRS organisation functions through Incident Response Teams (IRTs) in the field. Responsible Officers (ROs) have been designated at the State and District level as overall in charge of the incident response management. The RO may however delegate responsibilities to the Incident Commander (IC), who in turn will manage the incident through IRTs. The IRTs will be pre-designated at all levels; State, District, Sub-Division and Block. On receipt of Early Warning, the RO will activate them. In case a disaster occurs without any warning, the local IRT will respond and contact RO for further support, if required. A Nodal Officer (NO) has to be designated for proper coordination between the District, State and National level in activating air support for response.

Apart from the RO and Nodal Officer (NO), the IRS has two main components; a) Command Staff and b) General Staff. The structure is shown in Figure 7.2.

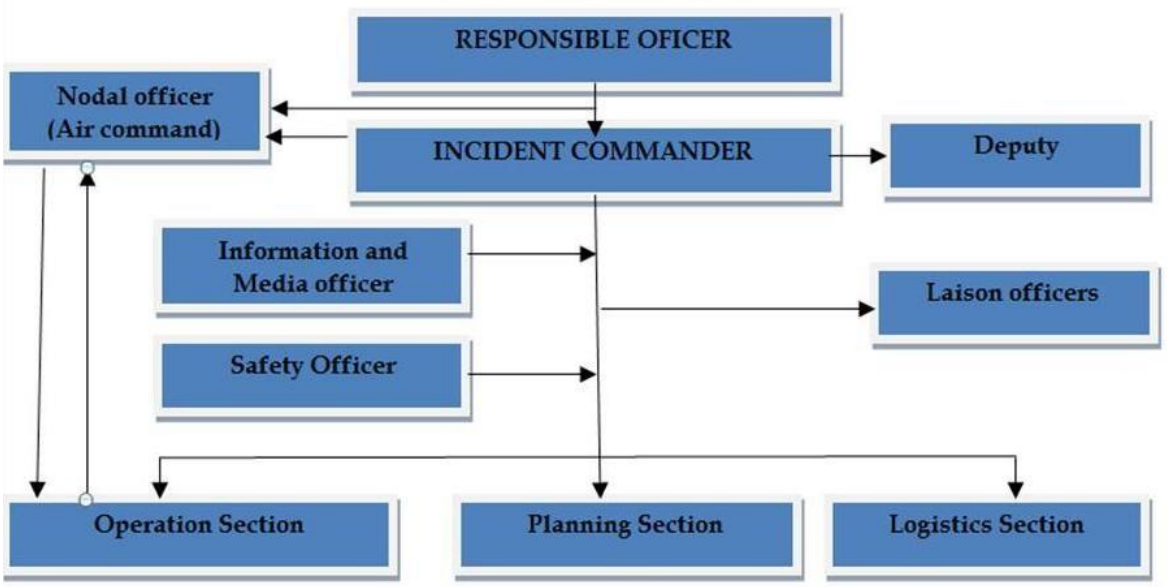


Figure 7. 2: IRS structure

Roles and Responsibilities Of Deputy Commissioner as Responsible Officer

The Deputy Commissioner / Responsible Officer will:

i) Ensure that IRTs are formed at city levels and IRS is integrated in the CDMP as per Section 31 of the DM Act, 2005. This may be achieved by issuing a Standing Order by the RO to all SDOs, SDMs and BDOs;

ii) Ensure web based / on line Decision Support System (DSS) is in place in EOC and connected with Sub-Division and Block level IRTs for support;

iii) Ensure that toll free emergency numbers existing for Police, Fire and Medical support etc. are linked to the EOC for response, command and control. For e.g., if there is any fire incident, the information should not only reach the fire station but also the EOC and the nearest hospital to gear up the emergency medical service;

iv) Obtain funds from State Government as recommended by the 13th FC and ensure that a training calendar for IRTs of city is prepared and members of IRTs are trained through ATIs and other training institutions of the District;

v) Activate IRTs at District headquarter, Sub-Division, Block levels, as and when required;

vi) Appoint / deploy, terminate and mobilise IC and IRT(s) as and when required;

vii) Ensure that IAP is prepared by the IC and implemented and remain fully briefed on the IAP and its implementation;

viii) Give directions for the release and use of resources available with any department of the Government, Local Authority, private sector etc. in the City;

ix) Ensure that local Armed Forces Commanders are involved in the planning process and their resources are appropriately dovetailed, if required and also ensure that when Armed Forces arrive in support for disaster response, their logistic requirements like camping grounds, potable water, electricity and requirement of vehicles etc. are sorted out;

x) Appoint a NO at the City level to organise Air Operations in coordination with the State and Central Government NO. Also ensure that all ICs of IRTs of the District are aware of it;

xi) Ensure that the NGOs carry out their activities in an equitable and non-discriminatory manner;

xii) Deploy the District Headquarter IRTs at the incident site, in case of need;

xiii) Ensure that effective communications are in place and that telephone directory of all ESF is prepared and available with EOC and members of IRTs;

xiv) In case the situation deteriorates, the RO may assume the role of the IC and may seek support from the State level RO;

xv) Conduct post response review on performance of IRTs and take appropriate steps to improve performance.

Coordination Of Response the Locality Level With a Slightly Different Administrative Structure and Set Up

In most localities of Shillong Municipal Area, as the same in the other localities or villages of Meghalaya, the administrative structure is slightly different from that of the rest of the country. Some departments and agencies may have a dominating presence while others may not have any presence at all. In such areas, village chiefs and community level leaders are also important functionaries. It is therefore necessary that the RO at the state or district level should design their IRTs according to their administrative structure and functionaries. They should select their village and ward level IRTs and get them sensitised and trained as per IRS principles for response. A proper communication set up should also be established.

Incident Commander (IC) and Command Staff

The IC is the overall in-charge for the management of onsite response to any incident. He is appointed by the RO. He may have a deputy with him depending upon the magnitude and nature of the incident. For his assistance and management of the incident there are two sets of staff:
a) Command Staff and b) General Staff. The command staffs comprise IC, Information & Media Officer (IMO), Safety Officer (SO), and the Liaison Officer (LO).

Roles and Responsibilities of IC

The IC will:

i) Obtain information on:

- Situation status like number of people and the area affected etc.;
- Availability and procurement of resources;
- Requirement of facilities like ICP, Staging Area, Incident Base, Camp, Relief Camp, etc.;
- Availability and requirements of Communication system;
- Future weather behaviour from IMD; and

ii) Determine incident objectives and strategies based on the available information and resources;
iii) Establish immediate priorities, including search & rescue and relief distribution strategies;
iv) Assess requirements for maintenance of law and order, traffic etc. if any at the incident site, and make arrangements with help of the local police;
v) Brief higher authorities on the situation as per incident briefing

vi) Establish appropriate IRS organisation with Sections, Branches, Divisions and/or Units based on the span of control and scale of the incident;

vii) Establish ICP at a suitable place. There will be one ICP even if the incident is multijurisdictional. Even a mobile van with complete communication equipment and appropriate personnel may be used as ICP. In case of total destruction of buildings, tents, or temporary shelters may be used. If appropriate or enough space is not available, other Sections can function from a different convenient location. But there should be proper and fail safe contact with the ICP in order to provide quick assistance;

viii) Ensure that the IAP is prepared and ensure that team members are briefed on performance of various activities as per IAP;

ix) Approve and authorise the implementation of an IAP and ensure that IAP is regularly developed and updated as per debriefing of IRT members. It will be reviewed every 24 hours and circulated to all concerned;

x) Ensure that planning meetings are held at regular intervals. The meetings will draw out an implementation strategy and IAP for effective incident response. The decision to hold this meeting is solely the responsibility of the IC. Apart from other members, ensure that PSC attend all briefing and debriefing meetings;

xi) Ensure that adequate safety measures for responders and affected communities are in place;

xii) Approve and ensure that the required additional resources are procured and issued to the concerned Sections, Branches and Units etc. and are properly utilised. On completion of assigned work, the resources will be returned immediately for utilisation elsewhere or to the department concerned;

xiii) If required, establish contact with the Rangbah Shnong, ULBs, CBOs, NGOs etc. and seek their cooperation in achieving the objectives of IAP and enlist their support to act as local guides in assisting the external rescue and relief teams;

xiv) Approve the deployment of volunteers and such other personnel and ensure that they follow the chain of command;

xv) Authorise release of information to the media;

xvi) Ensure that Incident Status Summary (ISS) is completed and forwarded to the RO;

xvii) Recommend demobilisation of the IRT, when appropriate;

xviii) Review public complaints and recommend suitable grievance redressal measures to the RO;

xix) Ensure preparation of After Action Report (AAR) prior to the demobilisation of the IRT on completion of the incident response.

Roles and Responsibilities of Information and Media Officer (IMO)

The IMO will:

i) Prepare and release information about the incident to the media agencies and others with the approval of IC;

ii) Jot down decisions taken and directions issued in case of sudden disasters when the IRT has not been fully activated and hand it over to the PS on its activation for incorporation in the IAP; ask for additional personnel support depending on the scale of incident and workload;

iii) Monitor and review various media reports regarding the incident that may be useful for incident planning;

v) Organise IAP meetings as directed by the IC or when required;

vi) Coordinate with IMD to collect weather information and disseminate it to all concerned;

vii) Maintain record of various activities performed

Roles and Responsibilities of Liaison Officer (LO)

The LO will:

i) Maintain a list of concerned line departments, agencies (CBOs, NGOs, etc.) and their representatives at various locations;

ii) Carry out liaison with all concerned agencies including NDRF and Armed Forces and line departments of Government;

iii) Monitor Operations to identify current or potential inter-agency problems;

iv) Participate in planning meetings and provide information on response by participating agencies;

v) Keep the IC informed about arrivals of all the Government and Non Government agencies and their resources; and help in organising briefing sessions of all Governmental and Non Governmental agencies with the IC;

viii. Maintain record of various activities performed

Roles and Responsibilities of Safety Officer (SO)

The SO will:

i) Recommend measures for assuring safety of responders and to assess or anticipate hazardous and unsafe situations and review it regularly;

ii) Participate in planning meetings for preparation of IAP and Review the IAP for safety implications;

iii) Obtain details of accidents that have occurred within the incident area if required or as directed by IC and inform the appropriate authorities;

iv) Review and approve the Site Safety Plan, as and when required;

v) Maintain record of various activities performed

GENERAL STAFF

The General Staff has three components which are as follows;

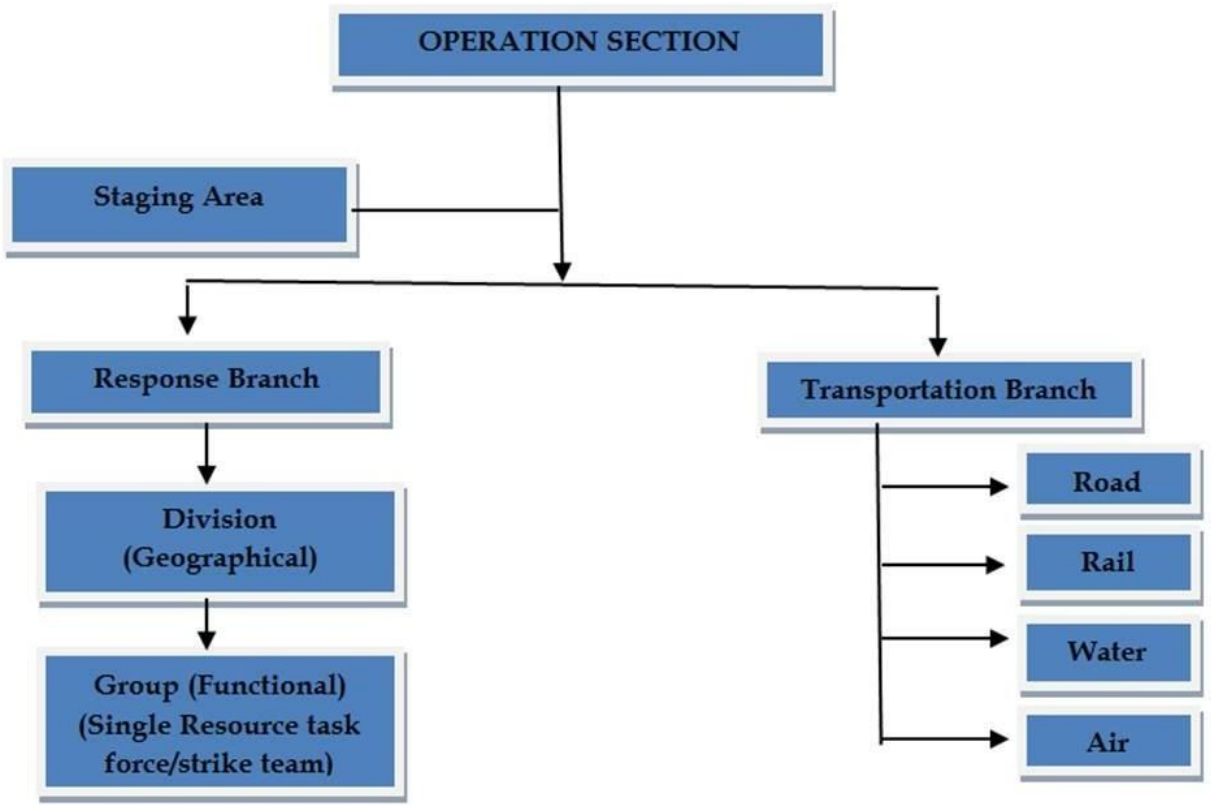
Operations Section (OS)

The OS comprises Response Branch (RB), Transportation Branch (TB) and Staging Area (SA) and is headed by the OSC. The activation of the RB and TB is situational.

The RB consists of various Divisions and Groups depending upon the functional and geographical requirements of the incident response. The Groups are classified by their functional characteristics, such as Single Resource, Strike Teams and/or Task Force.

The TB may consist of Road Operations Group, Rail Operations Group, Water Operations Group and Air Operations Group. These Groups are also activated according to the transportation modes that may be required in the incident response.

SA is the area where resources mobilised are collected and accounted for. It is from this location that the resources are deployed for specific assignments or tasks. The composition of OS is shown in Figure 7.3.



F i g ure 7. 3: Four Composition of Operation Section

RB is activated according to the nature of response required. For example in case of earthquake and flood where a lot of houses get damaged or destroyed and people need to be rescued and

provided relief and temporary shelter. The rescue and relief group of the Response Branch will be activated to provide these services.

The TB will manage the transportation of the affected people and the movement of relief materials. Groups within the TB like Road group or Water group will be activated as required for managing and providing the Road or Water transport. Since Air Operations in disaster response involves coordination between the Central Government, Ministry of Civil Aviation,Air Force, State and the Districts concerned and also requires technical inputs. Selection of the OSC depends on the nature of operations required. Rescuing people and taking them to shelter in case of earthquake or floods can best be handled by the police/Armed Forces and thus in such cases it should ideally be headed by them. However in cases of such disaster like bird flue epidemic, the main requirement will be providing medical treatment to the victims, vaccinating and culling of birds. In such cases the OS shall have to be headed by Doctors for treatment of victims and supported by Animal husbandry department and Municipal institutions for vaccinating and culling of birds.

Roles and Responsibilities of OSC

The OSC will:

i) Coordinate with the activated Section Chiefs;

ii) Manage all field operations for the accomplishment of the incident objectives;

iii) Ensure the overall safety of personnel involved in the OS and the affected communities;

iv) Deploy, activate, expand and supervise organisational elements (Branch, Division, Group, etc,) in his Section in consultation with IC and in accordance with the IAP;

v) Assign appropriate personnel, keeping their capabilities for the task in mind and maintainOn Duty Officers list for the day.

vi) Brief the personnel in OS at the beginning of each operational period;

vii) Prepare Section Operational Plan in accordance with the IAP; if required;

viii) Suggest expedient changes in the IAP to the IC;

ix) Determine the need for additional resources and place demands accordingly and ensure their arrival;

x) Ensure record of various activities performed by members of Branches, Divisions, Units/Groups are collected and maintained.

Planning Section (PS)

The PSC is responsible for collection, evaluation, dissemination and use of information. It keeps track of the developing scenario and status of the resources. In case of need, the PS may also

have Technical Specialist for addressing the technical planning matters in the management of an incident. A list of such specialists will be kept available in the PS. The PSC reports to the IC and will be responsible for the activation of Units and deployment of personnel in his Section as per requirement. The composition of PS is shown in flow chart (Figure 7.4).

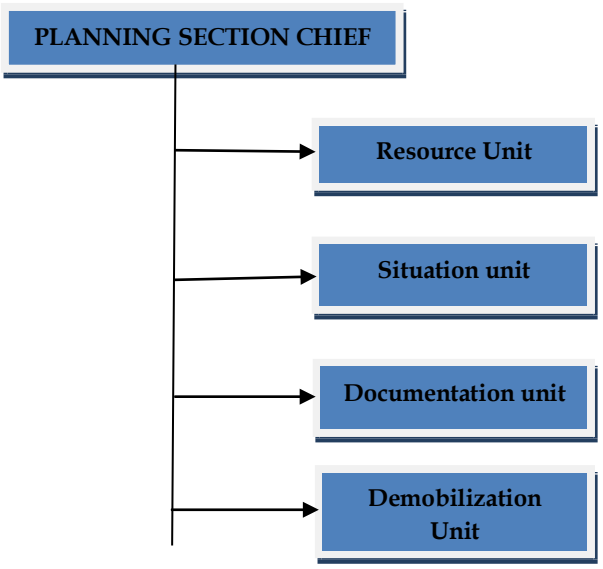


Figure 7.4: Composition of Planning Section

7.5.9.1 Roles and Responsibilities of PSC

The PSC will:

i) Coordinate with the activated Section Chiefs for planning and preparation of IAP in consultation with IC;

ii) Ensure that decisions taken and directions issued in case of sudden disasters when the PS had not been activated are obtained from the IMO (Command Staff) and incorporated in the IAP;

iii) Ensure collection, evaluation, and dissemination of information about the incidents including weather, environment toxicity, availability of resources etc. from concerned departments and other sources. The PS must have a databank of available resources with their locations from where it can be mobilised;

iv) Coordinate by assessing the current situation, predicting probable course of the incident and preparing alternative strategies for the Operations by preparing the IAP. The IAP contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period (24 hours is considered as one operational period). The plan may be oral or written.

v) Ensure that Incident Status Summary is filled and incorporated in the IAP;

vi) Ensure that Organisational Assignment List (Divisional/Group) is circulated among the Unit leaders and other responders of his Section;

vii) Plan to activate and deactivate IRS organisational positions as appropriate, in consultation with the IC and OSC;

viii) Determine the need for any specialised resources for the incident management;

ix) Provide periodic projections on incident potential and report to the IC of any significant changes that take place in the incident status; compile and display incident status summary at the ICP;

x) Oversee preparation and implementation of Incident Demobilisation Plan (IDP)

xi) Assign appropriate personnel, keeping their capabilities for the tasks in mind and maintainOn Duty Officers List for the day;

xii). Ensure that record of various activities performed by members of Units are collected and maintained in the Unit Log.

Logistics Section (LS)

The LS comprises Service, Support and Finance Branches. Structure and details of each Branch are shown in Figure 7.5. The Section is headed by a chief known as the LSC. The activation of various Branches of the LS is context specific and would depend on the enormity and requirements of the incident. The Finance Branch (FB) constitutes an important component of the LS to specially facilitate speedy procurement, and proper accounting following financial procedures and rules.

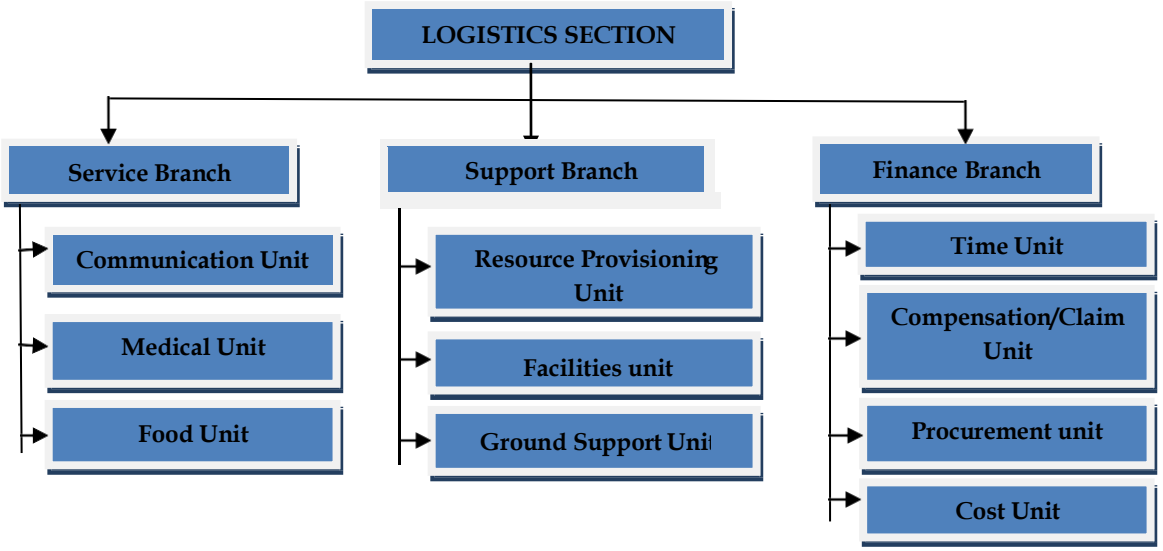


Figure 7.5: Composition of Logistics section

7.5.10.1 Roles and Responsibilities of LSC

The LSC will:

i) Coordinate with the activated Section Chiefs;

ii) Provide logistic support to all incident response effort including the establishment of SA, Incident Base, Camp, Relief Camp, Helipad etc.;

iii) Participate in the development and implementation of the IAP;

iv) Keep RO and IC informed on related financial issues;

v) Ensure that Organisational Assignment List (Divisional / Group) is circulated among the Branch Directors and other responders of his Section;

vi) Request for sanction of Imprest Fund, if required;

vii). Ensure that a plan is developed to meet the logistic requirements of the IAP with the help of Comprehensive Resource Management System;

viii) Anticipate over all logistic requirements for relief Operations and prepare accordingly;

ix) Constantly review the Communication Plan, Medical Plan and Traffic Plan to meet the changing requirements of the situation;

x) Assess the requirement of additional resources and take steps for their procurement in consultation with the RO and IC;

xi) Provide logistic support for the IDP as approved by the RO and IC and ensure release of resources in conformity with the IDP;

xii) Ensure that the hiring of the requisitioned resources is properly documented and paid by the FB;

xiii) Assign appropriate personnel, keeping their capabilities for the tasks to be carried out and maintain On Duty Officers List for the day

xiv) Ensure that cost analysis of the total response activities is prepared;

xv) Ensure that record of various activities performed by members of Branches and Units are collected and maintained in the Unit Log.

The Incident Response Teams (IRTS)

The IRT is a team comprising of all positions of IRS organisation as shown in Figure 7.6 is headed by IC. The OS helps to prepare different tactical operations as required. The PS helps in obtaining different information and preparing plans as required. The LS assesses the availability and requirement of resources and takes action for obtaining them.

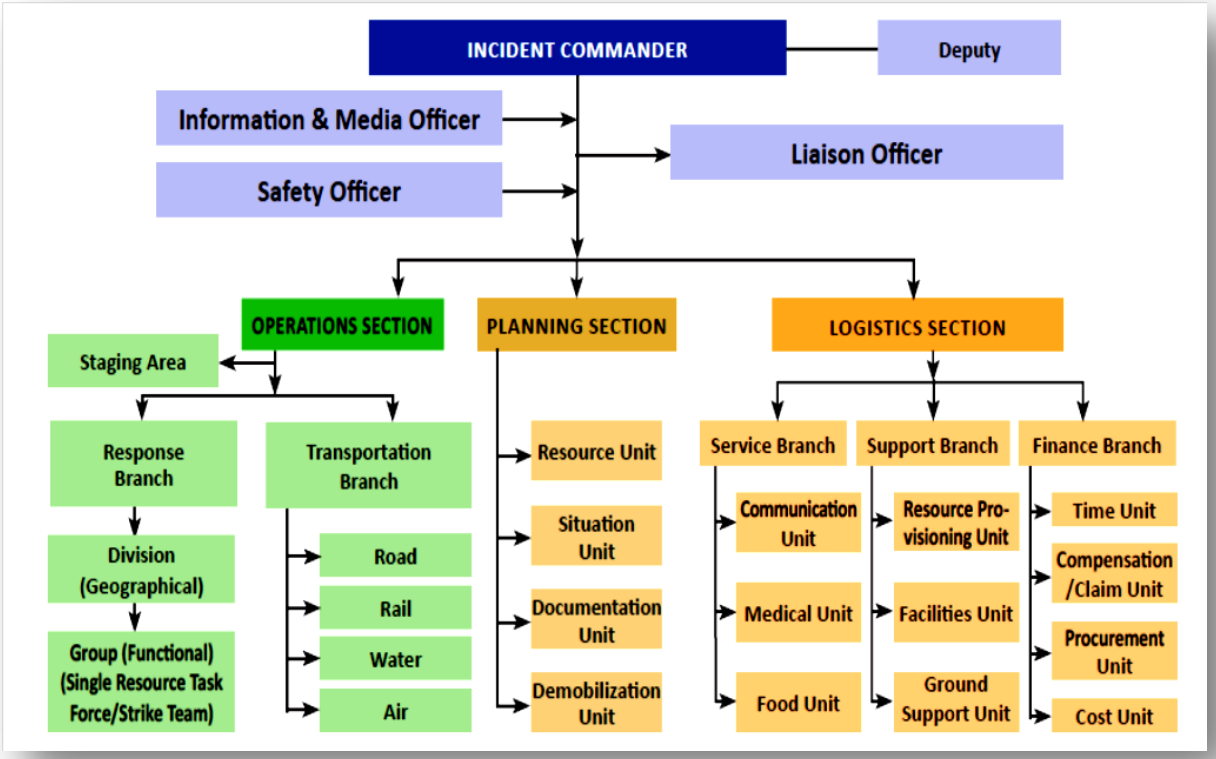


Figure 7.6: Emergency Support Function (ESF) Plan

NEED OF ESF PLAN

A disaster causes immense loss to human lives in a massive scale. If a formalized andtimely response would not take place, death toll can increase immensely. Therefore,district formulates a Emergency Response Plan consisting several Emergency Support Functions (ESFs) related to Communication, Search and Rescue, evacuation, law and order, medical response and Trauma Counselling,water supply, electricity, warning and transport, relief etc. All of these emergencyfunctions consist of emergency plans that would be activated at the time ofemergency.

The ESF Plan document outlines the objective, scope, organization setup andStandard Operating Procedures (SOPs) for each ESF that is to be followed by therespective ESF agencies when the Responsible Officer will activate the responseplan. Standard Operation Procedures (SOPs) provides a basic concept of theoperations and responsibilities of Disaster Management Team, Nodal andSecondary agencies.

ESF Organizational Setup and Inter-Relationships

The plan establishes an organized setup to conduct ESF operations for any of theNatural and Manmade Disasters. It outlines an implementing framework of sharingresources and coordinating, preparedness, Mitigation, response and recovery asper the requirement. National

and State level department will be engaged tosupport during an emergency situation. The Plan has structured the activities ofconcerned agencies i.e. Nodal and support agencies into an organized mannergrouping their capabilities, skills, resources, and authorities across the State anddistrict Government. The plan unifies the efforts of the District Administration and supportagencies so that they are involved in emergency management comprehensively toreduce the effects of any emergency or disaster withincity/district.

The Revenue and Disaster Management Department is the Primary Agency coordinating all Disaster RiskManagement Efforts at State Level. However, there will be Other Agencies Involved in-charge of Different ESFs.

Each ESF shall have an ESF Nodal agency, and a number of support agencies. TheESF Nodal agency shall be directly linked to the Responsible Officer /Deputy Commissioner and the State EOC, and will be the main coordinator in charge of theESF. The support agencies to the ESF shall support the Nodal agency in establishingand managing the emergency shelter and rehabilitation.

At the district level, the Nodal Agency will lead the ESF with direct link to the Responsible Officer of the District and the district EOC. The Nodal Agency will also be amember of the Incident Management Team lead by an officer of theRevenue/Police or other department as decided upon by the district IC, and asrequired by the Incident Commander who may draw upon some or all of the ESFs foronsite response. The Nodal Agency must hence nominate a Team Leader (TL) at theState level and district level, and a member for the IMT(s) in advance, withappropriate (at least two) backstopping arrangements.

The Nodal and Support Agencies must together or separately (as decidedaccording to need of the specialized function) constitute QRTs with members, andappropriate (at least two) backstopping arrangements. Team Leader (TL) of EOCwould be on the basis of its authorities, resources, and capabilities in the functionalarea. He would be the member of Disaster Management Team that represents all ofthe key functions of the district in a single location under the direction of the Deputy Commissioner (Responsible Officer).

