ERP A.1 - EARTHQUAKE RESPONSE PLAN

I. PURPOSE

The purpose of this annex is to minimize, to the degree possible, human suffering and property damage from an earthquake, by providing guidelines for the effective management and coordination of involved agencies in response to an earthquake that occurs in, or significantly affects Massachusetts, all of which could have devastating effects on Boston University.

II. SITUATION/ASSUMPTION

Since the 18th century some of the strongest earthquakes recorded in the United States have occurred in the Eastern part of the country, and because of this history, there is the potential for a major earthquake to occur at some time in Massachusetts. One of the most intense of these historical earthquakes was centered off Cape Ann near Gloucester and occurred on November 18, 1755. It was estimated to be a 6.3 on the Richter scale. Several earthquake fault lines lie in Massachusetts. These are:

- The Northern Border fault running northeast/southwest roughly between Marblehead and Wrentham.

- The Bloody Bluff fault running roughly between the tip of Plum Island and Blackstone.

- The Clinton-Newbury fault running roughly between Salisbury and Douglas.

- The Wekepeke fault running roughly between Dunstable and Upton.

- The Connecticut Valley Border fault running roughly from Richmond, NH, through Warwick, MA. to Hampden, MA. and on into Somers, CT.

However, there is NO discernible pattern of previous earthquakes having occurred along these fault lines. The majority of the recorded earthquakes that have been centered in Massachusetts since 1755 have been scattered throughout Essex, Middlesex, and eastern Worcester counties with a few in
Southeastern Massachusetts and Cape Cod. Therefore, there is no evidence to support predictions that future earthquakes will necessarily occur along these fault lines. Nevertheless, it is a fact that earthquakes have occurred in many areas of Massachusetts and other parts of New England and New York and Canada, and they will probably occur in these areas in the future. The likelihood, however, is less for this part of the country than for California, the New Madrid fault area of Missouri, and Alaska.

Earthquakes in the Northeastern United States are unpredictable at this time and would strike without warning. It is also a fact that an earthquake occurring in the Northeastern U.S. would affect a much larger area than the same event in the West because ground motions attenuate more slowly in the East. Massachusetts, and the five other New England states are at equal risk to the earthquake hazard, and Boston could be seriously affected by a large earthquake occurring anywhere else in New England, New York, or Eastern Canada.

Earthquakes range in intensity from slight tremors to devastating shocks and may last from just a few seconds to several minutes; can occur in a series over several days and may be followed minutes, hours, or days later by aftershocks. They are commonly measured on the Richter Scale which ranges from 1.0 intensity on upward. Earthquakes measuring less than 3.0 are felt either very little or not at all by people; they are detected by seismographs and other sensitive instruments. Above 3.0 they become more apparent, causing dishes to rattle, and poorly secured objects may go flying. In the range of 5.0 and upward earthquakes become damaging or destructive to devastating in the high ranges and cause structural collapse, and injury, and death. Richter measurements for the earthquakes with which New Englanders are most familiar are:

- San Francisco (1906) - 8.3
- Mexico City (1985) - 8.1
- Armenia (1988) - 6.9
- Northern California, Bay Area (October, 1989) - 7.1
- Northridge (Los Angeles), California, (January 17, 1994) - 6.6
- Kobe, Japan (January 17, 1995) - 6.9

The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Most casualties result from falling
objects and debris because the shocks can shake, damage or demolish buildings and other structures. Earthquakes may also trigger landslides and generate tidal waves (although high tidal waves do not occur off the New England coast). Earthquake related injuries are caused by parts of buildings collapsing (chimneys, walls, plaster, falling bricks and light fixtures, flying glass, overturned furniture and appliances); by fires; by falling power lines; by flash flooding from ruptured dams; by chemical spills from damaged tanks, and by erratic behavior caused by panic. Also, critical municipal functions such as communications, transportation, medical treatment, and utility and water services are severely disrupted by a strong earthquake.

III. CONCEPTS OF OPERATIONS

A. General

Unlike blizzards, hurricanes, flooding, or some other disasters which approach gradually and escalate over hours and days, earthquakes strike suddenly and without warning and wreak their havoc in a matter of a few seconds or minutes. Although sometimes rumblings that are indicative of instability in a certain area of the earth are picked up by seismological instruments, it is unlikely that they will provide a ‘prediction’ of the time and place of a particular earthquake. An earthquake occurs and it is "over before you know what hit you" and before officials have had an opportunity to warn the public to make preparations and take cover. An earthquake affords emergency agencies, such as emergency management, no opportunity to take advantage of the lead time of the 'watch' and 'warning' status or the 'standby' phase of operations.

As soon as the occurrence of a major earthquake in or affecting the Boston University campuses has been confirmed, the Director of Emergency Response Planning will cause a notification for response by the appropriate BU Departments. At this time, the DERP will activate a Phase C of the Boston University Emergency Response Plan and commence actions to direct emergency operations, and begin to coordinate the services and resources necessary to save lives and property and restore the affected areas to a functioning condition.
B. Phases of Management

1. Mitigation

While University buildings constructed after 1975 meet the State Building Code for earthquake resistant construction, the majority of University properties were constructed prior to 1975 and are extremely vulnerable to earthquakes. These structures may be constructed of unreinforced masonry and sit on filled in land.

