SAFETY MANUAL

Boston Water and Sewer Commission

Organizational Diversity • 980 Harrison Avenue • 617.989.7364


HUDSON

TABLE OF CONTENTS

Boston Water and Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

Boston Water and Sewer Commission (the Commission) places a high value on the safety of its employees, subcontractors and the general public. The Commission is committed to providing a safe workplace for all employees and has developed this program for health and safety as a systematic means of involving management and employees in identifying and eliminating hazards that may develop during the performance of their duties. It is the basic safety policy of the Commission that no task is so important that an employee must risk injury or illness in order to get the job done.

Only through the commitment of every employee to recognize the importance of safety in the work place and to utilize safe work practices as a fundamental tool in completing each and every task, can the goal of an accident and injury free workplace be achieved.

Safety is a team effort. We must all work together to maintain a safe and healthy workplace.

/ Hwy Vitale

Henry F. Vitale
Executive Director

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

PERSONAL PROTECTIVE EQUIPMENT

PPE

The Boston Water and Sewer Commission requires all field personnel to wear Personal Protective Equipment (PPE). Additionally, any Commission employee not considered field personnel attending an active worksite should also wear proper PPEs (hard hat and vest).

Safety footwear, a safety helmet and reflective safety outer garment (yellow vest, tee-shirts, sweatshirts or jackets) are standard requirements and must be worn at all field work sites.

As work dictates, hearing protection, safety glasses or goggles, face shields and gloves may be required. Other safety equipment such as welders gloves, aprons, blankets, face and eye protection are required when performing "hot" work (welding, burning).

Safety Footwear

Safety boots or shoes can reduce the risk of injuries to toes and feet. Safety footwear is a standard requirement for all facility and field site operations. The Commission provides safety boots to all eligible employees.

Safety Helmets

The safety helmet (hard hat) is an important piece of personal protective equipment. Safety helmets are designed to protect the head from impact and penetration from falling objects and flying debris common at field site work areas. The safety helmet, with coordinated chin strap consists of a shell and suspension system that absorbs the shock of a blow. Helmets should be inspected regularly for dents, cracks, nicks, gouges, faded, dull or when they become brittle.. The suspension system should be inspected for torn straps, damaged head boards and other signs of wear. Helmets should be replaced when these signs become evident.

Safety Vests/Reflective Clothing

Class 2 and/or Class 3 ANSI Certified attire (vests, ¾ length jackets, waist jacket, hooded sweatshirt, tee-shirts, or lightweight rain gear) must be worn by all employees who are exposed either to traffic or to work vehicles and construction equipment when working in highway / road construction work zones. In these situations, employees' visibility is critical to their safety.

Eye Protection

The Commission offers safety goggles/glasses to employees to reduce the risk of eye injuries. Safety goggles/glasses are protective devices designed to fit the face immediately surrounding the eyes in order to shield the eyes from a variety of hazards. The Commission requires employees to wear eye protection when operating power tools, pavement breakers/jackhammers, or any type of equipment that may put them in danger of flying debris, particles or dust. Employees engaged in hot work (welding, burning) and those handling potentially hazardous substances are required to wear eye protection. All employees operating Catch Basin Machines,

Vactors and Jet Trucks are required to wear face shields. Face shields are not considered eye protection and must be worn in conjunction with primary eye protection (goggles/glasses).

Hearing Protection

Loud noises can have a lasting effect on hearing; the best method of protection from hearing loss is to avoid loud noises. The Commission offers two (2) types of hearing protectors: earmuffs and ear plugs. Ear muffs can be attached to the Commission issued safety helmet, while the ear plugs come in two separate pieces to block the employee's ear canal. These hearing protectors are designed not to impede vocal safety, but to filter out background noises. When noise levels are at or above 85 decibels, employees are required to use hearing protection devices. A useful "rule of thumb"—if you cannot hold a conversation in a normal speaking voice with a person who is standing at an arm's length (approximately 3 feet), the noise level may exceed 90 dBA

Hand Protection

Hands are protected by using the proper gloves for the job being performed. Work gloves are designed for specific jobs and offer protection accordingly. The Commission offers canvas gloves or general purpose work gloves and orange vinyl lined gloves for use during winter months or when handling wet material. Latex gloves are also supplied to Commission employees as a protective barrier or liner to be used under the canvas or vinyl gloves.

Protective Clothing

The Commission offers protective clothing such as Tyvek suits and rain gear to employees engaged in work that may expose them to harmful, wet or nuisance substances. The Tyvek suits offer head to toe protection and are discarded after use.

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

OFFICE SAFETY

Purpose

To ensure maintenance of a safe and healthy work environment for office personnel through adherence to safe work practices, exercising reasonable care and judgment in the performance of routine duties and minimizing the possibility for accidents through prompt reporting of potential hazards.