All persons nominated, and all teams must go through a sensitization, training andmust be acquainted with the Standard Operating Procedures of the ESF Plan. Theymust practice and update their plan and SOP regularly (at least twice a year) eachof the Nodal and Support agencies would also comprise of quick response teamtrained to carry out their functions at the response site.

The success of ESF will be of critical importance and would reflect in the lives savedin the golden hour. Below a list of ESFs has been given which will be activated atstate/district level during emergency situation.

STANDARD OPERATING PROCEDURE

Emergency Support Function # 1: Coordination

Team Leader: Deputy Commissioner, Shillong

Support Agencies: S.P; ADC (DM); ADC (Law and Order); Joint director of Supply, CEO, Shillong MunicipalBoard; Secretary, MUDA, S.P, Fire, DTO, Youth Coordinator, NYK; Executive Engineer (PWD),Assistant Director, IPR, District AH&V Officer;Commandant, (Civil Defence and Home Guards) and other relevant departments of District desired during the crisis.

In anticipation of any disaster, the District Administration has taken variousprecautionary measures. Functioning of the Control Room, Closure of past breaches

in river and canal embankments and guarding of weak points, rain recording andsubmission of rainfall report, communication of Gauge reading, deployment ofpower/country boats, installation of temporary VHF stations, arrangement forkeeping telephone and telegraph lines in order, storage of food stuff, arrangementfor keeping drainage clear, agricultural / health /veterinary measures, selection ofFlash flood/ Earthquake shelters, etc. have been properly planned. The governmentofficials of different departments have been apprised of their duties for pre, duringand post disaster periods.

The ULBs, Executive Engineers of Water Resource Department,Executive Engineers of PWD Department, Executive Engineers of MeCEL,DM&HO, A H &Veterinary, Joint Director of Supply etc. have been requested to take allprecautionary and preparatory measures and to remain alert to face the challengeof any disaster. The other government officials have also been apprised of their rolesand responsibilities to be played during pre-disaster arrangement and during/postdisastermanagement. Every possible kind of cooperation from all the linedepartments has been sought for by the District Administration in combating the severe natural calamities that may occur anytime.

Emergency Support Function # 2: Communication

Team Leader: SP, Shillong

Support Agencies:	MPRO, Ham radio operator Clubs, IPR, Bharat Sanchar Nigam Limited (BSNL), NIC, Private/ mobile Telecom Representatives, Signal Representative Army', IMD, CWC, FM Radio, Doordarshan, All India Radio, Private Satellite Channels.

The Emergency Support Function (ESF) 'Communication' supports the ResponsePlan in case of Major Communication links damage in various parts of the cityduring a Disaster and there is a requirement for immediate restoration orreplacement of the network. The objective of the ESF is to provide safe andreliable communication support during and after a disaster; to restorecommunication facilities in the aftermath of a disaster and provide vitalcommunication linkages between Emergency Operations Center, and importantresponse agencies. This ESF encompasses setting up of temporary communicationcenters in and around the area of impact and activation of Mobile units in case ofwidespread damage in a disaster like an earthquake.

Situation Assumptions

- There would be congestion in the network because of increased calls to controlrooms due to panic created in the community
- The initial reports on damage may not give a clear picture of the extent ofdamage to Communication network
- The affected site may cut off from the state control rooms and the officials onsite and find difficulty in communicating to the District/State EOC
- Police wireless network will only be the reliable communication network till theother communication networks are fully restored

It is possible that telephone service will be disrupted very badly in a majorearthquake for a period of time. Not all components of the telephone system will beequally affected, but initially the failure of land- based components will cause ageneral failure of the total system's reliability. As the telephone system is graduallybrought back into service in accordance with the priorities given to it, it may allowlimited use by the competent authorities within a matter of hours after theearthquake.

As this is not a dependable or even predictable situation, this plan must require thecapability to carry out emergency response independent of the commercialtelephone system. While the use of existing radio systems is an obvious solution, thesimultaneous breakdown in delivery of electric power distribution may limit thosecapabilities as well. Other simple means of communication, such as handwrittenmemo delivered by courier, and verbal communication through personal liaison, willalso be necessary.

Scope:

This function is limited to the emergency communications requirements only. Assuch, the restoration of public sector communication could be carried out as a partof the Department of Telecommunication's emergency functions during disaster.

THE TASKS:

Immediate Tasks:

- Collection of initial reports of damage
- Status of the affected regions in respect of establishing communication withrest of the City/District
- Status of the key officials in the area
- The main focus of the activities is to coordinate life saving activitiesconcurrent with re-establishing control of the disaster affected area
- Establish radio communication with the State Emergency Operations Centre,District Emergency Operations Centre as well as Relief Centers
- Appoint a Nodal Officer, Communications
- Renew and update precautionary measures and review with the staff theprecaution to be taken to protect the equipment
- Alternative Communication

Initial Action:

- Identify operational telecommunication facilities within the affected area.
- Identify telecommunication facilities that need to be transported to theaffected site to establish the emergency operational services
- Identify the actual and planned action of private telecommunicationcompanies towards reconstruction of their facilities
- Establish temporary communication facility through mobile exchange onpriority for use by District Officials, Officers in the transit, relief camp, NGOs.
- Establish a temporary communication facility for use by the public
- Carry out an assessment of overall damage for the following:
  (i) Overhead route damage, (ii) Cable damage, (iii) Specific equipmentdamage.

Task during sustained Phase:

Establish emergency communications in order of priority to the functions andlocations most in need of them for the mitigation of life- threatening situations andthe relief of human suffering. Provide a communication advisory function andinternal communication organization. Monitor and control, where possible, the re-establishmentof telephone services.

Standard Operating procedures for the Nodal Agency

- Team leader (TL) of Communication ESF will activate the ESF on receiving theintimation of occurrence of the disaster from the Responsible Officer
- Wireless operators would be informed about the current requirements andcoordination mechanisms shared. Till the restoration of normal telecom facilities,the police wireless system would be the main communication network
- TL issues orders to establish systems and reports to District EOC on the actiontaken
- TL would inform Nodal Officers (NOs) of support agencies about the event andESF activation
- TL would establish contact with the district EOC for First Information Report
- TL requests for reports from local ESF contact persons (this would be the localoffice of ESF Primary Agency) to understand the current situation and actionstake
- Based on information given by the support agencies, TL decides on the need to launch an assessment mission to estimate the extent of damage to telecomservices and network as well as to come up with possible arrangements toestablishing reliable and appropriate network
- TL communicates situation to support agencies and also requests to providedetails on the status of equipment and infrastructure in the affected area(s).
- TL informs the Responsible Officer on the status of telecom services
- TL works out a plan of action for telecom companies and convenes a meetingof all ESF members to discuss and finalize the modalities
- TL gets the temporary telephone facilities established for the public. Priorinformation on this would be announced through media/ and locally throughmega phones and other feasible mediums
- TL monitors the situation and arranges emergency staff required to operateestablished systems
- TL sends the District Quick Response team (QRT) at the affected site with therequired equipments and other resources

SOPs for Quick Response Team on Help Lines, Warning Dissemination

The QRT (Quick Response Team) members will reach to the Nodal office assoon as they will get instructions.Once the QRTs receive any intimation from the Nodal Officer toreach at the site they would reach to the site at the earliest,without wasting any time.

- At the emergency site QRT members will take stock of the situation from the sitecommunication manager
- QRTs would assess the ground situation and would send sectoral report to theDistrict ESF agency

A sectoral report would contain following:

An assessment of overall damage, listing specifically:

- Overhead route damage (in miles/ kilometres)
- Cable damage (in yards/meters)
- Specific equipment damaged
- Establish a temporary communication facility for use by the public
- Identify requirements of manpower, vehicles and other materials andequipments Give priority and concentrate on repairs and normalization ofcommunication system at disaster affected areas
- Begin restoration by removing and salvaging wires and poles from the roadwayswith the help of casual labourers
- Carry out temporary building repairs to establish a secured storage area for theequipments and salvaged materials
- Report all activities to head quarter
- Begin restoration by removing damaged wires and poles through recruitedcasual labourers
- Establish a secure storage area for incoming equipments and materials

Emergency Support Function # 3: Emergency Public Information, Help line & Warning

Team Leader: Assistant Director, IPR

Support Agencies: NIC, NGOs, Media (Print/Audio-Visual), Local Cable TV Network, FM Radio, Doordarshan,AIR, NSS,NYK, Scouts & Guides.

All levels of government and the news media have a responsibility to provideemergency information to the public that is accurate, timely and consistent. Justwhen public and media demands for information are at their highest following anearthquake, the probability is that most

media in the area will not be operationaldue to power failures. Nevertheless, media will be present to gather information forlater local dissemination, and for media outside the disaster area. The mediarepresent the major resource to inform the public about the disaster situation, andsome Local Cable TV Network and radio broadcast media have long beenoriented to their role. It then follows that the utilization of the media for the benefit ofongoing relief, rehabilitation and restoration activities is essential, and a high level ofpriority should be set to restore an adequate radio broadcast capability.

Scope:

This Emergency Function in this respect is primarily concerned with creating aneffective means of informing the public in the disaster operational area concerningefforts and actions expected of them to reduce risks to life and safety. Secondarily,the presentation of a sole point of release for Government information to the mediain general is required to prevent confusion on the part of the public, and to makebest use of public information/media affairs staff.

The emergency functions include, the determination of surviving broadcast media,and provision of assistance to district authority by delivering their emergencyannouncements and pre- arranged State Government's announcements.

In a major disaster, a Public Information Centre will be established as an integral partof the DDMA and perform publicinformation and media relations activities and assist in arrangement of tours of theOperational Area by the government officials and media persons.

THE TASKS:

Immediate Tasks:

- Assist in the determination of damage to media public informationcapabilities
- Pass prepared and updated public information announcements to theoperational media from the District Emergency Operations Centre (DEOC)

Tasks during sustained Phase:

- Establish the requisite level of emergency public information capabilities;establish the necessary media relations capabilities for release ofgovernment information to the general public through thenational/international media
- Control media personnel access through a system of accreditation andaccess control, in conjunction with the Law and Order function; ascapabilities are available, assist media personnel to prepare and send theirmaterial from the Operational Area; arrange for

official government andmedia tours of the Operational Area subject to availability of resources; assistdistrict/sub- divisional authorities with their own requirements whenrequested

SOP OF NODAL AGENCY

- Upon finding out about any hazardous event, ESF-TL will contact theDistrict EOC by any means possible (phone, wireless, personally)
- If asked to activate the ESF, Team leader (TL) will call nodal officers ofsupporting agencies of the ESF
- QRTs will be activated and deployed at the affected sites
- Coordinate with the different ESFs to get regular information in order tocompile and prepare updates, situation reports, damage assessmentreports, and media briefs
- Upon finding out about any hazardous event, Nodal officers will contactthe ESF-TL / District EOC by any means possible (phone, wireless,personally)

SOP OF QUICK RESPONSE TEAM (QRT)

- The QRT members will reach to the nodal office as soon as they will getinstructions
- QRT teams would reach to the site immediately after receiving instructionsfrom the nodal officer
- On the site QRT members will take stock of the situation from the RO at thesite and their counter parts
- The QRTs will coordinate, collect, process, report and display essentialelements of information and facilitate support for planning efforts inresponse operations

Emergency Support Function # 4: Search & Rescue

Team Leader:	S.P Fire and Emergency Service and Deputy Controller, Civil Defence and Home Guards,Shillong
Support Agencies**:**	CEO,SMB; PWD(Roads and Building);Police Department, NDRF, Health Dept, Ambulance Services, NSS, NCC, NYK, Zila Sainik Board, NGOs Dorbar Shnong, Volunteer, Army , Air force and Para-military forces.

Search and Rescue operations are one of the primary activities taken up in a postdisaster situation. The promptness in these operations can make a remarkabledifference in the amount of loss of life and property and will include removal oftrapped and injured persons from buildings collapses and other structural collapses,administering first aid, and assisting in transporting the

seriously injured to medicalfacilities. This activity involves the use of professional and volunteer search teamsincluding the use of dog teams.

Situation Assumptions

- Local community task forces will initiate search and rescue at residential level
- Spontaneous volunteers will require coordination
- Access to affected areas will be limited.
- Some sites may be accessible only through air routes only

The Exigencies:

In the urban environment, the collapse of buildings may include rescuesituations well beyond the capabilities of fire- fighters to resolve (possibly many ofthem at the same time). These situations are characterized by the extensive rubble,which can make it unclear if a rescue is needed. In some rescue situations heavyobjects must be moved or cut to extricate trapped persons; perhaps tunnelling techniques may be needed; and in other situations further collapse could occur ifan unskilled rescue attempt is made. Often there are circumstances where otherspecialized skills should be applied, such as on- scene medical care beyond first aidtreatment.

While an adhoc rescue might be put together for many such earthquake scenarios,the lack of a coordinated specialized search and heavy rescue capability in urbanareas may turn out to be a contributor to the loss of life in major earthquakes. Alevel of permanent organizational integrity should exist to allow training andexercising of the techniques and skills required, and to permit the functionaries inother branches to orient their skills in concert with those of the Search and HeavyRescue function in urban areas. The possible total preoccupation of fire-fighterswith fire suppression at the critical time for rescue also suggests that a capability tocoordinate the total organized rescue effort would be desirable, utilizing othermanpower sources that possess basic rescue skills similar to those of the fire- fighter.

Organizational requirement:

This plan conceptualizes a Search and Heavy Rescue Team, which would meet the needs outlined above.

THE TASKS:

Immediate Tasks:

The objectives of the team would be to:

- Locate and remove injured people who are trapped in the wreckage ofdamaged buildings and other structures
- To ascertain the safety of damaged buildings and structures
- To provide on- site medical treatment; and to remove the dead

Task during sustained Phase:

- Assist in removal of the dead from collapsed structures
- Team Organization (Conceptual)

The Search and Heavy Rescue Team should be organized in such a way that at least one trained personnelremains in command of the team followed by his/her assistants. Apart fromthis, there should be a district coordinating team with specialists/ experts likeone surgeon, one structural engineer, one logistic person, search dogs andlabourers, etc.

***Heavy Rescue Group*:** This component includes one or more sections, each one of which could beassigned responsibility for search and rescue tasks for a particular site. Skills includebasic rescue techniques including improvisation of rescue equipment, tunnelling,cutting, shoring, hoisting with mechanical equipment, searching in confined areas,operation in hazardous environments, and providing paramedic treatment topatients in emergency situations. Each section should comprise about five to sevenpersons and hold some light specialized equipment, including a vehicle.

Heavy Equipment Group: This component holds heavy equipment and heavy equipment operators, ormaintains an inventory of where they can be obtained, and trains equipmentoperators in the application of their skills to heavy rescue situations. Personnel of thisgroup would be assigned to a Heavy Rescue Group for carrying out criticaloperations and then shall be re- allocated. For these purpose personnel from Army, Air force, Para-Military and NHAI, may be included in this group as they have goodnumbers of bulldozers and cranes, etc.

Rescue Group: The exact size, composition and duties of the team are subject to furtherdevelopments depending on the acquisition of skill modern methodologies.

The S&R ESF has to respond to assist the Responsible Officer as per their assignedduty, which has been described in the SOP's and is to be followed duringemergency within the State. The scope of Response function includes the followingbroad areas:

- Rescue of those trapped
- Search for victims of a disaster (whether living or dead)

SOPs FOR Nodal Agency

- The ESF would be activated on receiving order from the Responsible Officer(IC) to the Team Leader (TL) of Primary Agency for ESF activation
- TL of primary agency will call Nodal Officers of supporting agencies
- TL would activate the District Quick Response Team
- Quick Assessment for the scale of S& R operations required to be carried out
- On requirement request for additional S&R teams sent to National DisasterResponse force through state Govt. without wasting time, almostsimultaneously
- Assessments of the specific skill sets and the other equipments required
- Using IDRN network to check and map the availability of resources in andaround the disaster site
- Responsible Officer / District EOC (on orders from RO) would contact the team leader of S&ROperations to activate the ESF response plan
- Team leader of Nodal agency would report to the Quick response teams forimmediate operation and inform supporting agencies to coordinate in thesituation depending upon the scale of the disaster
- QRTs (of both nodal and supporting agencies) would perform a physicaldamage assessment and report to the leaders of central and nodal agencyabout the percentage of damage, percentage of casualties expected andpossible requirement of equipments, manpower and rescue sites
- Medical and Trauma Counselling Response Teams at District Levelto be activated by ESF-TL if needed, and report to the Incident Commander atthe Onsite EOC who will coordinate their activities
- Response Teams in the field communicate with the ESF-TL at the District EOC,through the Incident Commander
- Major hospitals given warning to activate their contingency plan, if required
- ESF-TL to inform Responsible Officer at District EOC if activation of the State EOC will beneeded
- Following up a systematic approach of transferring resources, manpowerequipments, vehicles at the Disaster affected areas
- Determine the release of QRTs and facilities at effected site may beconsidered on a priority basis

- Contacting health services to instruct them to send first-aid and traumacounselling team to the affected site, so the patients can be treated beforetransporting to the hospital for the advance treatment (if needed)
- Contacting damage assessment teams and send them to the site so thatassessment reports can be prepared and situation analysis can be doneproperly
- Establishing a failsafe communication system with QRTs members so thatcurrent reports on situation analysis can be gathered and accordingly helpcan be provided to the site
- Declaration of further help required at State and National level in case ofdamage is at large scale and situation is unmanageable with the availableresources
- At the site, QRTs should contact the local volunteers and local people togather information about vulnerable areas so that search and rescueoperation can be taken place through a proper channel in heavily denseareas, large buildings, community centres, hotels, hospitals, public buildingand any other area having large gathering.
- Special care to women and children groups should be given as they areexpected to be more affected and helpless in case of any emergencysituation
- Further request to the health department to deploy mobile hospitals in casethe casualties are severe and transportation of patients may take much moretime
- Provide regular updates to the RO at the District/State EOC based on reportsfrom the field and the hospitalsCoordinate with the Transportation ESF if a large number of medicalprofessionals need to be sent to the affected sites and/or a large number ofvictims need to be transported to health facilities.
- Ensure the provision and continuous supply of medical facilities (medicines,equipments, ambulances, doctors and manpower etc) required at thedisaster affected site and the hospital health centres catering to disaster victims
- Coordinate with the ESFs on Law & Order, Evacuation, and Debris and RoadClearance, for setting up of field medical posts, transport of victims, andsetting up of mobile hospitals

SOP for Quick Response Team on Search &Rescue

- Assessment of damage (locations, number of structures damaged, severity of Damage)
- The QRTs will be deployed at the affected site
- Enlisting the types of equipment required for conducting the S&R

- QRTs will report the situation and the progress in response activities to therespective EOCs
- QRTs will reach on the spot and take a damage assessment including typeof injuries, number of people affected and possible medical assistance need
- QRTs will provide situation and progress reports on the action taken by theteam to the ESF-TL
- QRTs will ensure timely response to the needs of the affected victims byEstablishing field medical posts at disaster sites, as needed
- QRTs should maintain a coordination with the local people so the S&Roperation may take place at more vulnerable locations having dense,population, multi-storied buildings and community gatherings as more peopleare expected to be trapped in such areas
- QRT will report to Nodal agency in case of shortage of vehicles, manpower,resources and relief materials
- QRT will also work effectively with the other teams conducting first aid, traumacounselling, law and order, debris clearance, damage assessment and waterand sanitations so the effective rehabilitation may take place accordingly

Emergency Support Function # 5: Evacuation

Team Leader (TL):	Deputy Controller, Civil Defence
Support agencies:	Police Department; Civil Defence and Home GuardsVolunteer;Dorbar Shnong, Voluntary Organization;NSS;NYK;NCC;Rotary Club;NDRF ; Army , Air force and Para-military forces

The purpose of this Emergency Support Functions is to coordinate efforts in safelyevacuating the public from a threat to life and/or health. Evacuation andmovement involves the coordination of varying agencies and good communications with the public. Evacuation and movement is the responsibility ofpublic safety and the legislative authorities of a jurisdiction. This ESF applies to thoseagencies and others that are necessary for an evacuation.

The ESF on evacuation is primarily responsible for establishing evacuation plans,identification of fastest evacuation routes and alternate routes and coordinatingevacuation logistics during field operations.

Situation Assumptions:

Any disaster situation could cause the need for evacuation. So far particularconcern to Shillong is from earthquake, flash flooding or a fire, which could cause theneed for an immediate evacuation, with very little time to plan for the specificevacuation.

- Individuals and families may be displaced from their homes and may beprovided shelters by one or more volunteer organizations
- Approximately 10% of the populous may seek shelter in organized shelters.The rest usually will find their own through friends, family, relatives orcommercial sources
- Displaced persons may require transportation to shelter facilities. This shouldbe provided for by private transportation
- Shelter operations will have sufficient sanitation and cooking facilities,including cold and frozen storage, to maximize the use of available products
- Most of the buildings would be damaged and would not remain serviceable.
- Many structures would be damaged and there would be an urgent need toevacuate

SOPs for Nodal Agency:

- Team leader (TL) of Evacuation ESF would activate the ESF on receiving thewarning of the disaster/disaster from District EOC
- TL would inform Nodal Officers (NOs) of other primary and support agenciesabout the event and ESF activation
- TL will direct the QRTs to be deployed on the affected site
- TL will gather information on availability of predefined evacuation routes
- Where the predefined evacuation routes are not available, the Nodal officerwould coordinate through District EOC with other ESFs Nodal officers and thesupport agencies about clearing of routes and identifying alternate routes.

SOPs for Quick Response Team on Evacuation

- The QRT members will reach the Nodal office as soon as they getinstructions to do so from the TL
- Once the quick response teams receive an order from the Nodalofficer for reaching the site they would reach to the site immediately
- On reaching at the site the QRT members will take stock of thesituation from the Incident Management Team at the site and theircounter parts
- The quick response teams with the help of local task forces will startevacuating peoples to safe shelters or open areas

- The QRT members should concentrate more on evacuation in areasthat have been worst affected by the disasters
- Keep reporting about all the activities to the TL

Emergency Support Function # 6: Emergency Medical Response

Team Leader: DM&HO

Support Agencies: Medical Supt. Shillong Civil Hospital and other hospitals; Blood Bank; Indian Red Cross Society, Nursing Homes; NSS; Rotary Club, Lions Club; Ambulance Services; Civil Defence First Aider; Medicine Stockiest ; Indian Medical Association (IMA); NYK; NCC.

All disasters affect human life and health. Health is both a main objective and ayardstick in disaster management. This Emergency Support Function (ESF) will beresponsible for the emergency medical treatment and mental trauma support in the aftermath of any hazardous event.

The ESF on Emergency Medical Services and Public Health Counselling will look afteremergency treatment for the injured people immediately after the disaster takeplace.

Situation Assumptions:

- Hospital services would be affected
- Communication and transport services would be disrupted
- Emergency Medical Care, Trauma Counselling services will be requiredfor affected population
- Likely outbreaks of diseases epidemic after the disaster
- Hospital services would be affected

Primary Agency: Health Department

The exigencies:

A severe earthquake is characterized by its effects on the health care deliverysystem perhaps more than any other way. Not only are there likely to be manyinjured persons, the types of injury experienced by persons rescued after beingtrapped under the rubble may require urgent hospital care. At the same time, thefacilities required by the health care system are subject to damage, which canincapacitate the system and require the evacuation of their existing patients.

Disrupted roads interfere with ambulance movement, requiring some dependenceupon on- scene paramedical treatment and first aid until removal to places wheremedical facilities are possible. The decentralized local operation of health servicesmay not suffice in the event of a major disaster.

Functions:

The function includes:

- District level health services responsibilities shall be mobilized toprovide emergency medical treatment to the injured; sustained hospital careto the seriously injured or seriously ill
- Continue care at an appropriate level to patients in hospital and outpatientsat the time of the earthquake and other hazards response
- Evacuation of the sick and injured to a location where care can beprovided as well as sustained emergency care until evacuation can becarried out with medical or paramedical supervision
- District level coordination of delivery of medical supplies, blood and blood Products; operation of ambulance services
- Prevention of epidemic through education of the general population
- Carrying out of health inspections of food and water supplies
- Initiation of vaccination programs under epidemic conditions. Radiologicaland toxicological services could be in increased demand and require anexpanded response
- There will also be a need to provide initial establishing of death, and thetemporary safe storage of human remains in support of coroner operations.

A major earthquake would require a much greater degree of control of resourceswithin the Operational Area and would necessitate the establishment of a healthservices coordination center at the State Capital. The Health Department is toidentify some safe locations to use as first aid centers and to shift the patientswhenever needed. In each ward the general public should be trained up for firstaid assistance and dispensary should maintain a rotating reserve stock of blood,saline, bandage, cotton, benzene, dettol and life saving drugs/injections.

Immediate task:

- Appoint one person as Nodal Health Officer for the district
- Ensure that the personnel working within the district come under the directcontrol of the District Nodal Health Officer

- Any other personnel once deployed for the purpose will directly come underthe control of the District Nodal Health Officer
- Identify emergency patient holding facilities
- To prepare and keep ready Mobile Hospitals and stock them withemergency equipment that may be required after the disaster
- Transfer patients who can be removed from hospitals to make room for theinjured; where necessary implement a system of staging causality collection,treatment, and evacuation to places where facilities are available (probablyoutside the Operational Area)
- Arrange delivery of emergency medical supplies; arrange for temporarysuitable storage of the dead until taken over by the coroner

All efforts should be made to keep the health care receiving centres and outpatientservice centres free from any kind of panic; prevent disease outbreak or spread;attend to mental health requirements; expand local public health services asnecessary, particularly the supply of essential drugs and pharmaceuticals in areaswhere the private sector drug stores have ceased to function; carry out sanitaryinspections.

SOPs for Nodal Agency

- Upon finding out about any hazardous event, RO will call the TL ofPrimary Agency and get the ESF activated
- Team leader (TL) of primary agency will call Nodal officers of supportagencies
- In coordination with the transport ESF, it will ensure a critical number ofmedical professionals to be reached at the site including specialists.
- QRTs will be activated and deployed at the affected sites
- Medical and Trauma Counselling Response Teams to be activated,based on report from the QRTs
- Provide systematic approach to patient care (Mass CasualtyManagement)
- Trauma counselling provided to the victims and their relatives at thesite and in the hospital. In the hospital emergency department, triage carried out again toprioritise treatment, and appropriate care provided
- Maintain patient tracking system to keep record of all patientstreated
- Deploy mobile hospitals as needed
- If medical facilities severely affected by the disaster, or roads blockedpreventing transport of patients to the hospital, mobile hospitalsdeployed at required sites.

- Provide regular updates to the RO at the District EOC based onreports from the field and the hospitals
- Coordinate with the Transportation ESF if a large number of medicalprofessionals need to be sent to the affected sites and/or a large number of victims need to be transported to health facilities
- Ensure the provision and continuous supply of medical facilities(medicines, equipments, ambulances, doctors and manpower etc)required at the disaster affected site and the hospital health centrescatering to disaster victims
- Coordinate with the ESFs on Law & Order, Evacuation, and Debris andRoad Clearance, for setting up of field medical posts, transport ofvictims, and setting up of mobile hospitals
- If temporary housing arrangements are being made for the affectedpopulation, the ESF must ensure high standards of sanitation insettlements in order to reduce epidemic outbreak
- Ensuring the provision and continuous supply of medical facilities(medicines, equipments, ambulances, doctors and manpower etc)required at the disaster affected site and the hospital health centrescatering to disaster victims
- In case of orthopaedic care required, the immediate response wouldhave to be complimented by a follow up treatment schedule for amajority of the patients in/near their place of shelter
- Trained professionals should be mobilized by psychological support
- Ensuring setting up of temporary information centres at hospitals withthe help of ESF through help lines and warning dissemination system
- TL will coordinate, direct, and integrate district level response toprovide medical and sanitation health assistances
- On the recommendations of the EOC, the TL is also responsible to :
  - Send required medicines, vaccines, drugs, plasters,syringes, etc
  - Arrange for additional blood supply. Send additionalmedical personnel equipped with food, bedding andtents etc

SOP of Quick Response Team (QRT)

- QRT's will assess the damage: type of injuries, number of peopleaffected and possible medical assistance need

- QRTs will provide situation and progress reports on the action taken bythe team to the ESF-TL
- QRTs will ensure timely response to the needs of the affected victimsby establishing field medical posts at disaster sites, as needed
- QRTs should maintain check posts and surveillance at each railwayjunction, bus depots and all entry and exit points from the affectedarea, especially during the threat or existence of an epidemic

Emergency Support Function # 7: Relief

The purpose of this Emergency Support Function is to identify food and water needsin the aftermath of a disaster or emergency; obtain these resources; and transportthem to the impact area. Food supplies obtained and distributed by EmergencySupport Function (Food, Water, Shelter etc).Obtaining food and supplies, arranging for transportation and authorizing assistancemay be required. Food must be suitable for household distribution or congregatemeal service. Transportation and distribution of food and supplies will be arrangedby local, state, private and/or federal agencies/organizations.The Food & CivilSupplies Department assumes overall coordination for this function. The scope of thefunction is to primarily provide food and civil supplies to the affected area. It wouldinclude setting up of storage facilities at the disaster site and distribution of thesupplies to the effected.