2. Preparedness

- Communications equipment and systems should be tested periodically and always kept in good working order.

- All other resources (equipment, facilities, vehicles, and procedures) should be checked and tested to ensure readiness.

- Periodic training should take place for emergency coordination and response personnel.

- Emergency response and management plan(s) should be well maintained, up-to-date, and easily accessible.

3. Response

Because it is likely that an earthquake would bring about one or more of several secondary disaster conditions, it is necessary that emergency agencies and personnel be prepared to respond to any of the following situations;

- Building collapse
- Flooding caused by broken pipes
- Power loss for an extended period of time
- Fires and/or explosions
- Hazardous materials mishaps
- Water contamination

Response actions must include activation of the EOC followed immediately by:

Dispatch of the ERT for

- Commencement of search and rescue activities.
- Commencement of medical response; triage and treatment of casualties.
- Commence a damage assessment
- Response to hazardous materials mishaps (spills/releases, explosions etc).
- Evacuation of people endangered by threat of building collapse, flooding, hazmat incident, etc.
- Animal control measures.
- Measures to prevent further injury and suffering caused by damaged electrical wires and power lines, gas lines, water pipelines, and other utility fixtures.
- Measures to prevent further injury and suffering caused by debris.
- Measures to obtain and transport temporary fuel, food, water, and other emergency supplies.
- Measures relating to the identification and disposition of the remains of deceased victims.

4. Recovery

The objective of recovery activities is to restore the University to a pre-event status in which people may carry on their normal everyday educational and research activities. To restore this University after being hit by a major earthquake to its pre-earthquake status could take months, even years, of rebuilding.

Recovery activities are:

- Restoration of all utilities.
- Decontamination of affected areas.
- Clean-up of debris
- Restocking of destroyed viruses, if necessary

IV. ASSIGNMENT OF RESPONSIBILITIES

A. BU Incident Commander

1. Declares a Phase C activation of the Boston University Emergency Response Plan.

2. In cooperation with the Director, EPR makes evacuation recommendations when and where necessary.

3. Working with Boston officials, including emergency management director, determines need for federal and/or state financial disaster aid, and authorizes applications for these funds.

B. Director, Emergency Management


2. Activates BU Command Center.

3. Coordinates response of all BU emergency services.

4. Makes recommendations to the Incident Commander regarding evacuation and other emergency procedures.

5. Provides situation reports to Boston Mayor’s Office of Emergency Management.

C. BU & NEIDL Public Safety

1. Assist in search and rescue activities.

2. Utilize communications under their jurisdiction (such as bullhorns and sound trucks), to provide warnings, instructions, etc. to those endangered by earthquake aftermath condition.

3. Assist in evacuation procedures.

4. Maintain surveillance to prevent security breaches
D. Boston Fire

1. Conduct search and rescue, if necessary
2. Fight fires
3. Utilize communications under their jurisdiction (such as sirens), to provide alert for EBS warnings and information.
4. Provide EMTs to work with Boston Emergency Medical Services in treatment of casualties.

E. Boston Emergency Medical Services

1. Provide basic (BLS) and advanced life support (ALS) treatment for the ill or injured
2. Conduct triage
3. Provide emergency ambulance transportation

G. Facilities Management and Planning

1. Coordinates equipment resources needed for evacuation, movement of emergency equipment, debris clearance, repair and other emergency related activities.
2. Clean debris.
3. Attends to damaged utility wires, lines, mains, and pipe and has responsibility to ensure that these fixtures do not cause further damage and injuries.
4. Repairs and restores utilities, water, sewage disposal, and other public services

I. Control

1. Provides damage assessment of communications, security and building automation systems.

J. BU ASC

1. Responsible for the care and control of animals
V. DIRECTION AND CONTROL

The Incident Commander is responsible for coordinating all earthquake emergency activities. He/she will activate and manage the BU Command Center and work in cooperation with representatives of all local operating emergency services and departments. He/she will supply situation reports to local officials during the emergency.

VI. ADMINISTRATION AND LOGISTICS

A. Records and Reports

Forms for Command Center management, message handling, and reporting are available at the BU Command Center. Forms for data collection and damage assessment and damage reporting are also found at the BU Command Center.

B. Resources

Local emergency services, such as Boston Police, Boston Fire, Boston EMS, PWD, and others who have disaster response and related responsibilities will maintain and provide equipment, personnel, and other resources as necessary to support emergency operations.

C. Training

The ERP through its training programs, provide disaster mitigation, preparedness, response, and recovery training programs addressing many aspects of handling all natural and technological disasters including earthquakes.

VII. PLAN DEVELOPMENT AND MAINTENANCE

The Director, EMD will be responsible for the development and maintenance of the earthquake section of the BU Emergency Response Plan.

IX. BIBLIOGRAPHY/REFERENCES

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Weston Observatory Staff, Weston, Mass.

X. ERP Revision History

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