Situation Assumption:

A disaster may partially or totally destroy food products stored in the affected area.

There may be a disruption of energy sources (e.g., electricity and gas). Oil forgenerators and propane tanks may be essential. Commercial cold storage andfreezer facilities may be inoperable. Bordering areas affected, schools and otherfacilities may have food and supplies sufficient to feed victims. There may be aneed to distribute food packets and drinking water to the victims.

Tasks:

Immediate Tasks:

- Establish mobilization centre at the different points like bus station, airport etc for movement of relief supplies
- Inform all suppliers of relief materials within 2-3 hours of the occurrence of thedisaster to keep ready the required supply;
- Arrange for transportation of the relief supplies;

- Provide assistance to in establishing local offices, relief camps, etc., byproviding beddings, furniture, etc

Scope:

Emergency Social Services includes feeding, clothing, shelter, reception,registration and inquiry, and personal services provided to evacuees, victims, andresponse workers. The services are defined as follows:

- ***Personal Services***- Counselling of victims and response workers,welcoming the evacuees at entrance to relief centres in orderto screen for need and to give information, and supervision andsupport of groups of dependent individuals including childrenseparated from their parents, frail elderly, and thehandicapped
- ***Registration and Inquiry***- Registering individuals and familiesinvolved in the disaster, answering inquiries from relatives andfriends concerning victims' whereabouts, reuniting separatedfamily members, and providing information to response workerson the whereabouts and numbers of evacuees
- ***Clothing***- Emergency clothing, blankets, toiletry articles, babysupplies, and other related goods necessary to protect healthand safety
- ***Shelter***- Temporary housing or sleeping space for individualsand families forced to leave their dwellings
- ***Feeding***- Provision of meals, hot beverages and snacks toprotect health, to maintain strength of response personnel, andto reassure victims

The Tasks:

Immediate Tasks

- Help the Deputy Commissioner in opening staff receptioncentres in all affected areas and alert the response workers andthe public about the location of these centres
- Mobilize feeding units to provide support to response workers onlocation;Coordinate supporting debriefing, counselling, and relatedservices for responders and victims
- Inventory of the available habitable shelter supply
- Begin registering all persons involved in the disasters

Task during sustained Phase:

Continue basic emergency social services to all evacuees, victims and othersrequiring help; continue the registering process and respond to enquiries fromaround the world; initiate public

information services on emotional responses todisasters; transform reception centers into multi-service centers; lay basis foroutreach, self- help, and educational programs.

A. Food Supply

Team Leader:	Additional Deputy Commissioner (Relief)
Support Agencies	Joint Director of Supply; Food Corporation of India; Social Welfare Dept., Chamber of Commerce; Dorbar Shnong; Donor Agency;SMB;Market Association;Local Civil Suppliers.

Immediate Tasks:

- TL will activate ESF on receiving the information about the incidentand will also inform to the supporting agencies
- Food coordinator would gather information about the locations ofshelters and number of persons housed in each of these shelters.
- TL will guide QRTs to reach at rehabilitation centres to provide foodpackages
- TL will keep on coordinating about the distribution of food items to theevacuees and will give appraisal to the IC

In case of shortage of food items TL will arrange more food packagesand will ensure continuous supply

Tasks for QRTS:

- Management and distribution of relief items to affected victims
- Report the progress on action to the TL
- Inform TL about more requirement of staff members, additionalmaterials and food packages
- Initiate procurement of food items available at nearby markets
- Prepare take-home food packets for the families
- Ensuring equal distribution of relief material including children, agedgroups, women and poor people

B. Shelter Arrangements

Team Leader:	Additional Deputy Commissioner (Disaster Management)
Support Agencies:	PWD, Meghalaya Housing Board, PHE;SMB; Tent House Association,Social Welfare department, Nazarat Department, Education Department, LocalTraders, Dorbar Shnong, NGOs etc.

Situation Assumption:

- There may be a situation of transferring victims to the safer temporary shelter
- There may be a need to establish triage station for medical treatments

Immediate Action:

- TL would be the in-charge of rehabilitation centres that will ensurenumber of people evacuated, care of evacuees and availability ofessential supplies
- Those who will reach to the relief centres would also like to know abouttheir missing members. TL will response to their queries and also pass onthe message to the evacuation and rescue related coordinators
- QRT will help them in arranging temporary shelters, food and sanitaryfacilities
- Medical facilities will also be provided to the victims and injuredpeople.

Emergency Support Function # 8: Water & Electricity

Team Leader:	**Executive Engineers, PHE and MeCEL**
Support Agencies:	SMB; Water Resource.; PHE; MeCEL; Health Dept.; Local water suppliers; Dorbar Shnong.

The purpose of this Emergency Support Function is to identify water needsand restore basic water supply if damaged, in the aftermath of a disaster oremergency. Till the time water supply to the damaged areas is restored waterrequirements need to be arranged by the ESFs and distributed either using their owntransportation mechanisms or in coordination with transportation agencies.

Situation Assumptions:

- Existing water storage bodies will be damaged and unusable
- There would be an urgent need of water to assist victims in rescue operation.
- Break down of sanitation system
- Contamination of water due to outflow from sewers or due to breakage ofwater pipelines
- There may be a need of supplying water for fire fighting operation
- There may be a need for drinking purpose
- Rehabilitation site might be requiring temporary/mobile toilets
- Need to ensure clean environment

SOPs for Nodal Agency

- Team leader (TL) of ESF on Water Supply will activate the ESF onreceiving the intimation of the disaster from District EOC
- TL would inform Nodal Officers (NOs) of support agencies about theevent and ESF activation
- TL will ensure special care for women with infants and pregnantwomen
- Provide for sending additional support along with food, bedding, tents
- Send vehicles and any additional tools and equipments needed

Immediate Tasks:

- QRTs will ensure that supply of drinking water is made available at theaffected site and relief camps
- QRTs will ensure the temporary sewerage lines and drainage lines are keptseparate
- QRTs will report the situation and the progress on action taken by the team tothe EOC
- QRTs will intimate their TL of the additional resources needed
- Carry out emergency repairs of all damages to water supply systems
- Assist health authorities to identify appropriate sources of potable water
- Identify unacceptable water sources and take necessary precautions toensure that no water is accessed from such sources, either by sealing sucharrangements or by posting the department guards
- Arrange for alternate water supply and storage in all transit camps, feedingcentres, relief camps, cattle camps, and also the affected areas, till normalwater supply is restored
- Ensure that potable water supply is restored as per the standards andprocedures laid down in “Standards for Potable Water”
- Plan for emergency accommodations for staff from outside the area
- QRTs will ensure timely response to the needs of the affected victims
- QRTs will set up temporary sanitation facilities at the relief camps
- TL will ensure that QRTs are on the site along with the required resources
- TL shall be ensuring uninterrupted supply of water for fire-fighting to all thebrigades in operation
- TL shall coordinate with the transport coordinator for replenishing thedepleted stick of fire water at the incident site through water tanks
- Carry out repairing task of all damages to water supply system
- Arranging alternate storage of potable water at temporary shelters
- Ensure restoration of potable water as per standards and procedures laiddown under ‘Standards for Potable Water

- Plan for emergency accommodation of water supply in or near temporaryshelters
- Establish temporary sanitation facilities at the shelters
- Ensure cleanliness of sanitation facilities, relief shelters and localcommand post.

Electricity

Team Leader: Executive Engineer, MeCEL

Support Agencies: NEEPCO, Power Grid

Situation Assumptions:

- There will be prolonged electricity failure
- The affected victims will be panicked
- Halt of all activities specially jamming communication networking systems inthe affected site
- Expect electric short circuits in the affected area which may aggravate thefire explosions
- Electric fitting of the affected areas may get damaged and need repairing
- There may be a requirement of temporary lightening provisions in the reliefshelters and local command post
- Ensure smooth transportation links at all levels and to all nodal andsupport agencies
- Assess damage to power supply infrastructure for assistance from otherstates
- Restoration of power supply or temporary power supply to critical areas
- Restore major electricity failure anticipated during disasters due to fallingof cables/poles
- Facilitate restoration of electricity distribution systems at most affectedsites on priority to help in Search and Rescue operations
- Provide electricity in lifeline buildings
- Procurement of clean drinking water
- Transportation of water with minimum wastage
- Ensure quick restoration of drainage system
- Sewer pipes to be kept separate from drinking water facilities

Task Involved

- Team leader will activate the Emergency Support Function (ESF) by informinghis headquarter team and field team
- Inform nodal and supporting agencies about the incident
- A Notification and shutdown of electricity utilities
- As per the instruction given by RO, TL should instruct to concerned officers toshut down the power supply immediately.

- Provisioning Backup Power during Emergency
- Once power system is closed down, but power would still be required forresponse teams, EOC, water supply stations, temporary houses andtemporary hospitals. Therefore, electricity coordinator will be responsible for providing back-up or alternate source of uninterrupted power supply forsmooth operations
- In addition to the above, QRTs should also undertake following responsibilities:
  - Take stock of situation immediately on reaching the incident site
  - Coordinate with other team leaders and provide essential help expectedform the electricity department
  - Conduct repairing work of dismantled connections
  - Provide temporary electricity supply to EOC and relief centres
  - Appraise the team leader about the situation

Emergency Support Function # 9: Debris Clearance **Team**

Leader: CEO, Shillong Municipal Board,

Support Agency: PWD; CPWD;MUDA; MeCEL; NHAI; Forest Dept.,Water Resources

Background:

The importance of this ESF emanates from the fact that most large-scale disasterssuch as earthquakes, wind storms, flash floodprimarily affect the building structures. TheESF would involve in identification, removal, and disposal of rubble, wreckage, andother material which block or hamper the performance of emergency responsefunctions and procure needed equipments from support agencies using IDRN; is ahigh priority action.

Situation Assumptions:

Access to disaster-affected area would depend upon the re-establishmentof access routes.

- Early damage assessment may be incomplete, inaccurate and general
- Arapid assessment may be required to determine response time
- Engineers and masons may be required in large numbers for the inspectionof present buildings

SOPS for Primary Agency:

- Team leader (TL) will activate the ESF on receiving the information of thedisaster from District EOC.

- TL would inform Nodal Officers (NOs) of support agencies about the eventand ESF activation. TL will coordinate with the support agencies to mobilize equipments from theware houses through IDRN database
- The respective supporting agencies will contact their respective personnel tomove the equipments to central warehouse
- The equipments like earth movers, concrete cutters identified as per theneed will be transported to the site.
- The equipments like JCB, concrete cutters identified as per the need will betransported to the site.
- As per the information the nodal officer of Debris road clearance will makean assessment on of the damages of roads and built structures at the siteand surrounding areas
- The nodal officers of Supporting Agencies will immediately start debrisclearance operation to enable movement to the affected site
- Review of the current situation is taken up by the nodal agency to updatethe support agencies and to delegate their respective personnel to takeprecautionary measure to plan de-routes for the transportation ESF to beoperational
- All supporting agencies will inspect the road and rail network and structureswithin the disaster site and surrounding
- The Response Teams will immediately start debris clearance operation toenable movement to the affected site
- TL will also ensure proper corpse disposal and post mortem by coordinatingwith ESF on medical response

SOP for Quick Response Team on Equipment Support and Debris Clearance:

- Damage assessment including locations, number of structures damaged andseverity of damage
- The QRTs will be deployed at the affected site.
- Enlisting the types of equipment as compiled from IDRN resource inventoryrequired for conducting the debris clearance
- The QRTs will report the situation and the progress in response activities to therespective EOCs.
- Undertake construction of temporary roads to serve as access to temporarytransit and relief camps, and medical facilities for disaster victims

Emergency Support Function # 10: Law And Order

Team Leader:	**Additional Deputy Commissioner (Law and Order), Shillong**
Support Agency:	City SP;SP Traffic;Deputy Controller, Civil Defenceand Home Guards;NSS; NCC, Para-military agencies

The purpose of Emergency Support Function on Law and Order is to establishprocedures for the command, control, and coordination of all law enforcementpersonnel and equipment. The Law and Order function encompasses a broadrange of routine policing activities. The response function has its primary goal in themaintenance of law and order activities, and, if necessary the restoration of lawand order should there be a breakdown within the normally law-abidingcommunity.

Situation Assumptions

- There would be panic and people will gather at a place.
- The crowd may go out of control.
- Riots may also take place.

The Exigencies

The Law and Order function encompasses a broad range of routine policingactivities. Certain of these activities are made more difficult by earthquakedamage and the general disaster scenario can cause a great increased workloadfor police forces. The response function has its primary goal the maintenance oflaw and order activities, and, if necessary the restoration of law and order shouldthere be breakdown within the normally law- abiding community.

SCOPE:

The Law and Order function in an earthquake hit area is particularlyconcerned with the preservation of life and the protection of property, trafficcontrol problems, the detection, investigation and prevention of criminal activity,and support to the Coroner, Light and Heavy Rescue, Communications, andDamage Assessment emergency response functions.

Police forces have integral internal radio communications and can be relied uponas an immediate available backup communication system, locally within policedepartments/detachments, and also within districts and sub- divisions.

The possibility exists that an earthquake may cause a breach of physical security atprison or reforms centres and lead to the possibility of an internal riot or escape. Thedisruption of transportation routes will inhibit police from performing manyrequiredtasks, and is a critical problem to be dealt with by the police forces themselves onbehalf of the total response effort.

The Tasks:

Immediate Tasks:

- Deploying a quick response teams (QRTs) to maintain law and order at theincident site
- Quick Assessment of law and order situation in affected areas
- Cordon off the site to restrict movement of curious onlookers, vehicles andpedestrians
- Control and monitor traffic movements
- Support and coordinate with local administration
- Prepare updates on the law and order situation in every 2 hours and brief theauthorities
- Ensure law and order at assembly points and evacuation points
- Carry out any necessary actions to save lives and prevent injury or damageto property
- Carry out route damage assessment to permit identification of usableemergency routes
- Assess and report other damage within capabilities
- Maintain a control over traffic with priority to emergency services
- Assist with the movement of emergency traffic
- Assist the Coroner as requested to provide investigation of causes of deaths,security of body, staging areas, identification of bodies
- Assist in the dissemination of emergency notifications
- Assist in the manning of coordination centers and the provision of immediateradio communication to them, if necessary

Sustained Phase:

Maintain emergency functions and restore normalcy as quickly as possible;provide personnel to protect abandoned and damaged properties and areas,which may attract the curious and tempt the criminal elements and augment prisonstaffs as needed to maintain a peaceful situation.

SOPs for Nodal Agency

- IC will call the TL of Primary Agency and get the ESF activated.
- TL of primary agency will call nodal officers of supporting agencies.
- TL would activate the State Quick Response Team.
- The QRTs will be deployed at the affected site.
- Cordoning of area to restrict movement of onlookers, vehicular andpedestrian traffic should be done.
- Any additional requirements at site to be taken care of.
- To coordinate and communicate with concerned functionaries
- To detail traffic staff to reach the place of occurrence
- To give directions whenever necessary to ensure free passage for fire brigadeambulance, police vehicles and vehicles of other respondents

Emergency Support Function:Damage Assessment

Team Leader:	ADC, Relief &Rehabilitation
Support Agencies:	SMB; Municipality; Agriculture Depts.; and other relevant departments ofEast Khasi Hills District desired, during the crisis.

Departmental Plan:

The Departments involved in this team will develop the Damage Assessment functionalconcept. The District Disaster Management Authority (DDMA) will include Damage Assessment as a staff function of the Damage Assessment Team, capable ofcoordinating the gathering of collated damage informationfrom Deputy Commissioners,SDOs, Block Officers and other agencies for the purpose of assessing overall damageon behalf of the State Government.

The Deputy Commissioners, Sub- Divisional Officers and Block Development Officers will plan for the gathering ofpost- earthquake damage information from within their jurisdiction with their ownresources and with pre-planned assistance provided directly to them by private sectorAgencies.

The Exigencies

The Damage Assessment function is the determining element in deciding District level response to an earthquake, and an early and accurate picture must be assembled toassist the government to be effective in its response. All emergency agencies,functionaries and a network of other information- gatherers must automatically passinformation concerning damage encountered through a collation, system which canprovide an assessment appropriate for successively higher levels of government as theneed arises. From the obviously damaged areas, information must be sought out atgreater and greater distances until damage is known by positive information.

Scope

DamageAssessmentisfirstconductedat theDeputyCommissionerandSub-DivisionalOfficer's level, for their evaluation andresponse, onthe basis of which general request for assistancefromtheStateGovernmentisrequested.Aslocalassessmentbecomesmoreprecise,they form the basis for specific requests for government resources, both immediate and for thenear future, and assist in provincial government mobilization of appropriate support. Theassistancerequired by local governments may also include requests to conduct assessments inareasremote'from active first responder operations.

The initial determination of damage process will be carried out irrespective of the suspectedmagnitude of the earthquake. On assessment that a major earthquake event has been calculated, amethodological search for gross damage will be undertaken at all levels, collated and filteredaneach successive level, until a clear picture of the damage has been formed. As this assessmentisclosely related to the dispatching of immediate resource assistance to areas where lives areat risk, it mustbe accomplishedpromptly. Accordingly,once a major earthquake is known to have occurred, the group will have to mobilize a DamageAssessmentcellandimplementa districtlevelplantogather information.

The Tasks:

Immediate Tasks: Assess areas likely to require life- saving response action. Help of nearestarmyunits may also be obtained as andwhen required.

Tasks during sustained Phase: Assess total damage as the basis of response efforts,futurerecoveryactivities,and claims; coordinatethe gatheringof informationfrom allsources.

Emergency Support Function # 12:Donations And Volunteers:

TeamLeader:	District Youth Coordinator, NYKS
Support Agencies:	NCC; Zilla Sainik Board; Blood Bank; Red Cross; NSS; Rotary Club; Lions Club; NGOs.

The Exigencies

Materialsand Fund Management is necessary to control the flow of goods and servicesinto a disaster area. The provision of materials and supplies in a coordinated way,particularlyfrom outside the Operational Area, will contribute to a more effectiveresponse.The coordination required will be provided by the Action Group coordinationstructureas a staff function.

Scope

Those emergency response functions which require specialized supplies (eg.,medical,construction) beyond the capabilities of district authority, will request themdirectlyfrom their counterpart or the Government or the private sector or voluntary organizationsthatmay either donatethe same or purchaseit. This function willfacilitatethatprocesswherenecessary, coordinate requestsfor likeitems,assureprioritiesareestablishedfor criticalitems,providethe coordinationlink withthe deliverymeansrequiredthrough the transportationemergencyfunction,andarrangefor stockpilingand holdingofsuppliesreceivedunderDistrictcontrolanddonations.

The Tasks

Immediate Tasks:

To identify the donation sectors (like general public, public and private sectororganizations, clubs, etc., international community);
Type of donations (like food, water, cloths, medicines, tools, generators, etc.) andto arrange to handover the same to the appropriate authority.

Human Resources

The Exigencies:

In company with material resources, disaster response will probably require an influxof additional human resources to augment the framework of professional respondersheld within the agencies,which bear the organizational responsibility for their functions.
These needed extra personnel will come from a variety of sources, and the desirabilityof each source will be dependent upon the function being performed:

- From differentagencieswith entrustedfunctions, or from departments or brancheswith limited or no usual emergency response role
- From auxiliary or volunteer components of the agencies, whose role is directlyrelated to emergency response but on a part- time basis
- From organized volunteer societies which may specialize in emergency responseor disaster relief; and
- Individual unprepared volunteers, either with or without emergency responseskills

As a general rule, the preferential sequence of obtaining additional resources will be inthe order listed above, so that the administrative burden on the overall response effort isminimized.

Scope:

This function is concerned with the coordinated and centralized methodsof obtainingadditionalhumanresources forum foreseen requirements, andotherwise-controlling employmentof those personnel in a mannerthat does not unduly comprise the response effort itself byrequiring large numbers of staff to implement.

Human resources in this category comprise:

- Volunteers which respond to a general appeal, or which simply are expresslysought by the response structure, and which may have to be brought in fromoutsidethe operationalarea.

The Tasks:

Immediate Task.

Withemphasis on life- saving operations:

- Determine requirements of lead agencies and seek out suitably qualifiedpersonnel
- Pre-arranged public announcements for general broadcast (if possible) shouldbe used. Establish method of reception and delivery of personnel to the requesting agency,or arrange direct reporting to collecting points or response sites, where feasible

Tasks during sustained Phase

Continuehumanresource supportto all responsefunctions,throughdirect recruiting and central support, to obtain out-of - area skilled personals.

Emergency Support Function # 13Public Works and Engineering

TeamLeader: Executive Engineer, PWD (Building)

Support Agencies: SMB; MUDA; PWD (Road & Building); MeCEL;Public Health Engineering Dept.; Water Resource

The Exigencies:

Thedamageto structures in adisaster will require additionalresources to be directedtothe Operational Area. While most engineering and construction work which needs tobe done will have a responsible government agency (Municipalities, DRDA,Housing Board, etc.) which can arrange its own requirements, the needfor provincial response covered by this plan is the prioritization of effort to the areasthatneedit most.

Scope

The function comprises the gathering of requests for Government assistance, collationand prioritization, and assignment of resources to tasks. In addition to heavy equipmentrequirements,whichmay be the most obviousones,qualified personnel to inspectdamageand to supervise engineering works will also be needed.Construction and demolitionmaterials will also be coordinated by this emergencyresponse function. This functionshould not be mistakenly considered as meeting the requirements of recovery phase construction and engineering tasks.

The Tasks:

Immediate Tasks:

- All technical Officers shall be notified for immediate response function

- Make provisions for resources to meet life saving operational requirements
- Inspectall roads, bridgesincludingunderwaterinspectionof foundationsandpiers
- Inspect all buildings and structures of the State Government-by a competent officer andidentify structures which are endangered by the impending disaster
- Helping the Deputy Commissioner/DDMA in identifying locations for setting up transitand relief camps, feeding centres and quality of construction materials;
- Keep ready the earth moving equipment, cranes, farm tractor (requisitioned)with chain, cables and buffer stock of fuel
- Adequate road signs should be installed to guide assist the relief work
- Establish priority list of roads which will be opened first which should includeroads to hospital and main trunk roads
- Construct temporary roads to serve as access to temporary transit to relief campsand medical facilities to disaster victims
- Technical damage assessment of potentially life- threatening situations (dams,dykes, etc.)
- Demolition, route clearance of debris, etc.

Tasks during sustained Phase:

- Continuing on to generate cleanup and debris removal
- Emergency repairs to prevent further damage, and assistance to other emergencyresponsefunctionsrequiringconstructionandengineeringsupport
- This function will probably continue beyond the response stage into recovery operationsand will be involved in detailed recovery planning during the response

Emergency Support Function # 14 Animal Health

Team Leader (TL):	District Animal Husbandry and Veterinary Officer
Support Agencies:	Shillong Municipal Board, Bharat Scouts & Guides, NCC/NSS/NYK volunteers

Tasks:

Public health during disasters is directly related to the safety of animals. Owners may fail to evacuate because they cannot take their animals with them, or owners who left their animals behind will later try to re-enter the disaster area to rescue them. Dead animals may create a threat to public health and safety.

SOP for Animal Health

- The TL will coordinate with the district level and block level Veterinarian

- Animal related organizations and individuals to provide assistance at the affected site
- Co-ordinate with the Shelter Task Force on the sheltering of companion animals
- In case of Animal Disease Outbreak, take immediate actions to control and quarantine the disease and issue the advisory for safeguarding one self and others
- Injuries and death of animals will be documented
- Deceased, diseased or contaminated animals to be dispensed with

SECTION 8

RESPONSE FUNCTION

RESPONSE FUNCTIONS

The main elements of response planning are described here as follows:

Early Warning:

Local Authority for Warning:

The District Administration is the prime agency responsible for issuing early warningfor all emergencies and natural disasters.

Early Warning Agencies:

Specialist agencies responsible for early warning and technical support are as follows:

Sl.No	Type of Hazard	Agency Responsible for warning
1.	Industrial and Chemical Accidents	Director, Commerce and Industries, S.P, Fire and Emergency Service.
2.	Fire	Fire and Emergency Service, Police Department
3.	Civil Disturbance	Intelligence units, Police Dept.
4.	Earthquake	IMD Shillong& Guwahati
5.	Flash flood	CWC, Water Resources.
6.	Cyclone	IMD Shillong

DEPUTY COMMISSIONER'S COORDINATION WITH EARLY WARNING AGENCIES

All the warning agencies will communicate and share their information with theDDMA/Deputy Commissioner/Additional Deputy Commissioner (DM). Warning agencies will provideinformation about methods, procedures, and language of warning to the DistrictAdministration. The implications of warnings should be clear to the DistrictAdministration/DDMA.

The District Administration will communicate continuously with the early warningagencies even after the stage of warning is over. Continuous information on thenature and turn of events is very important for responding to and mitigatingemergencies.

Deputy Commissioner/Additional Deputy Commissionerwill only issue early warning.Unauthorized authorities must not issue warnings. These are alwayscounterproductive.

- Fire incidents will be accompanied with alarms. Sirens may also be used toalert people to fire accidents
- Fires are generally localized, and in such cases, public announcementthrough megaphones is helpful in responding to the situation and evacuatingthe affected area

Warnings for Civil disturbance:

- In case of civil disturbances, warnings will be conveyed through prohibitoryorders and increased patrolling and monitoring of the situation. A number ofactivities could be suspended or stopped as a measure of caution
- Warning will be issued to those individuals, groups and organizations that maypotentially fan disaffection and create law and order situation
- The District Administration will promptly scan the rumours and present correctpicture authoritatively through mass media
- Press conferences and press releases are effective channels of early warningin case of civil disturbances, though the District Administration will also makeannouncements through radio and television

Warnings for Earthquakes and Flash flood

- In case of earthquakes, warnings are not feasible. It is impossible to predictearthquakes. However, a number of aftershocks are experienced after theearthquake. It will be necessary to provide information about the probabilityof these aftershocks
- In case of flash flood, the rainfall and rise in the water level of Wah Umkhrah, Wah Umkhen and Umshyrpi and all the canals will be carefully observed. If the water level rises posing danger of inundation, the District Administration will issue warning for the areas that are likely to be affected

General Instructions about Warning

- Industrial and chemical accidents will trigger off sirens, to be followed withpublic announcement through radio and television
- Early warnings will be accompanied with instructions regarding healthhazards and immediate response
- In case of industrial and chemical hazards, the local plant management andthe Directorate of Commerce and Industries will be involved

- Public announcement will provide information on the likely direction ofdispersion of toxic gas, and extent of the area that may be contaminated

Warnings for Fire

- The early warning will also convey the extent of submergence, andprecautionary measures people must take to protect their lives and propertyagainst flash flood
- Warnings regardingfloodand cyclonewill be given through radio andtelevision. These warnings will be repeated every half an hour

Urban Search and Rescue

Urban Search and Rescue activities include, but are not limited to, locating,extricating, and providing immediate medical assistance to victims trapped incollapsed structures.

Non-urban Search and Rescue activities include, but are not limited to, emergencyincidents that involve rescuing people during flash flood, assisting with road and air accidents, and treating any victims upon their rescue

Search and Rescue:

- At present, the Police, Army, and Fire Services carry out most of the searchand rescue functions. Though search and rescue has become a highlyspecialized function, the first responder agencies are not sufficiently trainedor equipped for undertaking these operations. Generally, in all emergencysituations, these agencies mount an improvised response
- The City Disaster Management Committee may constitute two searchand rescue teams for the city of Shillong, drawn from first responderagencies: Police, Fire Services, and Civil Defence and Home Guards. Medical services form a verystrong component of search and rescue functions, and hence a number ofparamedics from the Health Department need to be included. Inclusion ofspecialists from the Directorate of Commerce and Industries and other technical specialistsfrom private or municipal sector will provide further strength to the searchand rescue team.
- The DDMAshould incur the expenditure on constituting,training, equipping and maintaining search and rescue teams. The expensesshould be met through the budget available for disaster response andrecovery
- Shillong search and rescue teams can be used for all the disasters andaccidents

Evacuation

Necessity for Evacuation:

This function deals with the movement of people to a safe area, from an areabelieved to be at risk, when emergency situations necessitate such action.

Factors to be considered for Evacuation:

There are several factors which must be considered when planning for anevacuation. Themagnitudes, intensity, speed of onset, duration, and impact on the local community, are all significant elements to be considered. They will determine the number ofpeople to be evacuated, time available in which to effect the evacuation, and thetime and distance of travel necessary to insure safety. Evacuees are moved fromtheir homes to a designated area (not very far from their homes), not impacted bythe hazard that caused the evacuation.

Emergency Conditions for Evacuation:

The emergency conditions that could require evacuation are:

- Chemical and Industrial Hazard
- Civil Disturbances and Fire
- Earthquake
- Flooding
- Cycloneand
- Landslides

Developing an Evacuation Plan:

Evacuation in a city like Shillong is an extremely complex task. It is necessary forthe DDMAto prepare specific sub-plan for evacuation. The evacuation plan may carry following details:

- The evacuation plan should make provisions for carrying out a completeor partial evacuation of the people from risk areas
- The areas likely to be evacuated are defined
- The travel routes are specified and the destination of evacuees isidentified. The means that will be used to transport evacuees aredescribed
- The approach for controlling the flow of evacuees from the threatenedarea is outlined and the arrangements that have been made to returnevacuees to their homes explained
- In those emergencies for which there is sufficient warning in advance,evacuation could be carried out using designated routes. In these cases, people can be given all the necessary information through radio,television and newspapers for orderly evacuation.

Some families willevacuate through their own means. Transport will have to be provided forthe remaining population

- In most cases, people will be required to evacuate in emergencysituations with little or no warning, and so the evacuation will beimplemented on an adhoc basis

Operational Instructions for Evacuation:

Evacuation will be carried out as follows:

- The D.C. will order evacuation.The D.C. will designate an In-charge Officer for supervising evacuationoperations
- The D.C. will announce the necessary information regardingEvacuation—areas to be evacuated, routes to be followed, andDestination of evacuation—through radio, television and Newspapers
- If the evacuation is to be done urgently, the D.C. will organize publicannouncement in the area likely to be evacuated
- The D.C. will seek the assistance of the City S.P,Traffic, District Transport Officer andthe Manager, MTC in getting necessary transport— buses andtrucks— for evacuation
- The In-charge Officer will ensure that the women, children, old andpeople with disabilities are evacuated first
- The In-Charge Officer will fix the routes for evacuation. Traffic on theevacuation route will be regulated
- The DC will designate those public buildings where the evacuees willbe taken. These public buildings / shelter must be in safe areas
- In all the mass shelter facilities, health care must be provided
- Evacuees will be informed of the associated health hazards
- The In-charge Officer will get the police deployment to control accessto the evacuated area and provide security for the protection ofproperty in the area that has been evacuated
- The In-charge Officer will also be responsible for returning the peopleto the homes once the emergency is over

Family Preparedness for Evacuation:

Families should be encouraged to take along adequate supplies of water, food,clothing and emergency supplies.

The families should be encouraged to assemble the following disaster supplies kit:

- Adequate supply of drinking water in closed containers

- Adequate supply of non-perishable packaged food and dry rations
- Blankets and bed sheets, towels
- A change of clothing and rain gear
- Buckets, plates, glasses, mug made of plastic
- Soap, toothbrushes, toothpaste
- A battery-powered radio, torch, lantern, matchboxes
- Cash and jewellery
- Personal medicines
- A list of important family documents including ration card, passport, bankpassbook, address/telephone book, certificates, driving license, propertydocuments, insurance documents etc
- Special items including food for infants, elderly or disabled persons

Necessary Precautions at Family level:

People may be advised to follow these steps:

- Secure their homes. Close and lock doors and windows
- Turnoff the main water valve and electricity
- Leave early enough to avoid being trapped
- Follow recommended evacuation routes
- Not to move or drive into other congested / blocked areas
- Stay away from downed power lines

The DDMAwill ask the District Animal Husbandry and Veterinary Office to makearrangements for pets and other animals.

Medical Arrangement and Mass Care

The DDMAwill undertake all the measures related to mass care,taking into account the nature of medical issues arising from an event. In case of anearthquake, the injured may require orthopaedic treatment, while in case of flood,there will be more cases of water-borne diseases.

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In all cases, the DDMAwill have to take decision on the nature ofmass care: in-place sheltering versus evacuation, and multi hazard/multi agenttriage. The DDMA will also have to anticipate the need to handlelarge numbers of people who may or may not be contaminated but who arefearful about their medical well being.

General Instructions

- State and local health departments, as well as local emergency firstresponders, will organize ambulances for immediate transfer of all thepeople critically injured in the incident
- The first responders will set up a triage for all the injured, and get qualifiedpersonnel to supervise the triage. The injuries will be checked and theneed for medical assistance immediately assessed
- The DDMAwill organize in-place sheltering if it is requiredand organize supplies and personnel for the arrangement
- Except in those cases where in-place sheltering is necessary all thecritically injured people will be admitted in the Intensive Care Units ofdifferent hospitals in the city
- All the hospitals in the city will have a system of mutual aid. Hospitals willcoordinate in admitting all the injured to their ICUs
- All the hospitals will assess the need for blood transfusion. Blood banks inthe state will be asked to send blood supplies immediately
- The DDMAwill arrange food and clean drinking water forall the people who occupy "in-place shelter", decontamination station orhospital. The DDMAwill make these arrangements till thesituation is normalized

Damage assessment:

Damage assessment is a critical exercise for recovery and rehabilitation. Damageassessment may be organized in two broad groups: one meant to assess losses atthe individual and household level, and the other for the public buildings andinfrastructure.

Damages at Individual and Household Level:

At the individual and household levels, following damages need to be assessed:

- Human Deaths and Injuries,
- Individual Houses and Flats / Apartments
- Business and Livelihood Losses

Damage Assessment Methodology:

- To assess these individual and household-level damages, constitute damageassessment teams involving staff from Revenue, Civil Defence, Municipal Board and prominent citizens

- The damage assessment will be carried out on the basis of physical visits andinspections. The teams will prepare damage assessment estimatesthrough consensus. In those cases, where there is difference within theteams regarding methods or findings of the damage assessmentexercise, it will be decided by the Deputy Commissioner, AdditionalDeputy Commissioner (DM)
- The entire process of Disaster Management will be supervised by the Additional Deputy Commissioner (DM) at the citylevel
- Damage assessment reports will be prepared in the format prescribed for thepurpose
- Damage assessment should be conducted and completed within one monthof disaster. However, if certain areas have been left out, or some moreaccuracy is required in the reporting, the team can again look at thedamage assessment report.

SECTION 9

CONTINGENCY PLAN

EARTHQUAKE CONTINGENCY PLAN

9.1.1Earthquake Response, Recovery and Mitigation

The Shillong city falls under High Risk Zone –V, so the earthquake will adversely affect a large number of houses and business. It will disrupt the normal urban life and traffic for a considerable length, with a serious impact on business and livelihood.

Real Time Information on Important Physical Details of the Earthquake

It is impossible to predict or forecast an earthquake. However, the seismic activitiesin the district and region can be monitored through deployment of seismometersand ground motion accelerographs. Indian Meteorological Department is the leadagency for monitoring earthquakes. It is the responsibility of the IMD to provideinformation about the magnitude of the earthquake as soon as the earthquakeoccurs. In case the information is not forthcoming, the District Administration canitself contact the IMD in Shillong and Guwahati to find out about the earthquake.The most important information about the earthquake is the magnitude and epicentre.

If an earthquake of magnitude less than 5 on Richter scale, the probability ofdamage is very low. An earthquake, with a magnitude between 5 and 6 on Richterscale is a moderate earthquake, and given the state of houses and buildings in thecity, the District Administration should expect considerable damages in the areasclose to the epicentre. An earthquake of magnitude more than 6 is a bigearthquake, and consequences are likely to be enormous. It could be described asbelow.

Earthquake < Magnitude 5 Level 1 Disaster

Earthquake > Magnitude 5 and <Magnitude 6 Level 2 Disaster

Earthquake > Magnitude 6 Level 3 Disaster

Earthquake Information

The DDMAshould immediately find out about the magnitude andepicentre from the IMD. Its response should be guided by the information on thesetwo important parameters.

The Geological Survey of India can also provide information on theearthquake.

Primary Responders Supportive Service

Revenue and Disaster Management Department, District Police, Health, Fire Services, Civil Defence andHome Guards, NGOs, PWD, Water Resource, Shillong Municipal Board, Meghalaya Urban Development Authority, MeCEL and Bharat SancharNigam Limited.

Earthquake Response Information and Communication:

- Gather information regarding the deaths, injuries and damages. Conduct aground or aerial survey to determine the scope of the damage, casualties,and the status of key facilities. Damage assessment is a vital exercise in orderto identify areas where urban search and rescue operations are to beconducted, and a priority for conduct of these operations is to beestablished
- Establish communication links with the seniorGovernment officials including the Chief Secretary, Principal Secretary, Revenue and Disaster Management and ReliefCommissioner
- Communication links are most important for search and rescue operations,and flow of medical assistance and emergency supplies. Since land-basedcommunications lines are thrown out of gear by the earthquake, request the Bharat Sanchar Nigam Limited (BSNL) to restore communication linesimmediately.

Deployment of Search and Rescue Teams

- Disconnect the electrical supplies to the damaged area, unless the MeCEL considers it safe to resume electric supplies
- Deploy Search and Rescue teams of the District Police, Fire Service, andIndian Army in earthquake response immediately
- Remove trapped and injured people from collapsed buildings, and organizeadministration of first aid
- Ask for the deployment of NDRF, Rapid Action Force (RAF), and Para Military forces Force etc
- Ask for reinforcement from the Fire Services and police from all the neighbouring districts
- Procure necessary equipment for the Search and Rescue operations: cranes, gas cutters, and earthmovers from the neighbouring districts Ri-bhoi, West Khasi Hills District and West Jaintia Hills District. Seek the help of private sector in getting the necessary searchand rescue equipment

- If search and rescue teams available locally are not adequate forresponding to the situation, make a request for deployment of search andrescue teams from other states
- Protect the collapsed houses from theft and burglary. Do not allow salvagingof these houses, unless it is safe to enter. Ensure that only family members areallowed to salvage their houses
- Cordon off the earthquake-affected areas and regulate the traffic. Controlaccess to the area until it is safe. Only those people directly involved inemergency response operations should be allowed to enter. Ensure that thesearch and rescue operations continue unimpeded

Emergency Relief, Medical Assistance and Disposal of Dead Bodies

- Assess the needs of emergency relief and submit the demand to the stateand central governments
- Ask for the Indian Air Force support for deployment of relief and carrying severely injured people to the Hospitals
- Get as many ambulances as possible. Arrange transportation of all theinjured to hospitals
- Since physical injuries are likely to be very extensive, orthopaedic surgery willbe required on a large scale
- Remove all the rubble, wreckage and other material, which block or hamperthe performance of emergency response functions. Undertake demolitionand other actions to clear obstructed roads
- Ask the traffic police to provide access routes for transportation ofemergency relief. In those cases, where alternative routes are to beprovided, seek the help of PWD and even Indian Army. Constructemergency detours and access roads. Repair or reinforce roads and bridgeseven on a temporary basis
- Control traffic. Ensure that search and rescue teams and relief teams couldreach the earthquake-affected areas without any delay
- Organize mass funerals if the number of deaths is high
- Arrange for disposal of cattle that perished in the earthquake. It could be aserious health hazard
- Establish a protocol for determining the appropriate time to allow evacueesand the general public to re-enter the area that was severely impacted

Inspection of Buildings:

- Inspect buildings and structures that are critical to emergency servicesoperations and mass care activities. Designate those that may be occupiedand identify/mark those that are unsafe
- Inspect buildings and structures that may threaten safety. Identify/markthose that are unsafe and may not be occupied
- Inspect less critical damaged structures. Designate those that may beoccupied and identify/mark those that are unsafe to occupy
- Make arrangements for the demolition of condemned structures
- Funds or soft loans can be arranged for owners for retrofitting unsafe buildings.

Earthquake Needs

Set up relief camps close to the earthquake-affected areas. Appoint oneresponsible officer as in-charge of each of these relief camps

Assessment: Food, Drinking Water and Temporary Shelter:

- Assess the needs of food and drinking water based on preliminary estimatesof damages
- Ask the Civil Supplies Department, NGOs and charitable organizations tomake the provision for food and drinking water
- Ask the Shillong Municipal Board and PHEs to provide clean drinking water through tanks and installation ofhand pumps
- Organize a public health campaign in the earthquake-affected areas forimmunization against epidemics. Outbreak of an epidemic is seriouspossibility
- Make provision for special health and nutrition needs of the vulnerablegroups: children, women and the old
- Since a large number of people will be homeless, assess the needs oftemporary shelter
- Set up temporary shelter made of local building material and GI sheets
- Provide sanitation facilities in all the temporary shelters

Earthquake Recovery, Rehabilitation and Mitigation:

- Set up an independent project for recovery and rehabilitation. It involves ahuge amount of work, which cannot be undertaken in a routineadministrative course
- Announce a recovery and rehabilitation program, based on the assessmentof damages
- Restore all the civic services and critical infrastructure first. Ensure thatelectricity and water supply are restored, and phones are working. Repairroads and bridges as soon as

possible. Check that all the critical Water Resourcestructures in the city are safe and do not threaten flooding

- Open all the schools as soon as possible. Resumption of schools is very helpfulin restoring normalcy
- Arrange financial assistance and credit to small business, traders, artisans,service-providers, and farmers so that they can resume their respective works.
- Implement labour-intensive schemes, which generate employment
- Prepare a reconstruction program, which includes components of loans andsubsidy
- Insist upon the inclusion of earthquake-resistant features inConstruction
- Appoint engineers at the local level to supervise the reconstruction program.Train them in earthquake engineering
- Set up a program for the dissemination of earthquake-resistant technologyamong people through building centers, and popular media
- Develop financial incentives for seismic strengthening of houses

Non-Structural Mitigation Plan

Shillong is considered as the worst for disasters like earthquake, flash flood, landslide andfire. Shillong falls in Zone V, which indicates the city, is at high risk toearthquake. The city is prone to flash floodfrom river Wah Umkhrah, Wah Umkhen and Umshyrpi. Inaddition to this, fire is a major concern for the city as fire incidents have risensteeply in the last couple of decades. The vulnerability of the city increases in fireaccidents since some of the colonies are thickly populated.The non structural mitigation is basically framed in such a way that the wholepopulation of the city will be sensitized on Disaster Management and theircapacity is developed to cope up with a hazardous situation.

Preparedness Methodology

Instead of waiting for a disaster to occur and then to manage it, this concept envisages to make people part of the management process. The plan contains aseries of measures for preparedness in schools, colleges, hospitals, and all other vital institutions and ultimately the community itself. In a Disaster Management Cycle,preparedness shall be the first step. People of a given area have to be guided toprepare their own coping mechanism. For this the district shall plan various activitiesand reach out to the local level.

Sensitization / Awareness Campaigns

The DDMAmust reach out to the local residents and generalpublic of the city with various level sensitization programmes. Sensitizationprogrammes shall be conducted for schools, hospitals, colleges, communities,policy makers and all other specific sectors. Awareness on multi -hazards and do'sand don'ts are most important for a human being to savehim/herself. The basic information shall be given in forms of bookletsreading materials, audiovisual material etc. The broad objectives of suchprogrammes shall be as follows:

1. To bring awareness about disasters among the inmates of all institutions andresidents of all communities in Shillong
2. To pave way for strict enforcement of building rules in construction departmentsand contractors
3. Preparation of Building Evacuation Plans and training the general public onbasics of self defence thereby building capacities of school authorities andsaving lives in the event of an Earthquake or Fire accidents or any other disaster
4. To sensitize officers from the District Administration, Police Dept, Health Dept, FireService and all other parallel agencies
5. Different methods and techniques shall be utilized to spread awareness ondisaster in the city. Some sample techniques and methods are listed below:

- Public meetings and loud speaker announcements
- Hoardings at Public Places like Hospital, Bus Stands, Taxi Stands, Malls and Market etc.
- Wall painting in the communities
- Distribution of posters and other Information Education and Communication(IEC) materials to children and community people
- Street plays, documentaries and films on the subject
- Use of electronic media, especially cable channels
- Quiz-painting competitions, special types of books, etc for students

Training and Capacity Building

A series of training programmes shall be organized for specialized groups like,city DMTs, sub division and community level office bearers, teachers andprincipals, doctors, engineers, architects, masons, builders andcontractors etc. All walks of people shall be trained. This can even be onconstruction of buildings and other structures earth quake resistant.

- City shall identify sensitization as one of the best tools to create awarenessprogramme and preparation of Community Based Disaster Management planning. In this respect, organize a series of programmes for the communitypeople, Dorbar Shnong and NGOs.

- For better sustainability of Disaster Management, the DDMA / ESFs shall think oftraining Civil Defence & Home Guards, NYK, NCC and NSS volunteers at the costof the government and they shall be given certificate of training,identity cards as disaster managers. The DDMA/ ESFs can take appropriatedecision for paying any honorariums for their services.
- Training programmes shall be organized with Dorbar Shong and NGOs in the city orthey shall be funded for organizing such programmes.
- Corporate sponsors shallbe contacted to hold such massive training programmes.

Disaster Management Planning

The first responder of any disaster anywhere is none other than the localpeople who are the victims too. Once a disaster has been occurred, manyagencies like NGOs, Military and Para Military Agencies as well as the GovernmentAgencies approach the area. But it takes time to start rescue and relief operationsby these agencies due to poor accessibility and approachability to the disaster siteand ignorance to the geographical situation of the affected area. Taking all thesein to stock, the city shall organize various planning exercises with the local bodies.

Each ward has at least one Dorbar Shong or Community Development Organizations.
Thestrategy of planning shall be as follows:

1. The territory of each Dorbar Shnongcan be taken as logical unit for planning
2. Where there is no Dorbar Shnong, similar local bodies or NGOs can be taken as logicalunits
3. Every school in the city, irrespective of size, shall be a logical unit
4. Every Hospital with more than 10 beds shall have Disaster Management plans
5. All Cinema Halls,Multiplex, Malls, Clubs, religious centers etc where gatherings arepossible, shall have Disaster Management plans
7. Every Government office/building/department shall have separate Disaster Management plans

The predominant objectives of the initiative shall be:

1. To create awareness on disasters and Disaster Management among communityleaders and general public
2. To prepare Disaster Management plan for each logical unit with Hazard andResource Maps
3. To form City ManagementCommittees (CMC) and Task Forces within thelogical unit, to manage disasters and train them specifically
4. To exercise Mock Drills in each Community in a regular interval of time includingevacuation exercises

Each logical unit shall collect the template/modal plan document from the EOCat the District and after preparation a copy of the same shall besubmitted to the EOC and the other shall be with the logical unit. This plandocument shall be updated at least annually and the updated information shall begiven to the EOC in writing. The district EOC shall help the logical unit in conductingthe planning exercises as and when they request the same.

Disaster Resource Inventory

In a scenario of total damage due to disasters like earthquake, flash flood, orThunderstorm all communication system disrupts and disaster managers becomearmless in fighting the calamity. To overcome such obstacle, Government of Indiahas developed Disaster Management portals which facilitate the disaster managersand administrates to track down resource stocks in the country or at least in theneighbouring area. This Website, called www.idrn.gov.in, basically intended togather data from the government resources. Data are collected from local unitsand line departments and uploaded by the District Administration after verificationand scrutiny.

Each government department in the district shall take part in updating thisportal regularly. They shall give information on fresh procurement of equipments,manpower and technologies to the Emergency Operations Centre, Shillong inthe prescribed format at least biannually.

Enforcing Existing Codes and Laws

Lists of codes are already in place to monitor the construction practices inthe city. Bureau of India Standards, National Building codes of India andsubsequent amendments in various acts provides sufficient legal protection to theenforcing agencies for safe construction practices. In Shillong, the majorgovernment bodies undertaking construction and grant permission to the privateplayers' viz. ShillongMunicipal Board, PWD, MeghalayaUrban Development Authority, Urban affairs, Meghalaya Housing Board, NHAI and Water Resource and Flood Control Department shall ensurethat structural safety measures are followed well.

In Shillong the followinggeneral structural safety codes shall be followed strictly:

1. IS: 456:2000 WCode of Practice for Plain and Reinforce Concrete"
2. IS: 800-1984 WCode of Practice for General Construction in Steel"
3. IS: 801-1975 WCode of Practice for Use of Cold Formal Light Gauge Steel Structural members in General Building Construction"
4. IS: 875 (Part-2): 1987- WDesign Loads (other than Earth Quake) for Building and Structures, Part 2 Imposed Loads.
5. IS: 875 (Part-3): 1987- WDesign Loads (other than Earth Quake) for Building and

Structures, Part 3 Wind Loads.

6. IS: 875 (Part-4): 1987- WDesign Loads (other than Earth Quake) for Building and Structures, Part 4 Snow Loads.

7. IS: 875 (Part-5): 1987- WDesign Loads (other than Earth Quake) for Building and Structures, Part 5 Special Loads and Load Combination.

8. IS: 883:1966 WCode of Practice for Design of Structural Timber in Building"

9. IS 1904:1987 WCode of Practice for Structural Safety of Buildings: Foundation"

10. IS: 1905:1987 WCode of Practice for Structural Safety of Buildings: Masonry Walls

11. IS: 2911 (Part 1) section 1: 1979 WCode of Practice for Design and Construction ofPile Foundation Section 1

Part 1: Section 2 Based Cast-in-situ Piles

Part 1: Section 3 Driven Pre Cast Concrete Piles

Part 1: Section 4 Based Pre Cast Concrete Piles

Part 2: Timber Piles

Part 3: Under Reamed Piles

Part 4: Load Test on Piles

12. National building code 2005

13. IS 1893 (part I) 2002 criteria for earthquake resistant design of structure. Part I general provisions and building (fifth revision)

14. IS 14242 (part 2) 1995 selection and development of site for building in hill area guidelines

Besides the DDMA / MUDA and Urban Affairs shall take appropriate decisions to enforce Codes for Earthquake Protection, Wind Storm protection, Flash floodProtection etc.

Structural Mitigation Measures

It is immensely pivotal for the planning community to respond towardsDisaster Management positively. Urban Disaster Management is intimatelyconnected to the wholesome process of urban development and therefore needsa sincere incorporation in the development planning itself.

The city shall take steps for structural mitigation of disaster management. Thedepartments that are associated with development of residential and commercialplots shall strict the NOC norms. The Building codes shall be strictly enforced in thecity. Only seismically oriented engineers, contractors and masons shall be givencertificates for multi-story constructions and real estates. Simultaneously, retrofitting isto be promoted with the expert advice. The possible two structural

measures fordisaster protection are Retrofitting of the existing building and Earthquake Resistantnew construction.

Retrofitting

For an existing building, Retrofitting or Seismic Strengthening is the onlysolution to make it disaster resistant. In city, all lifeline buildings such as majorhospitals, Schools with large space for storage, District Administration offices andother vital installations shall be retrofitted in the first phase. In the second phase allother significant buildings shall be given priority for seismic strengthening. Beforecarrying retrofitting, a panel of experts shall be approached for assessing thestructure and to suggest the type of retrofitting required.

Earth Quake Resistant Construction

Promotion of Earthquake Resistant construction mainly includes constructionsafety, quality control and inspection. In the previous decades, there were nospecific guidelines on EQ resistant constructions and seismic strengthening. Allconstruction except load bearing buildings up to 3 storeys shall be carried out underthe supervision of the Construction Engineer on Record or ConstructionManagement Agency on Record for various seismic zones. They shall be given acertificate based on the norms on completion of the construction.All the constructions for high-rise buildings higher than seven storeys, publicbuildings, and special structures shall be carried out under quality inspectionprogramme prepared and implemented under the Quality Auditor on Record orQuality auditor agency on Record in Seismic Zones V. DDMA/ ESFs shall lookin to this aspect and ensure that such prerequisites are completed and observed bythe concerned agencies and construction engineers.

Illegal constructions, Encroachments, unapproved additions, alterations etcof residential buildings and conversion of residential building in to commercialpurpose etc shall be checked by the District Administration with strict measures.

These unauthorized activities may lead to disasters in that particular area.

Flash floodContingency Plan

Flash flooding in Shillong

Some of the low-lyingareas in the city are water logged during monsoon, largely due to clogging and decreasing width of the river due to human activities. The areas ofthe city, which lie close to the river Wah Umkhrah (northern parts of Ward 10, 8, 2; eastern and norther parts of Ward 1 and

southern part of ward 4) and Umshyrpi (northern parts of Ward 10, 8, 2; eastern and norther parts of Ward 5, 6, 22, 23, 24, 25 & 26 and southern part of ward 3 & 7) get flooded during the monsoon season, as result many properties and agricultural lands are damaged.

Early Warning Agencies

These agencies will include Water Resource Department, Central Water Commission and Indian Meteorological Department, Shillong.

- **Primary Responders:** Revenue and Disaster Management, Water Resource, Meghalaya Urban Development Authority, Urban Affairs, Shillong Municipal Board, Police, Fire Services, Civil Defence and Home Guards
- **Supportive Services:** PWD, Health, PHE and NGOs

Flash floodPreparedness:

- Direct the Shillong Municipal Board to clean drains and sewer lines of thecity, just before the monsoon
- Direct the Shillong Municipal Board to increase the carrying capacity ofdrainage and sewerage lines in low-lying area of the city
- Ask the Shillong Municipal Boardand Water Resource Department and PHE to arrange forpumps, so that water from low-lying areas of the city could be pumped out
- Ask the PWD and Shillong Municipal Board to inspect roads and bridges inlow-lying and flash flood-prone areas. Identify bridges, which need to bestrengthened, and water channels beneath need to be cleaned
- Establish communications with the IMD, Shillong, Central Water Commissionand Water Resource Department for information related to rainfall and discharge inrivers and canals. Establish protocol for receiving information from theseagencies

Early Warning for flash flood:

Water Resource Department will provide early warning to the District Administration regarding rising water levels in rivers. The Water Resource Department willmonitor the flooding situation on a round-the-clock basis, and pass all thecritical information to the District Control Room on a continuous basis.

- Water Resource Department will provide information to the District Administration ona likely breach in the embankments of rivers and canals. It will provideinformation and advice on the level of inundation such a breach will cause

- The Deputy Commissioner will inform the citizens and communities about flash floodingin a particular area through public announcement
- Warning and information will also be provided through radio, television andlocal newspapers. AIR, Doordarshan, and Cable TV willprovide flood warnings frequently as required. The Deputy Commissionerwillappeal to all the citizens to get the latest information on flash flooding throughmass media

Activation of Key Facilities:

- The DC will order closure of schools and colleges in Flash flood affectedareas.
- The District Administration will ask the Shillong Municipal Board to installpumps in the city to drain out water in the river or canal
- The District Administration will deploy Revenue staff, Police Officials, CivilDefence, and Fire Services for all the preparedness and precautionarymeasures
- The DDMAwill operate District Control Room (DCR) on around-the-clock basis. Assign officials to the DCR in three shifts of eight hourseach.

Evacuation:

Evacuation is an alternative that should be exercised only when it is unavoidable. There are many reasons. First, the people are not willing to leave their houses and property. Second, appropriate transit accommodation is notalways available, and sanitation facilities are always inadequate. Third, evacuation is an expensive exercise, requiring expenditure on transportation,and provision of food. However, in many circumstances, evacuation maybecome necessary, and so following steps will be taken to evacuate people:

- The DDMA will ask the District Transport Officer and Manager, Meghalaya Transport Corporation to organize buses and other vehicles to evacuate people
- The DDMA will make a public announcement regarding theareas being evacuated, transport arrangements for evacuation, and transitshelters. The District Administration should use public announcement system,radio and television for providing the necessary information
- Volunteers will take care and give priority to the most vulnerable groups such asthe old, disabled, women and children
- Assign a responsible official to supervise evacuation. Ensure that evacuationis orderly
- Deploy boats if it is necessary for the purpose of evacuation. Maintain lawand order. Ensure that there is no incidence of looting in course ofevacuation

Transit Shelters:

- Guide the evacuation to identified transit shelters: college and school buildings and other public buildings
- Identify transit shelters which have some sanitation facility
- Provide separate space for men and women for public toilets

Deployment of Emergency Responders:

- Deploy search and rescue team from the District Police, Fire Services, and Civil Defence. NGOs and citizens' groups can assist the first responders
- If the first responders in the district do not have the adequate strength fordealing with the situation, ask the external responders. Assess therequirement, and establish which the most appropriate agency fordeployment is. Ask for the assistance from Army,depending upon the availability of forces and their capability
- Seek the intervention of Army Shillong, if the otheremergency responders are inadequate for responding to the situation
- Attach government officials to the units of emergency responders: the Armyand Police. They can provide local information to these responders andalso help in coordination at the local level

Protection of Canal and River Embankments:

- Water Resource Department will maintain a continuous vigil over the river
- Water Resource Department will take necessary steps for reinforcement ofembankment if they are under threat. It will ensure supplies of sandbags,stones and other materials for repairing embankments when they arebreached

Flood Relief Operations:

- Estimate the number of people who have been affected by flash flood.Assess the requirement of drinking water and food accordingly
- Report to the Deputy Commissioner about the need for food provision and relief amount
- Organize supply of drinking water. Ask the Shillong Municipal Board, PHEto provide drinking water through tankers and temporarilyinstalled hand pumps
- Distribute chlorine tablets among families for purification of water
- Organize cooked food for people staying in transit shelters
- Seek the assistance of NGOs and charity organizations in distributingfood and clean drinking water

Flood Recovery and Rehabilitation:

After every major disaster, the Government announces a financial package forrecovery and rehabilitation. All the measures taken for recovery and rehabilitationare guided by the financial package announced by the government.

- Undertake repairs of all the critical public systems: roads, bridges, watersupply programs and electrical lines so that the basic amenities are availableto the people in the flash flood-affected areas. It helps restore normalcy in thearea.
- Undertake necessary repairs to school and hospitals. Reopening of schools isvery important for restoring the normalcy of life. Similarly, the hospitals mustbegin to provide critical health services immediately
- Distribute financial assistance for repairs to houses in accordance withdamage estimates. Make payments by cheques. The damage assessmentteam should be present at the time of disbursement of financialassistance
- Check that the amount disbursed has been spent on the repairs andstrengthening of the damaged houses. A small booklet can be prepareddemonstrating simple techniques of repairs and strengthening: strengtheningwalls and roof, and raising the plinth of house, and building lofts for storage
- Assist artisans and small business owners with cheap credit and tradeimplements so that they can resume their livelihood
- Continue aid and assistance through food supply and drinking water in thoseareas, where the people are still restricted by flash flooding

Flood Mitigation:

Flood mitigation refers to the measures aimed at prevention and preparedness.It reduces the actual or probable impact of flash flood on the people and theirenvironment. The most important measure required for Flash flood mitigation in Shillongcitywill be to improve drainage in the city. It will ensure that rain water is quicklydrained away into the river. It will prevent water logging. It will be necessary to maintain that there will be no encroachment along the banks of the river Wah Umkhrah, Wah Umkhen and Umshyrpi. Mitigation is always local and it must be planned based on the experience of flash flooding in the city. The District Administration has to take stern actions on those who have illegally built houses/commercial establishment on the bank and narrowing down the breadth of the rivers.

Landslide Contigency Plan for Landslide

As per Geological Survey of India (GSI), four historical landslides were identified within the study area (GSI, 2012). According to GSI, there is only natural landslide within the city, which

lies on the left bank of Umshirpi river near Lumlyer. The remaining landslides occurred due to human interference.

Structural Measures:

- **Tree Plantations:** Strengthening of the vulnerable slope through micro benching, micro retaining structures using bamboo, plantation of grassy vegetation having large horizontal root spread can be explored at places
- **Regulation for Construction:** It is required to have strong laws for regulating the construction at steep and unstable slopes. Site specific evaluation in the identified high hazard/vulnerable zones before taken up major construction project.
- **Drainage Improvement:** It is important to have proper drainage system to cater to the storm water. Contour drain above the distressed part of the slope and stepped chuted drain along the slope. The existing water ways also needs channelization wherever needed to reduce soil erosion. This activity would also reduce the pace of landslides and reduce the impact of heavy rains/cloudburst etc
- Modification of the distressed slope through berm and benches with provision of appropriate drainage.
- Concrete lining of the slopes areas affected by toe erosion/bank erosion.
- Provision of both flexible and rigid retaining structures, to arrest downward slippage in the vulnerable/affecting areas.

- All the encroachment on the drainage system needs to be removed so that storm water flows down smoothly causing least damage to the soil, infrastructure and property, avoidance of disposal of non-bio degradable waste (plastic, polythene etc) in the natural water course

Non-Structural Measures:

- **Land Slide Susceptibility/Micro-Zonation:** For preparation of perspective plan on landslides mitigation, Geological survey of India report on Meso-scale landslide hazard zonation of Shillong town may be referred for better understanding of the vulnerable areas of the town. A landslide susceptibility map of Shillong Municipal Area shows that wards 1 (Laitumkhrah), 20 (Upper Mawprem), 21 (Lower Mawprem), 26 and 27 (Lumparing) are more susceptible to landslide (RMSI, 2017).
- **Cutting of Hill Slopes:** In case of large scale excavation of slope for road widening and major civil construction; slope assessment and related geotechnical studies may be taken up before initiation of the project.

- One of the major reasons of landslides is unscientific cutting of slopes and that construction in high steep slopes. There is a need to enforce the development control regulations for such areas.

- **Awareness:** There is a need of community awareness regarding landslide and associated threat so that communities could be sensitised.

Mitigation Plan for Fire Hazards

Historical event data shows that the occurrence of fire events is higher in commercial buildings as compared to residential and industrial buildings. More events are reported in 2014 as compared to the 2015-2016(RMSI, 2017). High fire incidents are occuring in ward 17 (Qualapatty and Them Iewduh) and ward 9 (Police Bazaar). Wards No. 1 (Laitumkhrahincluding Demseinion area, Lumsohra, Nogrim Hills and Nongrimbah), ward No. 3 (Lachumiere, Don Bosco Square, Nongrimmaw and Bhagyakul), ward No. 10 (Jail Road) and ward no. 18 (Sunny hill and Lumdiengjri) are also also more prone to fire incidents.

Structural Measures:

- **Strengthening of Fire Department:** The staff strength of Fire Department is inadequate keeping in view the fire vulnerability of the city. Also the department has special needs to match the requirement of the city. Fire fighting equipment and vehicle capable of moving in the narrow lanes of the town needs to be added to the fleet of the Fire Department

- **Decongestion of critical locations:** Areas such as Them Iewduh, Police Bazar, Jhalupara, Barapathar and other such locations which are vulnerable to fire hazard need decongestion. The temporary structures need to be removed at these locations

- **Identification of Vulnerable Building:** Shillong City has very old and important structures which have generally a lot of wood in the shape of building content. Fire safety concerns of these building should be addressed

Non-Structural Measures:

- **Enforcement of Building Codes on Fire Safety:** Building Codes on Fire Safety (BIS Codes) must be made compulsory and forcefully enforced. Structures not complying with these codes-housing large numbers of occupants such as offices, hospitals, schools etc.

should not be allowed to function till it adheres to these codes. Regular mock drills on fire safety should be held in all building housing large number of people

- **Hands-on Training on Fire equipment:** The school children, government functionaries should be given hands-on training to handle fire-fighting equipment
- **Community awareness and preparedness:** The community at large should be educated about do's and don'ts of fire hazard.
- **Risk Transfer:** Entire risk cannot be mitigated. Whatever risk cannot be mitigated must be transferred by way of risk insurance. Insurance coverage is available against all the major hazards and this need to be promoted amongst the stakeholders.

Common Efforts required to mitigate hazards in Shillong

- At each ward level Buildings and Open spaces be identified and list will be prepared for probable shelter and later these buildings could be retrofitted
- Traditional coping mechanism of the communityin dealing with disastersshould be documented and promoted
- Fire & Emergency set up needs to be equipped with modern equipment for SAR
- The accident prone area needs to be identified and improved in a phased manner

SECTION 10

EMERGENCY OPERATIONS CENTER (EOC) SYSTEM

Officers in charge of the DCR (District Control Room):

The control room shall be in overall charge of the Deputy Commissioner. During crises in the absence of the D.C., ADC (DM)/ EAC (Relief), the Emergency Officer or any other Officer on duty, at that point of time, shall remain in overall charge of the Control Room.The person in charge of the C.R shall personally be responsible for implementing the SOP as indicated hereafter and sign on behalf of the DC on all reports and act on each point of SOP for effective management of the situation.

Purpose of the DEOC:

The District Emergency Operations Centre under the control of Deputy Commissioner, Shillong will operate round the clock and will be the nerve centre to

- Monitor
- Co-ordinate
- Implement the actions/activities for Disaster Management.

In a disaster time, the DEOC will operate under the central authority of the Deputy Commissioner/RO, exercising emergency power to issue directives to all departments to provide emergency response service. He will also co-ordinate with the State Response Machinery like the State Relief Commissioner, Meghalaya; SDMA. The Control Room should be manned round the clock.

EOC Norms

It will have:

- Representation of all concerned line departments with authority to quickly mobilise their resources;
- Adequate space with proper infrastructure to accommodate the participating agencies and departments;
- Communication facilities with last mile connectivity;
- A vehicle mounted with HF, VHF and satellite telephone for deployment in the affected site to provide immediate connectivity with the headquarters and ICP;

- A representative of central teams (NDRF, Armed Forces) whenever they are deployed to integrate their resources, expertise and to resolve conflicts that may arise during the response effort;
- Provision and plan for dovetailing the NDRF, Armed Forces communication capabilities with the local communication set up. There will be proper plan so that all are able to connect with each other in case of large scale disasters or failure of the local communication systems;
- Map depicting affected site, resources deployed, facilities established like Incident Command Post, Staging Area, Incident Base, Camp, Relief Camp, Helibase, Helipad,etc.
- DM plans of all line departments;
- DM plans of the State and the District;
- Directories with contact details of all emergency services and nodal officers;
- Connectivity with all District headquarters and police stations;
- Database of NGOs working in different geographical areas;
- Demographic details of the State and Districts;
- Online/Web based DSS with the availability of at least the following components:
  - Standardisation of Command Structure with the details of the earmarked and trained personnel in IRS;
  - Proactive planning facilities;
  - Comprehensive resource management system;
  - Geographic Information System (GIS) for decision support; and
  - Modelling capability for predicting casualties and resources for large scale incidents including CBRN emergencies.
- Socio-economic, demographic and land use planning;
- Resource inventories of all line departments and connectivity with database of India Disaster Resource Network (IDRN) India Disaster Knowledge Network (IDKN) and Corporate Disaster Resource Network (CDRN).

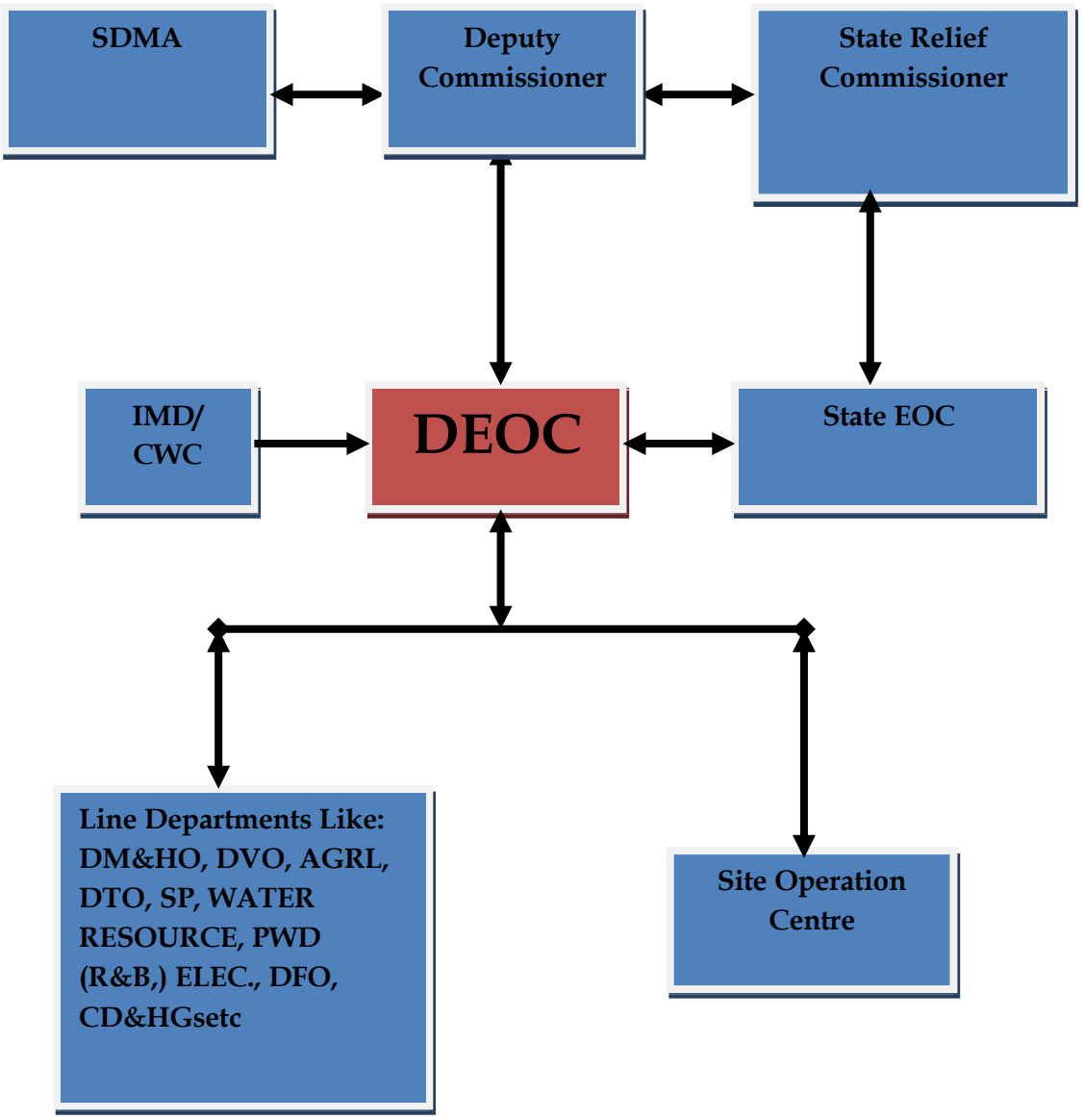

Figure 10.1: Information Flow Chart of the DEOC

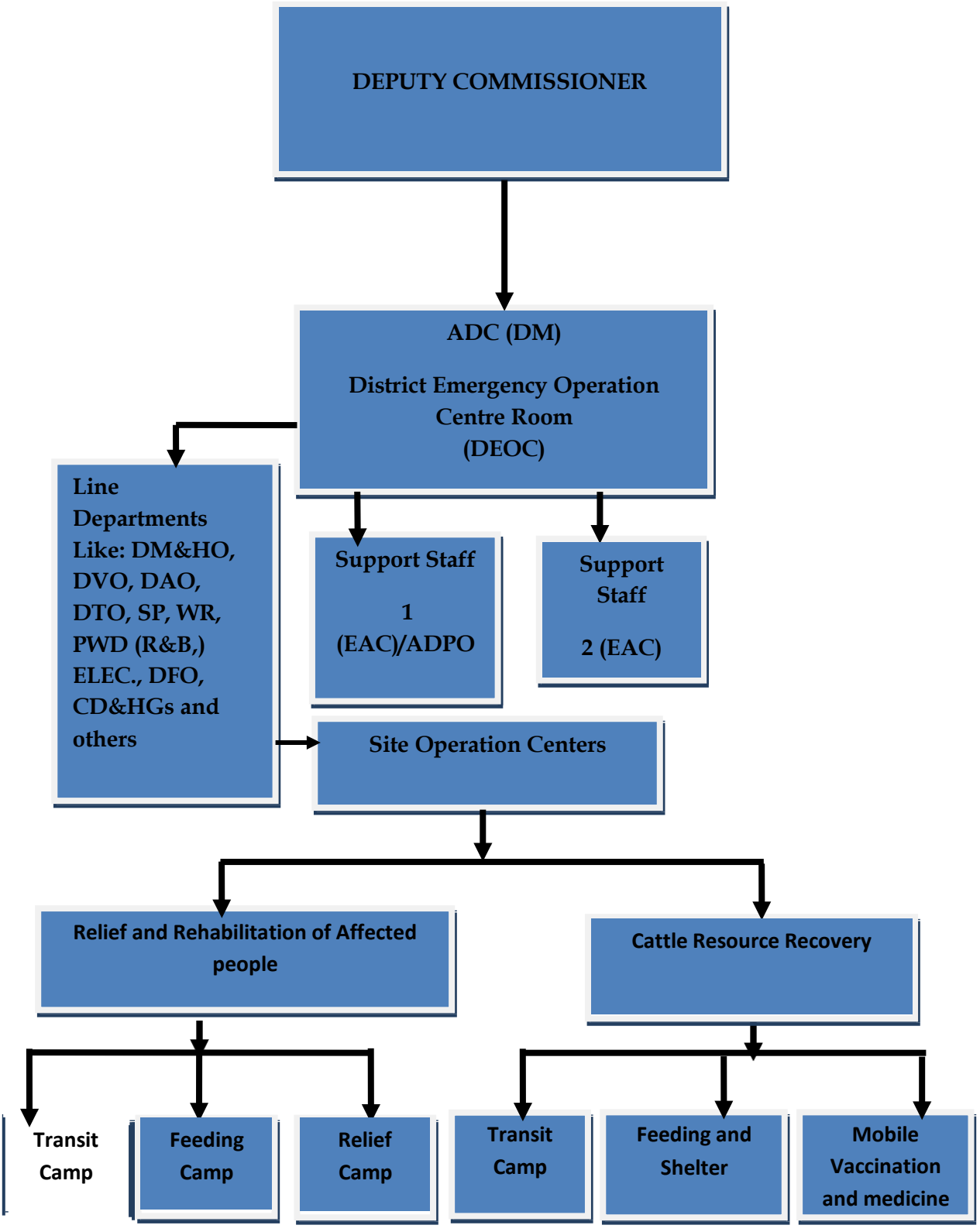

Figure 10.2: Co-ordination Structure at District Level Control Room

Assembly in the Control Room:

The following staff and officers shall assemble in the C.R on receiving any information from any authentic source about any emergency.Apart from these, any other officer or staff, who receive

the information from any source, will reach /inform the C.R immediately for further dissemination and follow up action.

- ADC (DM), SP, PD DRDA, EAC (R), DIO, Assistant Director, IPR, Jt. Director of Supply etc
- All other officers and staff of the DC's office
- Emergency Response & Support Teams

Alert all field officers:

Syiem, Rangbah Shnong, DM&HO, SP, BSNL, Agricultural Officer, PWD, ICDS, Water Resource, S.P, Fire and Emergency Service, NH, PHE, Municipality, MLAs, MPs, Station DirectorAll India Radio (AIR), and Warning should be informed in the following manner. The Assistant Director should inform the media after receiving order from the DC.

Emergency Warning Message No. **Dated:**

To,

S.P. /All OCs of Police Stations/IPR/DMHO/ DVO / EE (PWD) Building Div./ EE (PWD) Central Div. /EE (PWD) NH /EE (PWD) Shillong South /EE Water Resource /EE MeCEL/DAO / DSEO / DSWO / EE PHE /Jt. Director Supply/AIR Shillong/Shillong Doordarshan.

Information: Superintendent of Police, Shillong.

(Space for Message)

(Priority)

Earthquake

D.C., Shillong.

Call up all the officers and ensure that they remain in the Headquarters until the situation is back to normal.

Prepare a logbook for recording the chronological sequence of events from time to time.

Food and Kerosene

- Check up on the availability of food (rice, dal, atta etc) and kerosene with Storage Agents and in other inaccessible pockets. The concern official shall personally visit the godowns and verify the stocks. The Agents shall remain present at the store round the clock.
- The Joint Director of Supply should be informed to remain alert for procurement of dry food/ essential commodities at short notice
- Direct the private stockists / wholesalers and FCI to remain open on all days, including Sundays and holidays till the situation is back to normal
- Regulate the sale and supply of POL.

Check availability of Sandbags with:

- PWD (NH) Division
- PWD Shillong South Division
- PWD Shillong Central Division
- NHAI

Health Sector

Make a rapid assessment of the following:

- Check up the stock of medicines, bleaching powder and halogen tablets with the DM & HO
- Start movement of medicines, bleaching powder, etc., to PHCs, CHCs
- Ensure that Medical Officers are in place at the PHCs and CHCs through DM &HO, Police Stations

Vehicles

- Place requisition to the DTO for deployment of vehicles
- Requisition to be made as per need
- Empower field officials to requisition vehicles. Send 10 requisition forms to each Durbar Shnong and Police Station

Shelters

Close educational Institutions after making an assessment of the magnitude of the emergency.

10.13Veterinary Measures – DVO shall make assessment of vaccines and fodder availability for cattle.

Air dropping zones: Make a list of areas where air dropping may be needed, identify the air dropping zones.

Each JE or EE of C & RD, PWD (R & B), NH and Water Resource shall keep ready at least a team of 20 persons with axes and saws and also have one chain – pulley system ready.

Move Businessmen and concerned Depts. for supply of Road Cleaners and other materials with trained operators.

Maintaining Law and Order: City S.Pwill deploy personnel in rescue operation and maintenance of law and order.

Requisitionof the service of Officers who have been effective in the past. Allot areas to them with full powers of decision – making on the spot.

Make a thorough assessment of Relief items available in stock at different places of field as well as District HQ.

Civil Society Organizations: -

- Get in touch with Civil Society Organizations
- Get them introduced to the field functionaries
- Make a quick inventory of their resources
- Contact the International Agencies like UNDP, UNICEF, Red Cross, Oxfam, Save the Children, Action aid, Catholic Relief Services, World Vision, MSF and others

Press Briefings:-

Press Briefing plays a very important role in disaster management.

Daily press briefs will be issued at …….. Hours. Written information will be issued. The following format will be used.

East Khasi Hills District Press Note No. Dated:

	Total	Affected	**Remarks**
1. Population			
2. Severely affected areas			
3. Rescue measures			
Army/ Police			
Fire Brigade			
Other agencies			

Exemplary events

4.	Relief Measures	Qty./ Beneficiaries	Village Covered	**Days Covered**
	Free Kitchens			
	Rice			
	Dal			
	Salt			
	Other dry food			
5.	Kerosene oil			
	Polythene Sheets			
	Tents			
	Cattle feed			
	Halogen Tablets			
	Medicines			
6.	Casualties			
7.	Reports of Missing			
8.	Bovine Death			
9.	Civil Society Organizations			
. 10.	Damage to property			
11.	i. Roads			
	ii. Embankment branches			
	iii. Schools			
	iv. Other Public Buildings			
	v. House damage			
	vi. Electrical installations			
	vii. Others			
12.	Prospect in next 24 hours			
13.	Message for the people			

14. Details

Message to the General Public over IPR/All India Radio and DDK should be specific. Apart from warning, it should include the following points:

- Remain alert
- Take shelter in the nearest shelter or pucca building
- Keep cattle tied in open spaces/set free.
- Keep sufficient dry food.
- Take care of drinking water or keep purifier tabs
- Ignore rumours

Regular contact at intervals with SRC, SDMA, IMD, Home Secretary, Revenue Principal Secretary, PS to Chief Minister, Chief Secretaryand Health Secretary.

Written orders shall be issued for identifying places for starting free kitchens for at least 3 days.

Check up relevant websites of the State and District level.

10.27. Keep spare copies of District Maps.

Place requisition with SP for supply of temporary VHF sets for DM & HO, DVO, SDO, EE PWD, EE Water Resource, DAO and Neighbouring BDOs.

Requisition all IB / Rest houses/Schools/colleges forNDRF/Army/ Police Forces.

WHAT THE SOPS ARE?

*A **standard operating procedure** is "a set of instructions constituting a directive that establishes a standard course of action."*

Standard operating procedures or SOPs, clearly spell out what is expected and required of personnel during emergency response.

In other words, SOPs are written guidelines that explain what is to be done

WHAT THE SOPS ARE NOT?

SOPs are not pre-incident plans or pre-plans, which describe strategies for emergency response at a specific facility. Pre-plans allow the department to gather information on designated locations, identify potential hazards, and assess site specific factors. SOPs, on the other hand, are more generic in nature.

SOPs are not intended to provide technical information rather is meant for providing Procedural Guidance

SECTION 11

STANDARD OPERATING PROCEDURE FOR DIFFERENT DEPARTMENT

SOPs: Deputy Commissioner's Responsibility

All the actions mentioned above are to be carried by different departments/agencies participating in the District Emergency Management Plan. It isnecessary that all the departments have well-defined standard operatingprocedures.

The Deputy Commissionerwill circulate the standard operating procedures amongthe departments /agencies, and ask for compliance of the preparednessmeasures in the DDMA

meetings. It isnecessary that all the departments/agencies are very familiar with the overallplan and the procedures specifically applicable to them and report diligentlyupon their implementation.

Standard Operating Procedures will be modified and improved upon in light ofchanging circumstances. The Deputy Commissionerwill encourage all thedepartments to suggest changes in these procedures with a view to enhancethe effectiveness of the Plan.

Agriculture Department:

Task:

Assist in assessment of damage to agriculture & the farming community and help them to restart their agriculture/farming operations.

Advance Preparedness

- Identify hazard prone zones
- Skill up-gradation trainings for the officers/supporting staffs & volunteers.
- Formation of teams & delegation of areas of operation.
- Plan for emergency accommodation for agriculture staff & other Officers from outside areas
- Equipment/machines etc., to be upgraded &maintained in working condition
- List of alternative safe routes to be prepared
- Important telephone/contact details to be made available
- Keeping close contact with administration
- Encourage & ensure crop insurance by farmers
- Determine the quantity, type of seeds/plants/medicines/tools and equipments etc. which will be required, in case of an emergency
- Ensure people/farmers take the advantage of new schemes, technology and facilities provided by the government
- Listing possible storage godowns
- Pre-contractwith suppliers (seeds/plants/medicines/manure/tools/equipments)
- Estimate & maintain registers of type of agriculture practices, land use pattern, type of crops according to seasons, quantity of production, amount of cultivated area, insured crops etc & keep them updated
- Monitor pest & disease control
- Generate awareness on community level preparedness.

During/Post - Disaster Management

- Establish linkages with State/District Control Rooms
- Ensure availability of staff and teams (extension officers and others) visiting/stationed at respective disasters sites with necessary equipments, medicines, logistics support and authority as planned and establish communication links
- Assess the extent of damage to soil, crop, plantation, micro-Water Resource systems, storage facilities and the required intervention (estimate the requirement of seeds, fertilizers, pesticides, labour, tools and equipments etc)
- Ensure stock of seeds/plants/medicines/manure/tools/ equipment, which are needed and supply them immediately
- Requisition of seeds/plants/medicines/manure/tools/equipments etc. as per the pre-contract with the suppliers
- Clearance of debris, if any, due to land slides and flash floodand assist the community in developing agricultural land
- Organise transport, storage and distribution of the relief aid with adequate record keeping procedure
- Establish contact with water testing laboratories/offices
- Restore the agricultural operations (including soil conditions)
- Crop protection
- Restore agriculture produce market
- Arrangement of alternative power/ energy sources, as planned, to operate agriculture dept. / field offices
- Establish public information centers to let the people know about the type of work done and the necessary relief aid/new schemes etc
- Monitor pest and disease control
- Assist community/farmers in getting insurance benefit
- All valuable equipments/ instruments/seeds/manure/fertilizers and medicines etc. should be packed in protective coverings and stored in a safer place
- Regular reporting to higher authorities about the situation including expenditure statements etc

- In post operation phase, sit with the teams, review the situation, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Health &Family Welfare Department

Tasks:

- **To provide immediate medical, health and public hygiene services**
- **To check outbreak of epidemics and provide on-site Operation Theatres and Trauma Services**
- **Awareness generation on public health**

Advance Preparedness:

- Identify likely diseases associated with disasters
- Set up quick response teams with team leaders and supporting staff (Identify by name & allocation)
- Skill up-gradation trainings for the officers/supporting staff & volunteers
- Carrying out regular mock drills.
- Plan for emergency accommodation for staff & other officers from outside areas
- Equipment/machines etc., to be upgraded &maintained in working condition
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- List of alternative safe routes to be prepared
- Important telephone/contact details to be made available
- Keeping close contact with Administration
- Determine the quantity, type of medicines, medical support, equipments etc. that will be required per day/district/block/village, including relief camps etc. in case of an emergency
- Maintain inventory including portable equipments at different locations

During/Post - Disaster Management:

- Establish linkages with State/District Control Rooms
- Close contact with Administration
- Large stocks of surgical packs be sterilized to last for one week at least & kept in a safer place
- Arrange for emergency supplies of anaesthetic drugs
- Requisition of medicines/equipments etc. as per the pre-contract with the suppliers
- Ensure stock of equipment and drugs which are needed and/or request HQ, on priority basis, to supply to the hospitals immediately
- Arrangement of alternative power/ energy sources, as planned, to operate hospital centers

- Deployment of teams with necessary equipments, medicines etc. and logistics support and authority as planned and establish communication links
- Ensure storage of safe drinking water and encourage water savings in the hospital
- Ensure emergency admission procedures with adequate record keeping & establish public information centers to let the people know about the type of work done and the necessary relief aid/new schemes, etc.
- Ensure availability of staff and teams of doctors and assistants visiting disaster sites
- Assist volunteers/Dorbar Shnong/police personnel in rescue & evacuation and/or disposal of carcass, as well as in getting insurance benefit
- Assist Administration in setting up transit and relief camps, feeding centres and ensure adequate sanitary conditions in them
- All valuable equipments/ instruments and medicines should be packed in protective coverings and stored in a safer place
- Regular reporting to higher authorities about the situation including expenditure statements etc

- In the post operation phase, sit with the teams, review the situation, discuss problems, and suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Animal Husbandry &Veterinary Department

Tasks:

- **Disposal of dead cattle and other animals to prevent outbreak of health and sanitation problems**
- **Management of livestock in emergency**
- **Assist Police and Civil Defence and Home Guards and volunteers in disposal of dead bodies, claimed/unclaimed, after observing all formalities**

Advance Preparedness: -

- Skill up-gradation trainings for the officers/supporting staff & volunteers.
- Formation of teams & delegation of areas of operation
- Plan for emergency accommodation for veterinary staff & other officers from outside areas
- Equipment/machines etc., are to be maintained in working condition.
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition

- List of alternative safe routes to be prepared
- Important telephone/contact details to be made available
- Keeping close contact with the Administration
- Determine the quantity, type of fodder/medicines etc. which will be required per day including relief camps etc. in case of an emergency
- Listing possible storage godowns
- Listing possible shelters (camps) for animals
- Pre-contract with suppliers (fodders/medicines/equipments)
- Maintain livestock update
- Identify hazard prone zones
- Monitor disease control
- Encourage farmers to insure their livestock

During/Post Disaster Management:-

- Establish linkages with State/District Control Rooms
- Close contact with the Administration
- Requisition of fodder/medicines/equipments etc. as per the pre-contact with the suppliers
- Deployment of teams with necessary equipments, medicines etc and logistics support and authority as planned and establish communication links
- Ensure storage of safe drinking water and encourage water savings in the hospitals
- Treatment of injured cattle/ livestock/piggery
- Protection and care of abandoned/lost livestock
- Assist volunteers/village headmen/police personnel in rescue & evacuation and/or disposal of carcass as well as in getting insurance benefit
- Assist Administration in setting up transit and relief camps, feeding centres and ensure adequate sanitary conditions in them
- Estimate the requirement of water, fodder, medicines and animal feed and organize the same
- Regular reporting to higher authorities about the situation including expenditure statements etc
- In the post operation phase, sit with the teams, review the situation, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Public Health Engineering Department

Task:

To provide immediate supply of clean drinking water in the disaster affected areas and in the relief camps and hospitals etc.

Advance Preparedness: -

- Identify hazard prone zones. Maintain a list of weak points/disaster prone areas
- Skill up-gradation trainings for the officers/supporting staff
- Carrying out Regular Mock drill.
- Formation of teams & delegation of areas of operation
- Plan for emergency accommodation for staff & other officers from outside areas
- Equipment/machines etc., to be upgraded &maintained in working condition
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Listing alternative safe routes
- Important telephone/contact details to be made available
- Mitigations undertaken as per the plan
- Keeping close contact with the Administration
- Pre-contract with suppliers (tools/equipments)
- Generate awareness on community level preparedness

During/Post - Disaster Management:-

- Establish linkages with State/District Control Rooms
- Close contact with the Administration
- Deployment of teams with necessary equipments/tools, logistics support & authority, as planned and establish communication links
- Immediately undertake inspection of intake structures, pumping stations, water sources, treatment plants, storage tanks (hospitals etc), and sewerage lines and of other equipments and review extent of damage
- Undertake chlorination, bacteriological analysis, and determination of chlorine residue & restoration of water works. Daily determination of the chlorine residue in public water to avoid the presence of Escherichia coli & other sources of contamination in public water supply
- Recruit casual labourers on an emergency basis for clearing damaged pipes, blocked sewerage and salvaging important equipment and accessories

- Check the condition & contamination levels of private water sources including water from streams, wells, tube wells etc., if any, and use scientific methods of de-contamination to make it edible/use worthy
- Restore and ensure uninterrupted water supply to all vital installations, facilities and sites (life-line buildings, relief camps, feeding centers, godowns hospitals, etc)
- Assist health authorities to identify appropriate sources of potable water
- Encourage public in the economic use of water
- Make provisions to acquire tankers and establish other temporary means of distributing water on an emergency basis
- Requisition of equipments etc. as per the pre-contract with the suppliers
- A minimum level of stock should be maintained for emergencies and should include extra lengths of pipes, connections, joints, hydrants and disinfectants/ bleaching powders. Adequate tools should be at hand to carry out emergency repairs
- Arrangement of alternative power/energy sources, as planned, to operate PHE centers
- Cover and guard the pumps/motors with adequate protection so that they are not damaged or stolen
- Regular reporting to higher authorities about the situation including expenditure statements etc

Police (Home) Department

Task:

- **Maintain Law & order**
- **Undertake search & rescue works as well as orderly evacuation to safer places**
- **Protection of supply & convoys and assistance in orderly distribution of relief materials.**

Advance Preparedness:

- Formation of teams & delegation of areas of operation
- Skill up-gradation trainings for the officers and supporting staff & wardens /post wardens
- Mock drills according to plans
- Equipment/machines to be upgraded &maintained in working condition
- Emergency Control Rooms operational
- Adequate warning mechanism for evacuation
- Identification of alternative routes
- Important telephone/contact details to be made available

- Antisocial elements/groups identified
- Identification of sensitive areas and patrolling therein
- Patrolling on important buildings/ highways
- Support to the Administration on training of volunteers
- Keeping close contact with the Administration

During/Post- Disaster Management

- Establish linkages with State/District Control Rooms
- Close contact with the Armed Forces for specialized assistance/equipments for search and rescue
- Establish Radio Communication to assist evacuation, information dissemination and checking rumours
- Evacuation of people & immediate reporting to higher authorities
- Assist seriously injured persons to get to treatment centers
- Maintain law and order
- Assist fire brigade personnel in their efforts
- Assist and encourage the community in road-clearing operations
- Traffic management and patrolling as required
- Salvage operations
- Provide security in transit and relief camps, affected areas, lifeline infrastructures &services; ensure identified areas are cordoned off
- Provide security arrangement for visiting VVIPS and VIPs
- Assist the Administration in taking necessary action against hoarders, black marketers and those manipulating relief materials
- Identify and register the names of the dead and dispossessed persons
- Support the Administration, Medical, Community members in disposing dead bodies
- Assist the Administration in the supply and distribution of relief materials
- Deploy police personnel near relief godowns
- Escort relief carrier vehicles and personnel
- Regular reporting to higher authorities about the situation including expenditure statements etc
- In the post operation phase, sit with the teams, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Food & Civil Supplies Department

Task:

- **To meet the shortage of supply of food, baby food, P.O.L., S.K.O., L.P.G**
- **Action against black marketers, hoarders, etc**.

Advance Preparedness:-

- Identify hazard prone zones. Formation of teams & delegation of areas of operation
- Determine the quantity & type of supplies required in a disaster (e.g. dry food, ready to eat food, essential commodities, SKO, LPG, POL, toiletries, blankets etc.) & tie up with suppliers
- Identify storage facilities, location & capacity wise
- Maintain a list of suppliers of different commodities in the State & outside the State(in the NE region)
- Plan for emergency accommodation for officers & staff from outside areas
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Listing alternative safe routes
- Important telephone/contact details to be made available
- Pre-contract with suppliers

During/Post Disaster Management:-

- Arrange and despatch supplies to affected areas as per the requisition
- Arrange distribution of commodities to the affected people
- Take action against black marketers, hoarders etc. and maintain price line.
- Regular reporting to higher authorities about the situation including expenditure statements etc.
- In the post operation phase, sit with the teams, review the situation, discuss problems, and suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

PublicWorks Department

Task:

- **To clear roads, replace collapsed bridges by temporary bridging equipment or making temporary arrangements**
- **Assist concerned authorities to repair damaged air-strips, helipads**

- **Providing engineering support to Search & Rescue Teams (SRT)**
- **Providing support in terms of heavy equipments i.e., Earth Movers, Bulldozers, etc.**

Advance Preparedness:-

- Formation of teams & delegation of areas of operation
- Skill up-gradation trainings for the officers and supporting staff
- Mock drills according to plans
- Identify weak structures/weak points vulnerable to Earthquakes/Landslides
- Inspect all roads, bridges, including under water inspection of foundations and piers. A full check should be made on all concrete and steel work
- Equipment/machines etc., to be upgraded & maintained in working condition; procurement of tent equipments
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Preparation of possible helipads; give information of their location-their longitudes / latitudes to State/District Control rooms
- Non-destructive tests & retrofitting of lifeline buildings & important structures to ensure seismic proofing (along with the Urban Affairs Department)
- Heavy equipments, such as front-end loaders, should be moved to areas likely to be damaged and secured in a safe place
- Retrofitting of roads
- Listing of safe alternative routes
- Important telephone/contact details to be made available
- Training of masons on retrofitting and building bye-laws (along with the Urban Affairs Department)
- Keeping close contact with the Administration
- Pre-contract arrangement with suppliers for requisite equipment/stores
- Generate awareness on community level preparedness

During/Post - Disaster Management:-

- Establish linkages with State/District Control Rooms
- Close contact with the Administration
- Requisition of vehicles, debris cleaning equipments etc. as per the pre-contract with the suppliers

- Deploy teams with necessary equipment, such as towing vehicles, earth moving equipment, cranes etc., as planned, and establish communication links
- Adequate road signs should be installed to guide and assist the drivers
- Recruit casual labourers to work with experienced staff and divide them into work gangs
- Assist fire brigade/police personnel in rescue & evacuation by clearing debris
- Undertake cleaning of ditches, grass cutting, the burning or removal of debris and the cutting of dangerous trees along the road side in the affected areas
- Restoration of roads to their normal conditions by establishing a priority listing of which roads will be opened first. Among the most important are the roads to hospitals and main trunk routes, routes to relief godowns, camps etc.
- Undertake cleaning of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface foundation in the affected areas and keep monitoring their conditions
- Mobilize community/RangbahShnong/volunteers in road-cleaning operations
- Repair/reconstruction of public utilities and buildings
- If people are evacuating an area, the evacuation routes should be checked and people assisted
- Assist the administration in setting up transit and relief camps, feeding centers, hospitals
- Work under construction should be secured with ropes, sandbags and covered with tarpaulins, if necessary
- Regular reporting to higher authorities about the situation including expenditure statements etc
- In the post operation phase, sit with the teams, review the situation, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Meghalaya Energy Corporation Limited

Tasks:

Restoration of power supply and Provision of power/electricity to hospitals, lifeline buildings, feeding centres

Advance Preparedness:-

- Clear definition of individual domain - which will do what?
- Skill up-gradation trainings for the officers/supporting staff.
- Carrying out regular Mock Drill according to the plan.
- Identify hazard prone zones. Formation of teams & delegation of areas of operation
- Plan for emergency accommodation for officers & staff from outside areas

- Equipment/machines etc., to be maintained in working condition
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Listing alternative safe routes
- Important telephone/contact details to be made available
- Pre-contract with suppliers (equipments)
- Arrange Disaster Management tool kits, at each sub-station, comprising cable cutters, pulley blocks, jungle knives, axes, crowbars, ropes, back saws spanners and tents for crews
- Generate awareness on community level preparedness

During/Post - Disaster Management:-

- Establish linkages with State/District Control Rooms
- Deployment of teams with necessary equipments, logistics support and authority as planned and establish communication links
- Switch off the power supply immediately to avoid further damage to life and property during the time of disaster
- Immediately undertake inspection of Power grids, barrage, high tension lines, towers, substations, transformers, insulators, poles, and other equipments and review extent of damage. Undertake restoration works
- Restore power supply and ensure uninterrupted power to all vital installations, facilities and sites (relief camps, feeding centres, godowns)
- Recruit casual labourers on an emergency basis for clearing damaged poles and salvaging important equipment and accessories
- Requisition of equipments etc. as per the pre-contract with the suppliers
- Arrangement of alternative power/ energy sources, as planned, to operate hospital centers and lifeline buildings (DC Office/District EOC/Police Stations/Tele-communication Buildings/IMD Shillong etc.)
- Regular reporting to higher authorities about the situation including expenditure statements etc.
- In the post operation phase, sit with the teams, review the situation, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans.

Advance Preparedness

- Promotion of shelter belt plantations
- Publishing for public knowledge, details of forest cover, use of land under the forest department, the rate of depletion and its causes
- Keep saws (both power and manual) in working condition
- Provision of seedlings to the community and encouraging plantation activities, promoting nurseries for providing seedlings in case of destruction of trees during natural disasters
- IEC activities for greater awareness regarding the role of trees and forests for protection during emergencies and also to minimise environmental impact as a result of deforestation like climate change, soil erosion, etc
- Increasing involvement of the community, NGOs and CBOs in plantation, protection and other forest protection, rejuvenation and restoration activities
- Plan for reducing the incidence, and minimise the impact of forest fires

During and Post Disaster:

- Assist in road clearance
- Provide tree cutting equipments
- Units for tree cutting and disposal to be put under the control of DC during an emergency
- Provide building materials such as bamboo etc. for construction of shelters
- Take up plantation to make good the damage caused to tree cover

Transport Department

Task:

Arrangement of transport for reaching supplies to affected areas, Transport for evacuation of people and Transport of medical teams

Advance Preparedness:-

- Identify hazard prone zones. Formation of teams & delegation of areas of operation
- Plan for emergency accommodation for officers & staff from outside areas
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Listing alternative safe routes
- Important telephone/contact details to be made available
- Pre-contract with suppliers

- Assessment of the likely requirement in the event of a disaster
- Information about various classes/types of vehicles available, location-wise
- Keep vehicle requisition forms ready in sufficient numbers

During/Post - Disaster Management:-

- Get in touch with State/District Control Rooms
- Ascertain the actual requirement from District Control Room, Supplies Dept., Housing Dept, and Medical Department
- Arrange vehicles for evacuation, maintenance of supplies and medical aid etc.
- Regular reporting to higher authorities about the situation including expenditure statements etc
- In the post operation phase, sit with the teams, review the situation, discuss problems, suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

Information &Public Relations Department

General Tasks

- Creation of public awareness regarding various types of disasters through media propagation
- Dissemination of information to public and others concerned regarding do's and don'ts of various disasters
- Regular liasoning with the media Response Activities
- Setting up of a control room to provide authentic information to the public regarding impending emergencies
- Daily press briefings at fixed times to provide the official version
- Keep the public informed of the latest emergency situation (area affected, lives lost, etc.)
- Keep the public informed of various post disaster assistance and recovery programmes.

Water ResourceDepartment

Advanced Preparedness

- Contact Address and phone numbers of all staff/officers to be prepared
- Control room arrangements in the head quarters and appointment of Nodal Officers
- Details of damage prone places and the approach roads in the area
- Location of Water level gauge stations for Flash floodsituations
- Detail immediate action to be taken in case of leakage in large water storage reservoirs

- Clear explanation of disaster & priorities during disasters to all the staff
- Arrangement of equipments for communication and vehicles

During/Post

- Will obtain the clear picture of the condition of all the reservoirs through teams of technical officers
- If overflow or leakage is found, start immediate action to avoid adverse effects to the reservoir as per the action plan
- Keep the District Control Room informed about the (reservoir wise) water level related conditions. If there is no possibility of risk, keep the people & media informed that everything is safe
- If overflow or any leakage is found, immediately warn the people living in low lying areas through the District Control Room
- Take due care for the transportation of drinking water if drinking water is provided through Water Resource schemes
- Assist the District Administration in search & rescue operations

Urban Affairs Department Task

Damage assessment, finalization of reports and Mobilization of finance

Advanced Preparedness

- Formation of teams & delegation of areas of operation
- Skill up-gradation trainings for the officers and supporting staff
- Identify weak structures/weak points vulnerable to Earthquakes/Landslides
- Equipment/machines etc., to be upgraded & maintained in working condition; procurement of tent equipments
- Emergency fuel stored, vehicles including batteries inspected & maintained in working condition
- Non-destructive tests & retrofitting of lifeline buildings & important structures to ensure seismic proofing (along with the PWD Department)
- Heavy equipments, such as front-end loaders, should be moved to areas likely to be damaged and secured in a safe place
- Listing safe alternative routes
- Important telephone/contact details to be made available

- Training of masons on retrofitting and building bye-laws (along with the PWD Department)
- Keeping close contact with the Administration
- Pre-contract arrangement with suppliers for requisite equipment/stores
- Generate awareness on community level preparedness
- Proper sanitation and safe drinking water

During/Post - Disaster Management:-

- Establish linkages with District Control Room
- Close contact with the Administration
- Requisition of vehicles, debris cleaning equipments etc. as per the pre-contract with the suppliers
- Deployments of teams with necessary equipments, such as towing vehicles, as planned and establish communication links
- Recruit casual labourers to work with experienced staff and divide them into work gangs
- Assist fire brigade/police personnel in rescue & evacuation by clearing debris
- Undertake cleaning of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface foundation in the affected areas and keep monitoring their conditions
- Mobilise community/headmen/volunteers in cleaning operations.
- Repair/reconstruction of public utilities and buildings
- If people are evacuating an area, the evacuation routes should be checked and people assisted
- Assist the Administration in setting up transit and relief camps, feeding centers, hospitals
- Work under construction should be secured with ropes, sandbags and covered with tarpaulins, if necessary
- Regular reporting to higher authorities about the situation including expenditure statements etc
- In the post operation phase, sit with the teams, review the situation, discuss problems, and suggest remedies, collect feedback etc., to upgrade mitigation as well as action plans

District Rural Development Agency

Advanced Preparedness

- Dwelling houses constructed under Indira Awas Yojana (IAY) are to be assigned with retrofitting to be able to resist earthquake
- District Rural Development Agency can supplement other agencies in creation of roads, footpaths, small Water Resource, community halls etc. These can be made useful during disasters

Sports& Youth affairs

Advanced Preparedness

- Youth festivals/programmes can be the platform for creating awareness on Disaster Management/necessity of training
- The youth can be given training/demonstrations on DRM & in turn spread massiveawareness to the public

Education **Advanced**

Preparedness

- DM can be included in the school/college curriculum
- Teachers/ students must also be trained practically in various activities of the subject
- Regular mock drills can be carried out at regular interval.

Housing **Advanced**

Preparedness

- Impart training to engineers, contractors, masons etc on how to construct safe dwelling units
- Provision of housing materials like CGI sheets, tarpaulin, bamboo etc

SECTION 12

SAFETY MEASURES

12.1 Earthquakes:

Earthquakes usually give no warning at all.**"Earthquakes don't kill people, unsafe buildings do."**

.1 Before the earthquake:

Encourage people to formulate a safety plan for their family because if they wait until the earth starts to shake, it may be too late. People should be encouraged to consider the following safety measures:

- Always keep the following in a designated place: bottled drinking water, non-perishable food, first-aid kit, torch-light and battery-operated radio with extra batteries
- Teach family members how to turn off electricity, gas, etc
- Identify places in the house that can provide cover during an earthquake
- It may be easier to make long distance calls during an earthquake. Identify an out-of-town relative or friend as your family's emergency contact. If the family members get separated after the earthquake and are not able to contact each other, they should contact the designated relative/friend. The address and phone number of the contact person/relative should be with all the family members
- Safeguard your house
- Consider retrofitting your house with earthquake-safety measures \Reinforcing the foundation and frame could make your house quake resistant. You may consult a reputable contractor and follow building codes.
- Kutchha buildings can also be retrofitted and strengthened

During quake:

Earthquakes give no warning at all. Sometimes, a loud rumbling sound might signal its arrival a few seconds ahead of time. Those few seconds could give you a chance to move to a safer location. Here are some tips for keeping safe during a quake.

- Take cover. Go under a table or other sturdy furniture; kneel, sit, or stay close to the floor. Hold on to furniture legs for balance. Be prepared to move if your cover moves

- If no sturdy cover is nearby, kneel or sit close to the floor next to a structurally sound interior wall. Place your hands on the floor for balance
- Do not stand in doorways. Violent motion could cause doors to slam and cause serious injuries. You may also be hit by flying objects
- Move away from windows, mirrors, bookcases and other unsecured heavy objects
- If you are in bed, stay there and cover yourself with pillows and blankets
- Do not run outside if you are inside. Never use the lift.

- After the shaking stops, take the staircase to reach open space

- If you are living in a kutcha house, the best thing to do is to move to an open area where there are no trees, electric or telephone wires

- If you are in a structurally sound building, stay there

- If you are inside an old weak structure, take the fastest and safest way out

If outdoors:

- Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops

- If your home is badly damaged, you will have to leave. Collect water, food, medicine, other essential items and important documents before leaving
- Avoid places where there are loose electrical wires and do not touch metal objects that are in touch with the loose wires
- Do not re-enter damaged buildings and stay away from badly damaged structures

If in a moving vehicle

- Move to a clear area away from buildings, trees, overpasses, or utility wires, stop, and stay in the vehicle. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake

After the quake

Here are a few things to keep in mind after an earthquake. The caution you display in the aftermath can be essential for your personal safety

- Wear shoes/chappals to protect your feet from debris
- After the first tremor, be prepared for aftershocks. Though less intense, aftershocks cause additional damages and may bring down weakened structures. Aftershocks can occur in the first hours, days, weeks, or even months after the quake
- Check for fire hazards and use torchlights instead of candles or lanterns
- If the building you live in is in a good shape after the earthquake, stay inside and listen for radio advises. If you are not certain about the damage to your building, evacuate carefully. Do not touch downed power line
- Help injured or trapped persons. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. In such cases, call for help
- Remember to help your neighbors who may require special assistance-infants, the elderly, and people with disabilities
- Listen to a battery-operated radio for the latest emergency information.
- Stay out of damaged buildings
- Return home only when authorities say it is safe. Clean up spilled medicines, bleaches or gasoline or other flammable liquids immediately. Leave the area if you smell gas or fumes from other chemicals. Open closet and cupboard doors cautiously
- If you smell gas or hear hissing noise, open windows and quickly leave the building. Turn off the switch on the top of the gas cylinder
- Look for electrical system damages - if you see sparks, broken wires, or if you smell burning of amber, turn off electricity at the main fuse box. If you have to step in water to get to the fuse box, call an electrician first for advice

- Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets. If water pipes are damaged, avoid using water from the tap
- Use the telephone only for emergency calls
- In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster. Ask an out of state / district relative or friend to serve as the "family contact". Make sure everyone in the family knows the name, address, and phone number(s) of the contact person(s).

Flood

Basic Safety Precaution to be taken

- Listen to radio/TV for the latest weather bulletins and Flash floodwarnings. Pass on the information to the others
- Make a family emergency kit which should include; a portable radio/ transistor, torch, spare batteries, a first aid box along with essential medicines, ORS, dry food items, drinking water, matchboxes, candles and other essential items
- Keep hurricane lamp, ropes, rubber tubes, umbrella and bamboo stick in your house. Keep your cash, jewellery, valuables, important documents etc. in a safe place.
- Turn off power and gas connections before leaving your house

During flood:

- Don't enter into Flash floodwaters; it could be dangerous
- Stay away from sewerage line, gutters, drains, culverts etc.
- Be careful of snakes; snakebites are common during flash flood/flood
- Stay away from electric poles and fallen power-lines to avoid electrocution
- Don't use wet electrical appliances – get them checked before use
- Use boiled and filtered drinking water
- Stagnation of water can breed vector/ water-borne diseases. In case of sickness seek medical assistance
- Use bleaching powder and lime to disinfect the surroundings

Landslides

Areas generally prone to landslides

- On existing old landslides

- On or at the base of slopes
- In or at the base of major drainage hollows
- At the base or top of an old fill slope
- At the base or top of a steep cut slope
- Developed hill sites were leach field septic systems are used

Areas those are typically safe from landslides

- On hard and non jointed bed rocks that have not moved in the past
- On relatively flat lying areas away from sudden changes in slope angle
- At the top or along the nose of ridges, set back from the top of the slopes

Features that might be noticed prior to major land sliding

- Springs, seeps or saturated ground in areas that have been not typically been wet before
- New cracks or unusual bulges in the ground, street pavements or sidewalls
- Soil moving away from foundations
- Ancillary structures such as decks and patios tilting and /or moving relative to the mail house
- Tilting or cracking of concrete floors and foundations, broken waterlines and other underground utilities
- Leaning telephone poles, trees, retaining walls and fences
- Sunken or dropped road beds
- Rapid increase in creek water levels, possibly accompanied turbidity
- Sticking doors and windows and visible open spaces indicating jambs and frames out of plumb.

After landslide

- Stay away from slide area, there may be danger of additional slides
- Check for injured or trapped persons near the slide, without entering the direct slide area. Direct rescuers to the location
- Listen to local radio/ television for emergency information
- Look for broken utility lines such as telephone, electrical lines, water pipes etc and report to authorities
- Check gas leakage from cylinders
- Check the building for damages

Fire Hazard

High-Rise Fires

- Calmly leave the apartment/house, closing the door behind you.
- Pull the fire alarm near the closest exit, if available, or raise an alarm by warning others
- Leave the building by the stairs
- Never take the elevator during fire

If the exit is blocked by smoke or fire

- Leave the door closed but do not lock it
- To keep the smoke out, put a wet towel in the space at the bottom of the door
- Call the emergency fire service number and tell them your apartment/house number and let them know you are trapped by smoke and fire. It is important that you listen and do what they tell you

If there is a fire alarm in your building which goes off

- Before you open the door, feel the door by using the back of our hand. If the door is hot or warm, do not open the door
- If the door is cool, open it just a little to check the hallway. If you see smoke in the hallway, do not leave
- If there is no smoke in the hallway, leave and close the door. Go directly to the stairs to leave. Never use the elevator

If smoke is in your apartment

- Stay low to the floor under the smoke
- Call the Fire Emergency Number which should be pasted near your telephone along with police and other emergency services and let them know that you are trapped by smoke
- If you have a balcony and there is no fire below it, go out
- If there is fire below, go out to the window. Do not open the window but stay near the window
- If there is no fire below, go to the window and open it. Stay near the open window
- Hang a bed sheet, towel or blanket out of the window to let people know that you are there and need help

Kitchen Fires

It is important to know what kind of stove or cooking oven you have in your home – gas, electric, and kerosene or where firewood is used. The stove is the main cause of fire hazards in your kitchen and can cause fires. For electric and gas stoves ensure that the switch or the gas valve is switched off/turned off immediately after the cooking is over. An electric burner remains hot and until it cools off, it can be very dangerous. The oven using wood can be dangerous because burning embers remain. When lighting the fire on a wooden fuel oven, keep a cover on the top while lighting the oven so that sparks do not fly. After the cooking is over, ensure that the remaining fire is extinguished off by sprinkling water. Do not keep any inflammable article like kerosene near the kitchen fire.

Important Do's in the Kitchen

- Do keep hair tied back and do not wear synthetic clothes when you are cooking
- Do make sure that the curtains on the window near the stove are tied back and will not blow on to the flame or burner
- Do check to make sure that the gas burner is turned off immediately if the fire is not ignited and also switched off immediately after cooking
- Do turn panhandles to the centre of the stove and put them out of touch of the children in the house
- Do ensure that the floor is always dry so that you do not slip and fall on the fire
- Do keep matches out of the reach of children

Important Don'ts

- Don't put towels, or dishrags near a stove burner
- Don't wear loose fitting clothes when you cook, and don't reach across the top of the stove when you are cooking
- Don't put things in the cabinets or shelves above the stove.
- Don't stores spray cans or cans carrying inflammable items near the stove
- Don't let small children near an open oven door. They can be burnt by the heat or by falling onto the door or into the oven
- Don't lean against the stove to keep warm
- Don't use towels as potholders. They may catch on fire
- Don't overload an electrical outlet with several appliances or extension cords. The cords or plugs may overheat and cause a fire
- Don't use water to put out a grease fire. Only use baking soda, salt, or a tight lid. Always keep a box of baking soda near the stove

COMMON TIPS

- Phone number of the Fire Services should be kept near the telephone and ensure that everyone in the family knows the number
- Sleep with your bedroom closed to prevent the spread of fire
- Do you know that you should never run if your clothes are on fire and that you should - "STOP – DROP-ROLL."

Lightning and Thunderstorm:

Danger during thunderstorms

Lightning claims quite a few lives and injures many every year. Quite a large number of injuries occur from the electric shocks received while using fixed telephones during thunderstorms. Take these precautions during thunderstorms:

Consult an electrician for advice on lightning conductors required for your house

If caught outdoors

If you hear thunder 10 seconds after a lightning flash, it is only about three kilometers away. The shorter the time, the closer the lightning, so find shelter urgently:

- Seek shelter in a hardtop (metal-bodied) vehicle or solid building but avoid small open structures or fabric tents
- Never take shelter under a small group of (or single) trees
- If far from any shelter, crouch (low, feet together), preferably in a hollow. Remove metal objects from head / body. Do not lie down flat but avoid being the highest object.
- If your hair stands on end or you hear `buzzing' from nearby rocks, fences, etc, move immediately. At night, a blue glow may show if an object is about to be struck
- Do not fly kites during thunderstorms
- Do not handle fishing rods, umbrellas or metal rods, etc.
- Stay away from metal poles, fences, clotheslines etc.
- Do not ride bicycles or travel on open vehicles
- If driving, slow down or park away from trees, power lines, stay inside metal-bodied (hard top) vehicles or in a pucca building but do not touch any metal sections
- If in water, leave the water immediately
- If on a boat, go ashore to a shelter as soon as possible

If you are indoors

- Before the storm arrives, disconnect external aerial and power leads to radios and television sets. Disconnect computer modems and power leads
- Draw all curtains and keep clear of windows, electrical appliances, pipes and other metal fixtures (e.g. do not use the bath, shower, hand basin or other electric equipments)
- Avoid the use of fixed telephones. In emergencies, make calls brief, (do not touch any metal, brick or concrete) and do not stand bare foot on concrete or tiled floors

First Aid

Apply immediate heart massage and mouth-to-mouth resuscitation to lightning victims until medical help arrives.

Lightning facts and myths

- When struck, people do not glow or fry to a crisp but the heart and breathing are often affected
- Only about 30% of people struck actually die, and the incidence of long-term disability is low, particularly when appropriate first aid is applied promptly.
- If your clothes are wet, you are less likely to be seriously injured if struck, as most of the charge will be conducted through the wet clothes rather than your body
- Lightning can, and often does, strike more than once in the same place.

MAINSTREAMING DISASTER MANAGEMENT

Mainstreamingis used to describe the consideration of Disaster Risk Reduction in national (and regional) decision makingprocesses (planning, budgeting, development etc.)

Need for Mainstreaming

- Poor people (usually rural population) are the most vulnerable to impacts of natural disasters;
- Local communities are rarely consulted or able to influence decision-making;
- The main objective of mainstreaming into local planning is to reduce the vulnerability and create resilience at the local/community level
- Lack of local human and financial capacities to deal with disasters;
- Protection of the population and key infrastructure;
- Adhoc responses (short-term responses, uncoordinated processes, isolated projects, etc.) are **NOT** a solution

According to the Disaster Management Act – 2005, NDMA has been entrusted with the responsibility to

- "Lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects."
- It also emphasizes to "monitor the implementation of the guidelines laid down by the National Authority for integrating of measures for prevention of disasters and mitigation by the Ministries or Departments in their development plans and projects"

Approaches for Mainstreaming

There are three suggested approaches of mainstreaming disaster management into the development process and disaster management plans-

- Structural Measures
- Non Structural Measures
- Disaster Mitigation Projects

Based on the suggested approaches the specific action would involve-

- Adopting a Sectoral approach and identification of Key sectors for mainstreaming.
- Within each sector, key programmes/projects would have to be indentified.
- Indentifying the entry points within the programmes/projects for integration.
- Work at the policy and planning level be it national, state and district level.
- Close coordination with State Planning Commission and Finance Department for promoting DM into all development programmmes and involve working with different departments to mainstream DM into the Departmental Plans and policies.
- Advocacy for allocation of dedicated budget for DM within the Departmental plans.

Entry point for Mainstreaming Disaster Management in some of developmentPrograms of the Government.

Indira Awas Yojana (housing)

- Inclusion of such measures like application of hazard resistant design in construction of IAY houses, appropriate sitting of IAY housing in guideline of IAY
- Capacity Building of Masons on safe construction
- Community Awareness
- Capacity Building programme for DRDA officials on Disaster Management issues

Mahatma Gandhi National Employment Guarantee Scheme (Security and Rural Development)

- Identified works are available which take into account the hazard profile and offer continuous employment opportunities in the event of disasters to ensure livelihood security in the event of disaster
- Works which reduce disaster risk are given priority in plans-such as local mitigation etc.

Pradhan Mantri Gram Sadak Yojana (Infrastructure)

- The master plan for rural roads, the district rural road plan and identification of core network under the planning process of this scheme should, which the overall guidelines of its preparation, explicitly address the disaster risk reduction concerns and accord priority to connect the vulnerable habitations
- The technical guidelines should explicitly provide for suitable protection and inclusion of disaster risks concerns explicitly- while provision of cross drainage,

slope stabilization, protection works are already included, in multi-hazard and especially flood and landslide prone areas fair weather roads need to be upgraded on a priority basis.

- The maintenance guidelines are modified to ensure that in case of disasters these roads get provision for restoration to ensure all weather connectivity

Sarva Siksha Abhiyaan (Education)

- Development of policy paper on school safety
- Introducing school safety as a part of the guidelines of SSA which is currently focusing on inclusive education.
- Developing model structurally safe designs for schools
- Introducing school safety in the Teacher's training curriculum
- Training of Engineers appointed under the SSA schemes as well as the SSA State coordinator/ Training of masons
- Construction of technology demonstration units
- Community Awareness

Jawaharlal Nehru Urban Renewal Mission (urban infrastructure)

- Emphasis on disaster risk audit at the stage of preparation of Detail Project Reports
- Inclusion of amending of building byelaws to ensure structural safety as a mandatory reform in the mission cities to ensure safe habitat development (both structural safety and fire safety norms)
- Inclusion of disaster management as a function of the Urban Local Bodies and allocate resources
- Inclusion of disaster resistant features in the houses being constructed under the BSUP components as well as to promote development of safe habitat.
- Inclusion of strategies for disaster management in the city development plans
- Training and capacity building programme for municipal officers on disaster management

National Rural Health Mission (Health and Family Mission)

- Ensure that the Health Plan explicitly addresses the disaster risk reduction in the vulnerable habitations and the vulnerable districts and the disaster management plan as per DM Act 2005.
- Provide training to the ASHA workers on disaster health preparedness and response.
- Strengthening of Disease Health Surveillance system in rural areas.
- Ensuring structural safety of the CHC/PHC and other health care service delivery centers in rural areas
- Training doctors and hospital staffs on mass casualty management and emergency medicine
- Community awareness on disaster management.

SECTION 14

RESOURCE INVENTORY&CAPABILITY ANALYSIS

RESOURCE INVENTORY

This chapter describes about various resources available in the district,which can be mobilized for managing disasters in the district. Most of the resources of the District have been uploaded in India Disaster Resource Network (IDRN) database. TheIndia Disaster Resource Network is an online inventory designed as a decisionmaking tool for the Government administrators and crisis managers tocoordinate effective emergency response operations in the shortest possibletime.

The major component of the chapter is listed below:

- District Disaster Management Authority
- Important Names & Contact Numbers
- Names of Block Development Officers with Contact Numbers
- Other Important Offices with Contact Numbers
- List of Police Stations/O.P/BH/TB with Contact Nos.
- List of Fire & Emergency Service Stations
- List of Hospitals & Contact Nos.
- Static First Aid Posts/Shelters under Urban Areas
- List of Pharmacies in Shillong
- Name of the S.K.Oil Agencies
- Name of the Petrol Pumps
- Name of the PDS outlets
- Open Grounds for Setting up of Relief Shelters/helipads
- List of Main Hospitals and Nursing Homes in Guwahati for Referral

District Disaster Management Authority

District Emergency Operations Centre- 1077/0364-2225289/2502094, Fax-2502149

Sl. No.	Name	Designation	Status	Address	Contact Nos.
1.	Shri. P. S. Dkhar, IAS	Deputy Commissione	Chairman	O/O Deputy Commissioner,	**(O):0364-2224003**

		r		East Khasi Hills, Shillong	**(R): 0364-2521561** **(F): 0364-2223394** **(M):94361-17519**
2.	Shri. P.Syiem	Chief Executive Member, District Council	Co-Chairman	O/O Khasi Hills Autonomous District Council, Shillong	**(O):0364-2241601** **(M):98563-83742** **80140-41742**
3.	Smt.I.Majaw, MCS	Addl. Deputy Commissioner	Chief Executive Officer	O/O Deputy Commissioner, East Khasi Hills, Shillong	**(O): 0364-2503201** **(M): 96120-02864**
4.	Shri. Davis N.R.Marak, IPS	Superintendent of Police	Member	O/O Supdt. Of Police, East Khasi Hills, Shillong	**(O): 0364-2224150** **(M): 98560-88248** **94361-13208** **(F): 0364-2225675**
5	Dr. M.R.Basaiawmoit	DM&HO	Member	O/O District Medical & Health Officer, East Khasi Hills, Shillong	**(O): 0364-2226432** **(M): 87947-13976**
6	Shri.F.Marbaniang	Addl. Chief Engineer, PWD, Roads	Member	O/O Addl. CE, PWD (R), East Khasi	**(O):0364-2227905**

				Hills, Shillong	
7	Smti. M.Nongbri	District Agriculture Officer	Member	O/O District Agriculture Officer , East Khasi Hills, Shillong	**(O):0364-2522290**

Important Names & Contact Numbers

Sl.No.	Names of Officers	Designation	Office Address	Contact Nos.
1.	Smt.D.M.Suja, MCS	Addl. Deputy Commissioner	O/O Deputy Commissioner, East Khasi Hills District, Shillong	M: 9436164363
2.	Shri.J.P.Lakiang, MCS	Addl. Deputy Commissioner	O/O Deputy Commissioner, East Khasi Hills District, Shillong	M: 9436113084
3.	Smt.R.Iangrai, MCS	Addl. Deputy Commissioner	O/O Deputy Commissioner, East Khasi Hills District, Shillong	M: 9863068652
4.	Shri.V.Syiem, MPS	SP (City)	O/O Supdt. Of Police, East Khasi Hills District, Shillong	M: 94361-03108
5.	Shri.N.K.Syiem, MPS	SP, Traffic	O/O Supdt. Of Police, East Khasi Hills District, Shillong	O: 0364-2222900 M: 8014081394
6.	Smt. Mary G. T. Sangma	SP, Fire & Emergency	Fire & Emergency Service, Fire	O:2222247

		Service	Brigade, Shillong	M:94363-36218
7.	Shri.Ankit K.Singh, IAS	Sub-Divisional Officer	O/O SDO Civil Sub-Division, Sohra	M –9725136544 8700052785
8.	Shri.B.Kharbuli	Chief Engineer, PWD (R)	O/O Chief Engineer, PWD (R), Shillong	O-2226481 F-2226481 M-9863063596
9.	Shri.P.R.Marwein	Chief Engineer, PWD Standard	O/O Chief Engineer, PWD Standard, Shillong	O-2506228
10.	Shri.M.R.Sangma	Chief Engineer, PWD (NH)	O/O Chief Engineer, PWD, NH, Shillong	O-2226429/2216 M-9436112841
11.	Shri.L.Suchiang	Chief Engineer, PWD (B)	O/O Chief Engineer, PWD, B, Shillong	O- 2226551
12.	Shri.S.K.Sunn	Chief Engineer, PHE	O/O Chief Engineer, PHE, Shillong	O-2225119 M-94361-04286
13.	Shri.K.D.Phawa	Chief Engineer, Water Resources	O/O Chief Engineer, Water Resources Shillong	O-2211363 F-2211363
14.	Shri. P.H.Khongsngi	Deputy Controller	O/O Deputy Controller, Civil Defence, Shillong	O-2211746 M-97742-94520

15.	Smt.K.Marbaniang	District Social Welfare Officer	O/O the District Social Welfare Officer, Shillong	O-0364-2224409 M-98560-08442
16.	Smt.D.V.Massar	District Programme Officer (ICDS)	O/O the District Programme Officer ICDS Cell	M-9856931046
17.	Shri.A.Kharpran	District Sericulture Officer	O/O the District Sericulture Officer	M-089740-09351
18.	Shri.R.Budnah	EE, Urban Affairs	O/O the EE Urban Affairs, Shillong	O-2220831 M-085753-47184
19.	Dr. (Mrs) A. Pakyntein	District AH & Vety. Officer	O/O District AH & Vety. Officer, East Khasi Hills District, Shillong	O-2241244/2548724 M-094363-34515
20.	Shri.E.Kharmalki, MCS	Secretary, MUDA	MUDA, Shillong	O-2227844
21.	Shri. B.Sohlyia, MCS	Chief Executive Officer	Shillong Municipal Board	O - 2501359
22.	Shri P. S. Lyngdoh	Asst. Director, IPR	Information & Public Relations, Lachumiere, Shillong	O-2224957 M- 98569-27257 F- 2224612
23.	Shri. H. F. Khongsit	District Transport	O/O District Transport Officer	O-2220219

		Officer		
24.	Shri.H.Decruse	General Manager	O/O General Manager, District Commerce & Industries Centre	O-2590117 (M) - 09436111675
25.	Shri. D. K. Khonglah	Divisional Soil & Water Conservation (Territorial)	O/O Divisional Soil & Water Conservation (Territorial), Polo	O-2591085 M: 94361-07021
26.	Shri. I. Rynjah	Divisional Soil & Water Conservation (Cash Crop)	O/O Divisional Soil & Water Conservation (Cash crop), Polo	O-2590361 M-9436330363
27.	Smt. P. Lyngdoh	District School Education Officer	O/O District School Education Office, Mawkhar	O-2226847 M- 9863022909
28.	Smt. L. M. Iangap	Sub-Divisional School Education Officer	O/O Sub-Divisional School Education Officer, Mawkhar	O-2226204 M-98560-07708
29.	Shri. B. R. M. Lyngdoh	District Urban Planner, Urban Affairs	O/O District Urban Affairs, Urban Affairs, Raitong Building	O- 2223530
30.	Shri.Manjunatha C, IFS	Divisional Forest Officer, Khasi Hills Division	O/O Divisional Forest Officer, Khasi Hills Division	O-2226375 M-94369-99102

31.	Shri R. Nainamalai, IFS	Divisional Forest Officer, Silviculture Division, Shillong	O/O Divisional Forest Officer, Silviculture Division, Shillong	O - 2502789
32.	ShriB.Shangdiar	Divisional Forest Officer, Training Division, Shillong	O/O Divisional Forest Officer, Training Division, Shillong	O- 2225305
33.	Shri S. A. Nongsiej, IFS	Divisional Forest Officer, East Khasi Hills SF Division, Shillong	O/O Divisional Forest Officer, East Khasi Hills SF Division, Shillong	O - 2591482
34.	Shri I.A.G.Mathuram, IFS	Divisional Forest Officer, Khasi Hills WL Division, Shillong	O/O Divisional Forest Officer, Khasi Hills WL Division, Shillong	O- 2226181 M-9485104805
35.	Shri M.M.Sangma, MFS	Divisional Forest Officer, FRS Division, Shillong	O/O Divisional Forest Officer, FRS Division, Shillong	O- 2226780 M-94369-95609
36.	Shri.P.S.Kharnaior	District Horticulture	O/O District	M: 9436107778

		Officer	Horticulture Officer	
37.	Shri. E. Lamare	EE, PHE	GSWS Division-I, PHE Administrative Complex	O-2223286 M-94361-16402
38.	Shri.C.Kharwanlang	EE, PHE	Hills Division, Barik Point	O-Extn 2212 R-2226791 M-97740-10546
39.	Shri. D. Marbaniang	EE, PHE	S&D Division, PHE Administrative Complex	O-2226987 M-98560-08079
40.	Shri.C.Marngar	EE, PHE	Electrical Division, Shillong, PHE Administrative Complex	O-2501912 M-9863577067
41.	Shri.E. Khonglah	EE, PHE	Investigation Division, PHE Administrative Complex	M-9863097654
42.	Shri.S.G.Kharmawphlang	EE, PHE	GSWS Division II, Mawphlang	O-2567305 M-80147-46752
43.	Shri.H.S.Nongkynrih	EE, PHE	Electrical Division, Mawphlang	O-2567265
44.	Shri.H.S.Basaiawmoit	EE, PWD (B)	O/O the EE, PWD Building Division	M-9436119557
45.	Shri.P.Dhar	EE, PWD (E)	O/O the EE Electrical Division	M-9436103665
46.	Shri.B. M. Syiem	EE, PWD (R)	National Highway Shillong Bye Pass	O - 2502357 M-9436102314

			Division	
47.	Shri. W. R. Lyngdoh	EE, PWD (R)	National Highway	M-9436322235
48.	Shri.C.Kharmudai	EE, PWD (R)	Shillong Central Division	M- 8575335381
49.	Shri.R.N.Wahlang	EE, PWD (R)	Shillong South Division	M-9436309676
50.	Shri.P.K.Hajong	EE, Water Resources	O/O the EE, Water Resources, East Khasi Hills District, Shillong	M-9862425452
51.	Shri S. Rangad	CO	Central Training Institute, Mawdiangdiang	M- 9856625678
52.	Shri.T.R.Pdah	Chief Executive Officer, Shillong Distribution	MeECL, Shillong	O- 2590812 M-9436108276
53.	Shri T. Passah	Chief Engineer (Distribution)	MPDCL, Shillong	M- 94361-00655
54.	Shri F. K. Langstieh	Deputy General Manager (West)	MeECL, Shillong	O- 2590145
55.	Shri M. F. Mawlieh	Deputy General (East),	MeECL, Shillong	O- 2223122 2222222 2223050
56.	Shri J. H. Suchiang	Superintenden	O/o Superintendent	O- 2225954

t of Fisheries	of Fisheries, East Khasi Hills, Shillong	

Names of Block Development Officers with Contact Numbers

Sl. No.	Names of BDOs	Office Address	Office No.	Mobile No.
1	Shri.A.S.Mukhim, MCS	Shella-Bholaganj C&RD Block	-	98567-82177 98621-90775
2	Shri.P.T.Passah, MCS	Mylliem C&RD Block	0364-2561473	94021-35152
3	Smt.E.L.Warjri, MCS	Khatarshnong-Laitkroh C&RD Block		89745-85801 98560-18274
4	Shri.L.Kynjing, MCS	Mawryngkneng C&RD Block	03637-235239	98630-67114 98622-61834
5	Shri.W.M. Marbaniang	Mawkynrew C&RD Block	-	94363-04632 96155-27463
6	Shri.P.S.Tynsong	Pynursla C&RD Block	269518	94363-07322
7	Shri.M.Challam, MCS	Mawphlang C&RD Block	0364-2567278	98631-14269
8	Shri.P.Mukhim	Mawsynram C&RD Block		98560-84164
9	Shri.M.Challam, MCS	Sohiong C&RD Block		98631-14269

Other Important Officeswith Contact Numbers

Sl.No.	Name of Offices	Contact Numbers
1	Indian Red Cross Society, Meghalaya Branch, Oxford Hill, Kenches Trace, Laban, Shillong	2223403/2220459/2223674
2	All India Radio, Shillong	2224153/2230075/2223057/2224439
3	Doordarshan Kendra, Shillong.	2580312/2580320/2580311
4	MeECL, Shillong.	2591609/2590145
5	BSNL, Shillong	2222228/2223700/2223400
6	Meghalaya Transport Corporation	2232779/2222864
7	Shillong Municipal Board	2224702/2224850/2224702
8	Head Quarter Army 101 Area, Shillong	2224300/2224302
9	Eastern Air Command, Upper Shillong	2561461/2561465
10	Border Security Force, Shillong	2535891/2230411/2534856
11	Central Reserve Police Force, Shillong	2210321/2590069/2591948/
12	Indo-Tibetan Border Police Force, Shillong	2220438/2224591
13	Assam Rifles, Shillong	2705403 Fax-2705419
14	National Disaster Response Force, Guwahati	0361-2841464, Fax-2840284
15	Indian Meteorological Department, Shillong	2560106, 2561638
16	Indian Meteorological Department, Guwahati	0361-2840225/2840552/2842421 (F)
17	North Eastern Space Applications Centre, Shillong	2570141, Fax-2570139
18	Chief Engineer, Central Water Commission, NER	2226226

List of Police Stations/O.P/BH/TB with Contact Nos.

Sl.No	Name of Police Stations/Out Posts/Beat Houses/Traffic Branch	Contact Numbers
1.	Police Control Room	100, 2222277, 2226101
2.	Women Police Station	2502077
3.	Sadar Police Station	222440, 2224818
4.	Laitumkhrah P.S.	2223069
5.	Lumdiengjri P.S.	2548151
6.	Laban P.S.	2223168
7.	Mawlai P.S.	2575505
8.	Madanryting P.S.	2231408
9.	Rynjah P.S.	2230402
10.	Mawsynram P.S	03657-242320
11.	Pynursla P.S	03653-269368
12.	Shella P.S	03637 - 261353
13.	Sohra P.S	03637-235227
14.	Jhalupara O.P	2547600
15.	Cantonment BH	2544124
16.	Pasteur BH	2591545
17.	Kench’s Trace BH	2224055
18.	Sohryngkham O.P	2265211
19.	Mawryngkneng, P. S	0364-2264403
20.	Mawngap O.P	2567230
21.	Nongmynsong O.P	2230224
22	Nongthymmai O.P	2537587

23.	Mawdiangdiang O.P	2908684
24.	Dangar O.P	-
25.	Bholaganj P.C.P	-
26.	Tyllap O.P	-
27.	Shillong Sadar Traffic Branch	2223451
28.	Lumdiengjri Traffic Branch	2548083
29.	Laitumkhrah Traffic Branch	2227731
30.	Madanryting Traffic Branch	2535322

List of Fire & Emergency Service Stations

Sl. No.	Name of Station	Office No.	Equipped with VHF
1.	Control Room, F&ES, Shillong	2227000/101	Yes
2.	Nongthymmai F&ES	2227000/2223300	Yes
3.	Bara Bazar FS	2222000	Yes
4.	Mawlai Sub F&ES	2546875	Yes
5.	Upper Shillong Sub F&ES	2560327	Yes
6.	Mawngap F&ES Camp	-	Yes
7.	Sohra Sub F&ES	03637 - 235261	No
8.	Shella Sub F&ES	-	No

List of Hospitals & Contact Nos.

Sl. No.	Name of Hospitals	Contact Nos.
1	EMRI	108
2	Civil Hospital	2223889, 2224100
3	Ganesh Das Hospital	2224766, 2590766

4	KJP Hospital	2242053, 2548053
5	Military Hospital	2224368
6	Nazareth Hospital	2224052, 2210188
7	Reid Chest Hospital	2241497, 2225742
8	Bethany Hospital	2520300, 2300168
9	Woodland Hospital	2224885, 2225240
10	NEIGRIHMS	2590593, 2590623
11	Super Care Hospital	2506226
12	NIMHANS	2591714
13	Red Cross Hospital	2223403
14	Govt. Eyes Hospital	2225399, 2225423
15	J.R.Geonka	2241483
16	T.B.Chest Hospital	2241521
17	Children Hospital, Pohkseh	2535061/2535062

Static First Aid Posts /Shelters under Urban Areas

1. Ram Krishna Mission Dispensary, Laitumkhrah

- Ramkrishna Dispensary Compound
- St. Edmund's School
- Laitumkhrah Presbyterian High School
- Football field at Motinagar

2. Bethany Hospital, Nongrim Hills

- Sports Complex, Nongthymmai
- S. Ferrando School
- Mizo Modern School, Nongrim Hills
- H. Elias School, Nongshilliang
- Auxilium School, Nongshiliang
- Eriben School, Jylli's Shop, Nongthymmai
- NEHU existing facilty at Upper Nongthymmai
- IIM, Shillong at Mayurbhanj Complex

3. Nazareth Hospital, Laitumkhrah

- NEHU Bijni Complex
- Shillong College

- St. Margaret's School, Upland Road
- St. Mary's School, Upland Road

4. **Woodland Hospital, Dhankheti**
    - Malki Ground
    - Don Bosco Youth Centre
    - Law College , Dhankheti
    - St. Anthony's School
    - Seven Set School, Malki
5. **John Roberts Hospital (KJP), Jaiaw**
    - St. Joseph's School
    - Dinam Hall
    - Khasi Pnar School
    - St. Dominic School
    - Seng Khasi School
    - Community Hall, Lumdiengjri
    - Govt. Boys' School, Jaiaw
    - Mawkhar Christian High School
    - St. Joseph's Dispensary, Jaiaw
6. **E.S.I. Dispensary, Lachumiere**
    - Areas of Lower Lachumiere
    - Office of the DM&HO
7. **P&T Dispensary, opp. Raj Bhawan**
    - Offices of the A.G.
    - A.G. staff quarters
    - Youth Hostel
8. **Demthring Urban Health Centre (UHC)**
    - Presbyterian Compound - Madanriting
    - Holy Child Schoo l- Demthring
    - St. Peter's School – Madanriting
9. **Nehru Memorial St. Dispensary, Mawlai**
    - Sacred Heart Compound - Mawlai
    - Madan Heh
    - Basic School – Mawlai Kynton Massar
10. **Laban State Dispensary, Laban**

- Laban State Dispensary Compound
- Community Hall - Upper Lumparing
- Community Hall - Lumsohphoh, Laban

11. Bishnupur Urban Health Centre

- Sishu Mandir – Bishnupur

12. R.P. Chest Hospital, Jhalupara

- R.P. Chest Hospital Compound

13. Goenka Hospital (Cantonment Board Dispy.) - Jhalupara

- Goenka Hospital Compound – Garikhana

14. Mawprem Urban Health Centre

- Community Hall - Mawprem
- Hindu Mission School
- Community Hall - Lumsohphoh Mawprem

15. Umsohsun Urban Health Centre

- Community Hall - Sweeper's Colony
- Community Hall - Riatsamthiah
- Christian Academy School (Block III) – Wahingdoh

16. Civil Hospital, Shillong

- Community Hall - Jail Road
- Bengali Boys' School - Jail Road
- Bengali Girls' School - Jail Road
- Community Hall - Oakland.
- St. Xavier's School, Polo

17. Mawpat Urban Health Centre

- Mawpat Community Hall
- Langkyrding Community Hall

18. Mawlai Urban Health Centre

- Basic School, Mawlai Kynton Massar
- Umthlong Community Hall
- Umjajew Girls L.P. School

19. Rynjah State Dispensary

- Umpling Community Hall
- Lapalang Community Hall
- Nongrah Community Hall

- Pohkseh Community Hall

List of Pharmacies in Shillong

A. Retailers

Sl.No	Name & Address of the Premises	Address & Contact No. of the Proprietor
1	M/S Economic Medical Hall, Police Bazar	Shri.Narendra Singhania, Police Bazar-793001, Ph-2224237
2	M/S Assam Pharmacy, Police Bazar, 98630-29205	Shri.Dilip Kr. Bhattacharjee & Shri.Pradip Kr Bhattacharjee, Polo Hills, Shillong
3	M/S Mahari & Sons, Mawkhar, Motphran, Shillong	Shri.Jwain Singh Kharshiing, Mawkhar, Motphran, Shillong
4	M/S Town Pharmacy, G.S.Road, Shillong-1, Ph-2224441	Shri.Jyotendro Bhattacharjee, Oakland, Shillong-1
5	M/S Drugs Store, E.N.Complex, G.S.Road, Umsohsun, Shillong-2	Shri.Swapan Dastidar, Harisona Road, Laban, Shillong-4, 2222604
6	M/S Redicura, G.S.Road, Motphran, Shillong-2, 2221560	Shri.S.Trilok Singh Ranhotra, G.S.Road, Shillong-2
7	M/S Meghalaya Pharmacy, Laitumkhrah, Shillong-3	Shri.Arabinda Deb, Nongrimbah, Laitumkhrah, Shillong-3, 2210518
8	M/S Delite Pharmacy, Police Bazar, Shillong	Shri.Kashi Nath Singhania, Police Bazar, Shillong, 9436101250
9	M/S Pioneers Medicals, Barabazar, Shillong	Smt.Jyotsna Paul, Audit Estate, A.G Qtr.No.124/II, Motinagar, Shillong-14, 2243752
10	M/S Shri.Krishna Medical Store, Laban, Shillong-14	Shri. Lalit Kumar Dey, Howel Road, Laban, Shillong-14

11	M/S Kiron Drugs, Polo Bazar, Shillong-1, 2591638	Shri. Surabrata, Shri Sanjoy Purkayastha, Smt.Manjula Purkayastha, Nongumkhrah, Polo Bazar, Block-I, Shillong-1
12	M/S K.J.Medical Store, G.S.Road, Shillong-2, 2243078	Shri.Ratan Kumar Jasrasaria, Quinton Road, Shillong
13	M/S Uptodate Drugs Store, Laitumkhrah, Shillong-3	Smt.Spero Meliora Nongpluh, Pohkseh, Nongthymmai, Shillong
14	M/S Gupta's Medico Chemist & Druggist, Polo Bazar Shillong-1	Shri. Haripada Gupta, Lower Jail Road, Shillong-1. 2220816
15	M/S T.D.Pharma, Garikhana, G.S.Road, Shillong-2. 2241779	Shri.Lambot Pyrbot, Lamavilla, Shillong
16	M/S Bharat Medical Store, Iewduh, Shillong. 2544278	Shri.Mohamad Shued, 71, Jhalupara Cantonment Shillong.
17	M/S Shree Durga Pharmacy, Iewduh, Shillong	Shri Rajat Deb, Durga Kutei, Oakland, Shillong-1
18	M/S Kessel House of Medicine, K.J.P. Synod House, Mawkhar, Shillong-2, 2243469	Smt.Gail Russel Lyngdoh, Pdengshnong, Mawlai Mawroh, Shillong-8. 2590669
19	M/S Laitumkhrah Health Care, Laitumkhrah, Shillong-3	Dr.Wazed Ali Wardecruse, behind ITI Lower Rynjah, Shillong-6. 98630-67324
20	M/S Sarkar Medicine Centre, Police Bazar, 2210550	Smt. Barun Chakravarty, Oakland, Shillong-1
21	M/S Modern Drugs Centre, Qualapatty, Shillong. 2243358	Smt. Neeru Arora, Qualapatty, Shillong-2. 98630-62576
22	M/S Sumarlang Medical Store, Iewduh, Shillong	Smt.Shimtilut Nongbri, Nongthymmai, Shillong
23	M/S Dev Medico, Qualapatty, G.S. Road, Shillong. 2243082	Shri Ujjal Paul, Upper Mawprem, Shillong-2. 98631-11082

24	M/S Vista Pharma, Bishnupur, Shillong-4	Smt Millethun Swer, Lawsohtun, Block-III, Laban, Shillong
25	M/S Drugs Store, Laitumkhrah Branch, Laitumkhrah Main Road, Shillong-3. 2228820	Smt.Sumita Dastidar, Risa Colony, Shillong-3
26	M/S Dalari Medicos, Iewduh Taxi Stand, Shillong-1	Smt. Aiom Baiar Dkhar, Demthring River side, Nongthymmai, Shillong-14
27	M/S Meghdoot Pharmacy, Hotel Polo Tower Building, Polo Bazar, Shillong	Shri Bhanu Kar Das, Lower New Colony, Near B.K.Bajoria School, Shillong-3
28	M/S Variety Medicine Centre, Iewduh, Shillong	Shri Kanulal Choudhury, Sharma Building, Keating Road, Shillong-1, 2544260
29	M/S Shiwani Medical Care, 17, Jhalupara Cantonment Bazar, Shillong-2	Shri Anand Kumar Thapa, Near JB Cantonment Police Out Post, Barapathar, East Khasi Hills, Shillong, 2545495
30	M/S Wirika Medicals, Mawlonghat Opp. Cherra Bus Stand, Shillong	Smt Telda M Pakyntein, Jingkieng Nongthymmai, Shillong, 94361-01577
31	M/S Cash Pharmacy, Thana Road	Smt Khanam Khatum
32	M/S B.B.Drugs, Laban, Shillong	Shri Umasankar Dasgupta, Laban, Shillong-4
33	M/S Binode Medicos, Polo Bazar, Shillong	Smt Tamalika Das, Opposite CBI Office, Oakland, Shillong-1, 2226461, 98630-67819
34	M/S Heal Pharmacy, Jhalupara, Shillong-2, 2544636	Shri Shyamal Chandra Paul
35	M/S Amrita Medicos, Banik Mansion, Jail Road, Shillong. 2210853	Shri Gurendra Das Purkayastha, Jail Road, Shillong
36	M/S The Mediciner, Laitumkhrah, Shillong-3. 2221143	Smt Sharmila Dutta
37	M/S Lahun Pharmacy, Laitumkhrah,	Smt Lahunmon Sohliya, Mawlai Mawroh,

	Shillong-3	Shillong. 2590514
38	M/S Kyndiah Medicos, Tirot Singh Syiem Road, Wahthapbroo, Shillong	Shri Monphio Kyndiah, Lumkshaid, Lower Mawprem, Shillong. 98630-65384
39	M/S Senapati Medical, Laban Bazar, Shillong-4. 2229722	Shri.Bidhan Senapati, Babul Kutir Laban, Jack Sion Trace Road, Shillong-4
40	M/S Damecha Pharma, Laitumkhrah Beat House, Shillong	Smt Meiktila Budnah, Jaiaw Langsning, Shillong-2
41	M/S Norpal Medical Store, G.S. Road, Qualapatty, Shillong-2	Shri Ram Niwas Mishra. 94361-04837
42	M/S Khiah Krat Medicos, G.S. Road, Shillong. 2544915	Shri Samarendra Dey, Prabha Cottage, Rilbong,, Shillong-13
43	M/S Qualapatty Medico, Qualapatty, Shillong-2. 2545273	Shri Emmuhod Pakyntein, Qualapatty, Shillong-2
44	M/S Shabong Pharmacy, Barik, Shillong	Shri Hansel H.Shabong “Sha Marr” Upper Nongrim Hills, Shillong-3.94361-10597
45	M/S Mawprem Medicure, Upper Mawprem, Shillong	Shri Damodar Pandey, Upper Mawprem, Shillong-2. 94363-07421
46	M/S Sure Cure, Pharma, Last Stop Kench’s Trace, Shillong-4	Smt Mitali Sohkhlet, Rilbong, Shillong-4
47	M/S Meghalaya Health Care Pharmacy, Jail Road, Shillong-1. 2222555	Shri Karuna Sindhu Ghosh, Lower New Colony, Shillong-3
48	M/S Sabnam Medical Store, Motphran, G.S. Road, Shillong	Smt.Sabnam Naz 57 JB Jhalupara, Shillong-2. 98630-85944
49	M/S OK Medicos, Mawlonghat, Shillong. 2547271	Md. Aquil Ahmed, 82, Garikhana, Shillong-2
50	M/S Pappu Medical	Shri Dibyojoti Acharya, Last Stop Laban, Shillong
51	M/S Choudhury Pharmacy, Police	Smt Meenakshi Banerjee, Shri Surjya

	Bazar. 2224435/2501319	Banerjee, Shri Swadhin Banerjee, Police Bazar, Shillong-1
52	M/S Usha Medical, P.Warbah Complex, Lower Jail Road, Polo Bazar, Shillong	Shri Debobrata Bhattacharjee, Upper Jail Road, Shillong
53	M/S Central Pharmacy, Goenka House, Police Bazar, Shillong-1. 2224614	Smt Mongoli Das, Lower Lachumiere, Shillong-1
54	M/S Classic Medicos, Qualapatty, G.S.Road, Shillong. 2243301	Shri Balbir Singh, C/o Mumtina Shullai, Wahthapbroo Flat No 13, Shillong
55	M/S Shubha Medicos, Cooperative Store Complex, Rilbong, Shillong-4	Shri Bibhuti Bhushan Chakravorty, Basanti Kutir, Rilbong. 2220457
56	M/S Angshu Medical, Polo Bazar, Shillong-1. 2220208	Shri Anup Dey, Polo Bazar, Shillong-1
57	M/S S.M.Drugs Store, Mawbah, Shillong-2	Smt Mina Das, Mawbah, Shillong. 2545570
58	M/S Sai Medical Centre, Jail Road, Shillong	Dr.Nivedita Sen Dutta Choudhury, Oakland, opp. Community Hall, Shillong-1
59	M/S Chakravorty Medical Laban Last Stop, New Red Cross Meghalaya, Shillong-4. 2222441	Shri Subhamoy Chakravorty, 'Nalanda' Laban Last Stop, Shillong-4
60	M/S Sharma Medicals, P.K. Warbah Complex, Polo Bazar, Shillong	Shri Raj Kumar Sharma, Polo Bazar, Shillong. 98630-66431
61	M/S Get Well Medicos, Dhankheti Road, Shillong. 2229947	Smt Cristeen Pariat, C/O R.B. Gurung, Cleave Colony, Shillong
62	M/S New Star Medicos, Bara Bazar, Shillong	Md. Taiyab
63	M/S Jyoti Medical Hall Chemist and Druggist, Laban Shillong-4. 98630-67112	Smt Sabita Das, opp. St. John Church, Laban Shillong-4. 2220931

64	M/S Jeevan Jyoti Medical Pabitra Ghatong, 175 Jhalupara, Shillong-2	Shri Sajal Chakravorty, Upper Mawprem, Shillong. 98630-63352
65	M/S Laxmi Medical Store, Pala Complex, Laban, Near Red Cross	Shri Surajit Dey, C/O Laban Printer Keating Road, Shillong-2. 2225312, 94361-01434
66	M/S Moonlight Pharmacy, Jail Road, Shillong	
67	M/S Ryndiar Medicare, Iewduh, Shillong	Shri A.Filington Roy Thangkhiew, Lummawbah, Block-I Raid Sawkur Nongkseh, 3rd Mile Upper Shillong. 94361-16702
68	M/S Mritunjay Pharmacy, 23, Cantonment Area, Shillong	Shri Chandra Shekhar, Tigrania, Govind Bhawan, Nongrim Hills, Shillong-3. 2544186/2544157
69	M/S Parari Medical Store, Keating Road, Shillong	Shri. Godwyne Nongrum, Lumkshaid, Lower Mawprem, Shillong-2. 98630-66772
70	M/S Eize Drugs Store, Police Point, Near Nazareth Hospital, Laitumkhrah, Shillong-3	Smt. Lucinda Sohkhlet, Near Nazareth Hospital, Police Point, Laitumkhrah, Shillong-3. 94361-04742
71	M/S Laitumkhrah Pharmacy, Lummawrie, Laitumkhrah, Shillong-3. 2520252	Dr.Clarinda E.Khongwar, Nongrim Hills, Laitumkhrah, Shillong
72	M/S Jaiaw Drugs Store, Jaiaw Main Road, Shillong	Shri Carl Allison Syiem, Jaiaw Lumsyntiew, Shillong-2. 98630-97355
73	M/S Bani Medical Three Pine Colony, Laban, Shillong-4	Shri KishorChoudhary, Ishan Kutir, Three Pine Colony, Laban. 94363-07280
74	M/S J.B.Pharmacy, Demseiniong, Shillong	Shri Kamal Malakar, Nongrim Hills, Shillong-3. 98625-85870
75	M/S J.S. Medical, Upper Mawprem, Shillong	Smt Sabari Paul, Upper Mawprem, Opp. Police Beat House, Shillong-2. 98630-22893

76	M/S Health Care Pharma, Bishnupur, Shillong-4	Shri Kitlang Slong, Lamavilla, opp. Community Hall, Shillong-2. 98630-62283, 98630-80496
77	M/S Megha Junam Medicos, 8 JB Cantonment, Shillong	Shri Chandra M.Rai Dkhar, 8 JB Cantonment, Shillong-2
78	M/S Rasong Medico, Demseiniong, Shillong	Smt Dafne Corriecia Syiem, Polo Hills, Shillong. 98631-04308
79	M/S Neha Medicos, Mawlonghat	Shri Ganesh Chanda, Garikhana, Narsing Akhara, Shillong-2
80	M/S Lucky Division	Shri George Gilbert Dop, Lawmali Pasteur Institute Road, Shillong
81	M/S Red Cross Pharmacy, Howell Road, Laban, Shillong-4	Smt.Evansary Marbaniang, Sino House Madan Laban, Shillong-4. 98633-17370
82	M/S Dhar Medical, ABP Road Laban Bazar	Shri Pankaj Dhar, Dhar Villa Kench's Trace, Shillong-4. 94361-05443
83	M/S Loknath Pharmacy, New Complex, Barapathar, Shillong	Shri Ranjit Chakravarty, Barapathar, Shillong-2
84	M/S Arati Medical Hall, Laban Howell Road, Shillong-4	Shri Rajib Das, Lower Lumparing, Laban, Shillong
85	M/S Hope Clinic, Pine Mount Ridge, Barik, Shillong	Dr.Daljit Singh Sethi, Highwinds, Pine Mount Ridge, Barik. 2228784
86	M/S Charis Pharmacy, Police Point, Laitumkhrah	Shri Wom Wara De Chen, Lumshngian, Rynjah, Shillong-6
87	M/S Krypton Medico, N.M. Society Complex, Polo Bazar, Shillong	Shri Ratnadip Deb, C/O Deb Kutir, Forest Colony, Shillong-1. 2591391

B. Restricted

Sl. No	**Name of Licensee**	**Address**

1	Shri. Amalendu Paul	M/S Surjamani Paul & Others, Iewduh, Shillong
2	Shri Bhani Ram Jasrasaria	M/S Kaluram Jainarain, G.S Road, Shillong
3	Shri Pawan Jasrasaria	M/s J.S Store, Laitumkhrah
4	Shri Mian Lamin	Iewduh
5	Shri Krelishon Marngar	Iewduh, Shillong
6	Shri Reniwell Majaw	Iewduh, Shillong
7	Shri Daniel Star R Jeen	M/S Shillong Cooperative Marketing Society, Iewduh, Shillong

Name of the S.K.Oil Agencies

Sl. No.	Name of Locations/Block	Name of Wholesalers/Nominees	Contact Details
1.	Laitumkhrah	Assam Auto Agency	9863104410
2.	Rynjah	G.G. & Co.	8974233044
3.	Laban	Kero Fuel	9436100075
4.	Karikhana	M.M. & Co.	9436317073
5.	Polo	S. Hynniewta	9436104063
6.	Mawlai	S. Kharbamon	9774282166
7.	Shillong	Ashok Auto Trader	9862667178
8.	Nongthymmai	L. Khiangtee	9436165109
9.	Polo	MECOFED	9615525026

PETROL PUMPS UNDER SHILLONG – SADAR DIVISION

UNDER HINDUSTAN PETROLEUM CORPORATION LIMIT**ED**

Sl. No.	**Name of the dealer**	**Name of the Centre**	Phone No.
1.	M/s P. Marbaniang Service Station	Shillong	2223660 (R), 2521425 (P)
2.	M/s Thangkhiew Service Station	Upper Shillong	2547490 (R), 2548973
3.	M/s Thangkhiew Service Station	Mawlai	
4.	M/s Thangkhiew Fill In Centre	Barabazar	
5.	M/s Hava Tariang Service Station	Mawlai Mawiong	252073 (R)
6.	M/s Reliable Refilling Centre	Mawlai	9436100441 (Banrilin Lyngdoh-Owner) 9436301288 (Manager)

UNDER INDIAN OIL CORPORATION LIMITED (MARKETING DIVISION)

Sl. No.	**Name of the dealer**	**Name of the Centre**	**Phone No.**
1.	M/s Ashok Auto Service	Shillong	2228178 (R)2222134 (P)
2.	M/s United Hills Super Service Station	Shillong	2222632 (R)2222480 (P)
3.	M/s Mahari & Son Service Station	Shillong	2241130 (R)2241209 (P)
4.	Banalari Service Station	Mawlai	2575308
5.	M/s Bawri Service Station	Dhankheti	
6.	M/s Abigail Service Station	Nongthymmai	9436101903 (Mukesh)
7.	M/s Shillong Highway Service Station	Mawlyndep	9436303127 (Manager)
8.	M/s Kurbah Service Station	Mawangap	2567631 (P)

UNDER INDIAN OIL CORPORATION LIMITED (ASSAM OIL DIVISION)

Sl. No.	**Name of the dealer**	**Name of the Centre**	**Phone No.**
1.	M/s Mawiong Motors	Mawiong	2520855 (R)2520947 (R) 2575061
2.	M/s Khasi Hills Petroleum Supply Co.	Mawlai	2222002 (R)2575707 (P)
3.	M/s Peak Service Station	Dhankheti	2504692 (R)2222118 (P)
4.	M/s Peak Service Station	Laitkor	25046921 (R)2580303

5.	M/s Assam Auto Agency	Laitumkhrah	2501234 (O)2520855 (P)
6.	M/s Assam Auto Agency	Jail Road	2501234 (O)2520855 (P)
7.	M/s Inda Refill Centre	Mawryngkneng	
8.	M/s Rani Service Station	Weiloi	
9.	M/s Donbok Service	Pynursla	
10.	M/s Mahari & Company	Nongthymmai	2241130 (R)2241209 (P)
11.	M/s Madan Mohan & Co	Mawlai 3rd Mile	2548685, 2222002
12	M/s Upper Shillong Service Station	Upper Shillong	2560104

UNDER INDIAN BURMA PETROLEUM CO. LTD

Sl. No.	**Name of the dealer**	**Name of the Centre**	Phone No.
1.	M/s Pynbianglang Refilling Station	Mawiong	943610461, 2575809 (R)

Public Distribution Systems

A. Urban Areas: Wholesalers

Sl. No.	Name of Locations/Block	Name of Wholesalers/Nominees	Contact Details
1.	Nongthymmai, Laitkor	S.S. Roy Thangkhiew	9612772451
2.		S. Khongjee	9862041298
3.		K.P. Syiem	
4.	Madanriting-Umpling	S.I. Kharkongor	9863116526
5.		K.P. Syiem	
6.		C. Kharkongor	
7.		P. Jyrwa	9856088267

8.		T. Mukhim	9856008026
9.	Laitumkhrah	S. Khongjee	
10.	Malki	D. Lyngwa	9863061005
11.	European, Police Bazar	S. Sawkmie	9436303070
12.	Laban	D. Lyngwa	9863061005
13.		R. Lyngwa	9436102831
14.	Cantonment	K. Jaisukhlal	9436103810
15.		P. Bothra	9436101825
16.		W. Sawkmie	
17.	Mawprem	J.P. Agarwala	9436336600
18.		B.K.J.P.	9863097017
19.	Mawlai	M. Nongkynrih	
20.		P. Mylliem	
21.		Banri Lyngdoh	
22.		A.Malngiang	9863531831
23.	Polo-Pynthorumkhrah	Cosgrave Lyngdoh	9089071808
24.		R. Khardewsaw	9436302088
25.		N. Khongiong	
26.	3rd Mile Upper Shillong	N. Kurkalang	9436105259
27.		C. Lyngdoh	9436105259
28.	Jaiaw	S. Kharkongor	
29.		Barkupar Lyngdoh	8014609742

Open Grounds for Setting up of Relief Shelters/helipads

- Garrison Ground
- Polo Ground
- Fire Brigade Ground
- St. Edmund's College Ground
- GTC Grounds, Happy Valley
- Lady Hydari Park
- Golf Links
- Mawroh L.P. School Ground
- Sacred Hearts School Ground, Mawlai Phudmawri Ground
- Students Field, Jaiaw
- Nongthymmai (near Me.S.E.B. Sub Station) Ground
- Pohkseh Ground
- Malki Ground
- Home Guards, Bishnupur Ground
- All Saints School Ground.

List of Main Hospitals and Nursing Homes in Guwahati for Referral

Sl. No.	Name	Address	Phone No.
1.	M/S Dispur Polyclinic & Nursing Home	Ganeshguri Dispur, Guwahati – 36	2220769/2260864
2.	M/S Nemcare Hospital	G.S. Road, Bhangagarh, Guwahati – 5	2455906/2528587 Fax – 2457344
3.	M/S Wintrobe Hospital	G.N.B. – Road, Ambari,l Guwahati – 1	2522860
4.	M/S Central Nursing Home	Behola Basistha Road, Guwahati – 28	2262044/2265923 /2227342
5.	M/S Down Town Hospital Ltd.	G.S. Road, Dispur, Guwahati – 36	2331003/2330659 /2330695/233274

			1
6.	M/S Guwahati Neurological Research Centre Ltd.	Dispur, Guwahati – 36	2227700-04 Fax – 2227711
7.	M/S Agile Hospital	Jayanagar Chariali, Beltola, Guwahati	2620611
8.	M/S Gutucharan Polyclinic cum Nursing Home	M.D. Shah Road, Paltanbazar, Guwahati – 8	2514194/2540876
9.	M/S H.M. Hospital & Research Centre (P) Ltd.	Hatigaon, Dispur, Guwahati – 33	260948
10.	M/S East End Nursing Home & Research Institute	G.N.B. Road, Bamunimaidam, Guwahati – 21	2550334/2556008 /2740045
11.	M/S Care Home & Diagnostic Centre	Bamunimaidam, Guwahati – 21	2550202
12.	M/S International Hospital	Lotus Tower, Christianbasti, G.S. Road, Guwahati – 5	2347700/01/02/03 Fax – 2347715
13.	M/S Central Clinic and Nursing Home	M.S. Road, Faneybazar, Guwahati – 1	2602104/2549065
14.	M/S Kalicharan Das Nursing Home & Polyclinic	Kalapahar, Gopinath Nagar, Guwahati – 16	2472963/2476774
15.	M/S Nightingale Hospital (E.N.T.)	Ganeshguri, Kacharibasti, Dispur, Guwahati – 5	2342920
16.	M/S Marwari Maternity Hospital	Satijoymati Road, Guwahati	2541201/2541202
17.	M/S Good Friend Hospital & Research Centre	G.S. Road, Dlubari, Guwahati – 7	2515209
18.	M/S Swagat Endolaparoscopic,	A.T. Road, Santipur,	2131726/2637899

	Surgical Research Institute	Guwahati – 9	Fax – 2519026
19.	M/S Barthakur Clinic Pvt. Ltd. Hospital	Kharghuli, Guwahati – 4	2543411/2546233
20.	M/S Sacred Home Hospital & Research Clinic Pvt. Ltd.	Kachaibasti, B.K. Kakati Road Byclane – 4, Ulubari, Guwahati – 7	2431358
21.	M/S Kumar Nursing Home	K.R. Choudhury Road, Near Panchali, Kumarpara, Guwahati - 9	2570033
22.	M/S Dr. B.A. Saikia Memorial Nursing Home	A.T. Road, North Jalukbari, Adabari, Guwahati – 14	2529854/2527229
23.	M/S Aruna Memorial Hospital Pvt. Ltd.	Rajgarh Road, Bhangagarh, Guwahati – 5	(9536231) 2840001/2840379
24.	M/S Greenland Nursing Home & Medhi Diagnostic Clinic	V.I.P. Road (Guwahati Airport), Guwahati – 17	2268230/2263407
25.	M/S Good Health Hospital	G.S. Road, Guwahati – 6	2522647/2562130
26.	M/S City Heart Hospital	Rajgarh Road, Guwahati – 7	2491090
27.	M/S Sangpo Health Care Pvt. Ltd.	Adagodown, Lakhara Road, Guwahati – 34	2522959
28.	M/S City Nursing Home	R.K. Choudhury Road, Bharalumukh, Guwahati – 9	2529390/2529945
29.	M/S N.L. Medicure & Research Centre	Sarboday Path, Bus Stop A.B.C., G.S. Road, Guwahati – 5	2202338
30.	M/S Midland Hospital & Research Centre (P) Ltd.	Sreenagar (Near Zoo), R.G. Baruah Road, Guwahati – 5	2522866/2541859

31.	M/s Sidhant Maternity & Nursing Home	Subhadra Bhawan, Chatribari, Guwahati – 6	2544560
32.	M/S Institute of Human Reproduction (Goenka Nursing Home)	Bharalumukh, Guwahati – 9	2431358
33.	M/S Advance Neoro-Science Hospital	Kahililpara Road, Ganeshguri, (Near Ganesh Mandir), Guwahati – 6	2263540/2335519
34.	M/S Carewell Polyclinic and Diagnostic Centre (P) Ltd.	Silpukhuri, Guwahati – 3	2666352
35.	M/S Ramcharan Foundation for Better Medical Care	Sandhyachal Nagar, Lalmati, Guwahati – 29	2303674
36.	M/S Reliance Polyclinic	Mathgharia – 2, Guwahati – 20	2550338
37.	M/S Sri Sankardev Netralaya	Beltola, Guwahati – 28	2305516/2228879 -80/2223922-21
38.	M/S Brahmaputra Hospital Ltd.	Six mile, G.S. Road, Guwahati – 22	2227014/2230035
39.	M/S E.G. Nursing Home (P) Ltd.	Narengi Tiniali, Guwahati – 26	2641898/2640697
40.	M/S Marwari Hospital & Research Centre	Sati Joymati Road, Athgoan, Guwahati - 8	2662774/2662775 /2602738-39
45.	M/S Omega Eye Clinic & Research Centre	Lankeswar, Near Old Survey Jalukbari, Guwahati – 14	2572374
46.	M/S Satribari Christian Hospital	K.C. Choudhury Road, Guwahati – 8	2600051/2540193
47.	M/S Institute of ENT – Head & Neek Surgery & Research Centre	B.K. Kakati Road, Uluhari, Guwahati – 7	2460513
48.	M/S Arya Hospital	A.M. Road, Rehabari,	2606888/2606665

		Guwahati – 8	
49.	M/S Dr. S.C. Jain Maternity & Nursing Home	Ganeshguri, Janakpath, Guwahati – 6	
50.	M/S Guwahati Lions Eye Hospital	Lions Hospital Road, Rehabari, Guwahati – 8	2541235/2637423
51.	M/S Sanjivane Hospital	Maligoan, Guwahati – 12	2674892/893
52.	Guwahati Medical College Hospital	Bhangagarh, Guwahati	2529457, 2528417
53.	MMC Hospital	Panbazar, Guwahati – 1	2543998
54.	N.R. Rly Hospital	Maligaon, Guwahati	2570492
55.	Red Cross Hospital	Red Cross Road, Chandmari, Guwahati – 3	2665114

SECTION 15

CONCLUSION

The Shillong City Plan has been designed to serve the District Administration in efficient management of any emergency situation that may arise. It not only lays out the various activities that the different government departments and their officials have to carry out in the event of a disaster but also the disaster risk reduction activities that would be needed to prevent any such disaster. Therefore, this document could be referred by the district officials in carrying out of their normal administrative and developmental activities as well so that all of their activities have an inbuilt component of disaster management.

This document could also be referred to by the citizens of Shillong as it contains crucial aspects of family and household level preparedness for different kinds of disasters. This document will also provide the citizens with an idea as to how the District Administration would carry out disaster response activities in the event of a disaster and what would be expected of them.

This plan would also provide non-government agencies and international funding organizations with an idea as to where they could chip in with their resources and expertise to provide services related to disaster risk reduction or in the aftermath of an emergency.

Used in the right spirit, the Shillong City Plan can go a long way in building the disaster resilience of the city and its citizens as well as manage disaster events in a manner which minimizes the loss to life, property and livestock.

References

Government of India, 2001,**'Census of India, Meghalaya, Series 1991 and 2001'**

Government of Meghalaya, 2011, **'Master Plan of Shillong, 1991-2011'**

North Eastern Space Applications Centre, 2008, '**Satellite Based Inputs for Preparation of Shillong Disaster Management Plan',**

O/O The Deputy Commissioner Dhanbad, 2009, '**City Disaster Management Plan Dhanbad**' , accessed on 4th November 2012dhanbad.nic.in/undp/City%20Disaster%20Management%20Plan.pdf

Ghaziabad District Administration, 2013, **Ghaziabad City Disaster Management Plan**, accessed on 23rd November 2012 ghaziabad.nic.in/CDMP_GZB_2012-13.pdf

Delhi Disaster Management Authority, 2010, '**District Disaster Management Plan, *New* Delhi',** accessed on 10th November 2012 http://delhi.gov.in/wps/wcm/connect/7e6b21804b5296f3acf7ee3ba4f00dc7/Chapter+I.pdf?MOD=AJPERES&lmod=2072205402&CACHEID=7e6b21804b5296f3acf7ee3ba4f00dc7

Department of Relief and Rehabilitation, Government of Maharashtra, '**MumbaiDisaster Management Plan', accessed on 3rd December 2012** mdmu.maharashtra.gov.in/pages/Mumbai/mumbaiplanShow.php

Assam State Disaster Management Authority, '**Guwahati City Disaster Management and Response Plan'**, accessed on 14th December 2012 http://sdmassam.nic.in/download/gcdm_plan.pdf

Vijaywada Municipal Corporation, 2012, '**City Disaster Management Plan'** accessed on 6th January 2013 www.ourvmc.org/urrp/cdmp.pdf

Revenue Department, Gujarat, 2010, '**Disaster Management and Response Plan – Kheda'** accessed on6th January 2013

http://revenuedepartment.gujarat.gov.in/guj/districts/kheda/disaster_management_plan_11082010.pdf

City Disaster Management Cell, Municipal Corporation Shimla, 2012, **'City Disaster Management Plan- Shimla'**, accessed on19th January 2013 hpsdma.nic.in/disastermanagement/CDMP_MCShimla.pdf

Virtual University for the Small States of the Commonwealth (VUSSC), Commonwealth of Learning (COL)**, 'Introduction to Disaster Management'**

Federal Emergency Management Agency, 2004**, 'Non structural Earthquake Mitigation-Guidance Manual'**

International Federation of Red Cross, and Red Crescent Societies, 2011**, 'Public awareness and public education for disaster risk reduction:** A guide, accessed on 3rd February 2013 http://www.ifrc.org

Kayal J. R , Arefiev S. S, Barua S, Hazarika D, Gogoi N, Kumar A, Chowdhury S. N, Kalita S, 2006, **'Shillong plateau earthquakes in northeast India region: complex tectonic model',** accessed on 19th January 2013. **http://www.iisc.ernet.in/currsci/jul102006/109.pdf**

Miocene rise of the Shillong Plateau and the beginning of the end for the Eastern Himalaya, http://www.sciencedirect.com/science/article/pii/S0012821X0800071X

National Disaster Management Authority, Government of India, 2010, "**National Disaster Management Guidelines—Incident Response System"**

Shillong City Overview, http://www.census2011.co.in/census/city/187-shillong.html

United Nations Department of Safety and Security India and Bhutan Volume 2 Issue 2, February - March 2012

http://en.wikipedia.org/wiki/Shillong

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