The topics covered in the Office Safety section of the manual include the following:

- Guidelines for Office Safety Housekeeping, Hazards, Slips, Trips and Falls
- Proper Lifting Techniques
- Office Ergonomics
- Office Furnishings and Accessories
- Workstation Positioning
- Guidelines for Office Safety

The Commission's Facilities Department ensures that office furnishings are arranged to provide unobstructed safe movement of employees and materials; comfortable climate and lighting conditions; janitorial services and other activities required to provide employees with a clean and safe office work environment. The following housekeeping guidelines have been established by the Department to ensure hazards are minimized in the office environment:

Facilities Department will:

- Maintain the building's heating, ventilating and air conditioning system to provide employees a comfortable and healthy work atmosphere.
- Maintain that chairs and office furnishings are in safe/reliable condition.
- Ensure office lighting is adequate and available: replace light bulbs and have additional lighting installed, as necessary.
- Maintain that office equipment and machines are in good condition to provide efficient operation.
- Ensure that file cabinets are secured.
- Ensure that spills are cleaned and fallen debris picked-up immediately.
- Place warning signs at doors that open into aisles and employee walkways.
- Ensure that electrical cords and phone cords do not cross walkways or otherwise pose a tripping hazard.

Safety in the office requires involvement from employees to reduce the potential of accidents in their work area. Accidents due to slips, trips and falls are significantly reduced, when employees practice

good judgement. The guide below notes the steps employees can take to reduce the potential for injury in their office environment.

Reduce Office Accidents

- Keep work areas neat and orderly.
- Ensure desk drawers and file cabinet drawers are closed when not in use.
- Close drawers slowly using the handle to avoid pinched fingers.
- Take care when sitting in chairs with wheels to prevent them from rolling when attempting to sit.
- Store supplies and materials on lower shelves below eye level.
- Take care when working with copying machines. When opening to troubleshoot, remember some parts may be hot.
- Unplug defective machines.
- Immediately report detected or potential hazards.

Lifting

Typical office work may not involve lifting large or especially heavy objects; however, it is important to follow the principles of safe lifting. Small light loads, (i.e. stacks of files, boxes or computer paper, books, etc.) can have a negative effect on the body when they are handled incorrectly. Before you pick up a carton or load, ask yourself these questions:

- Is this too heavy for me to lift and carry alone?
- How high do I have to lift it?
- How far do I have to carry it?

If you feel that lift is beyond your ability, contact your supervisor or ask another employee to assist.

Safe Lifting Steps

- Take a balanced posture: feet placed shoulder width apart when lifting something from the floor, squat close to the load.
- Keep the back in a straight position.
- Grip object with hand, rather than with your fingers. Draw the object close, holding elbows close to the body to keep load and body weight centered.
- Lift by straightening legs. Let the leg muscles, not the back muscles, do the work. Tighten stomach muscles to help support back. Maintain neutral back position as you lift.
- Never twist when lifting. When turning with the load, turn the whole body, feet first.

- Never carry a load that blocks your vision.
- To set the load down, use the same body mechanics designed for lifting.

Office Ergonomics

Ergonomics is the science that explores the relationships between the worker, the workplace and job design. The goal of ergonomics is to allow work to be done without undue physical stress on the person performing the job. Workstation design can have a big impact on office workers' health and well-being.

The Commission Headquarters building has been equipped with ergonomically sound furnishings to ensure employee comfort in offices and work-stations. Adjustable chairs have been selected to assist computer users to work comfortably and to accommodate the work surface and tasks performed.

Document holders are available for supporting documents at the approximate same plane as the computer monitor. A document holder may be placed on either side of the computer monitor or directly in front of the user (between the keyboard and monitor).

Foot rests are provided when feet cannot rest comfortably on the floor while seated at the workstation. Adjustable under-desk keyboard/mouse support trays are installed on desks where the work surface (too high or too shallow) cannot properly accommodate a keyboard/mouse and monitor.

Monitors that are too low can be raised using monitor risers or blocks.

Preventive measures that can reduce the potential for ergonomic related problems:

- Strive for and maintain good general health.
- Strive for and maintain fitness and flexibility.
- Avoid static postures such as sitting still for long periods of time throughout the day.

Whether sitting or standing, the correct working posture does not induce fatigue or discomfort unless it is maintained for long periods of time. One should shift positions often as needed to relieve any muscle fatigue.

Posture and seating positioning at the workstation is important to the comfort and safety of employees.

- Always sit up straight. Ensure your chair is adjusted to provide adequate support to your back.
- Place your feet flat on the floor or on a footrest. Lower legs should be approximately vertical and thighs should be approximately horizontal.
- Ensure there is at least one (1) inch of clearance between the top of your thighs and the bottom of the desk or table.
- Keep your wrists in natural position. They should not rest on the edge of the desk or table.

- Keep the front edge of your chair approximately four (4) inches behind your knees.

Lighting

The lighting around computer work stations should illuminate the work area without obscuring the Video Display Terminal (VDT) or causing glare. Position computer screens, blinds and pictures to reduce the glare during work hours (e.g., place the VDT screen perpendicular to the window).

LCD Monitors LCD images should be clear and well-defined. Adjust the screen's brightness, contrast and display size to meet your needs.

Place the monitors 18-28 inches away from your face. The center of the monitor should be approximately 15 to 25 degrees below your line of vision.

Keyboards

Position computer keyboards so that the angle between the forearm and upper arm is between 80 and 120 degrees. Place the keyboard in an area that is accessible and comfortable.

Wrist Support

Use wrist supports made of padded material. The support should allow you to type without bending your wrists.

Telephone

Use a headset or speakerphone when using the telephone for extended periods of time.

Climate

The quality of indoor air in offices and workplaces is important not only for employee comfort but also for their health. To ensure air quality, the Commission has the air tested yearly by an outside contractor. Climate comfort zone is a generally accepted range of thermal conditions under which people in a typical office environment will be comfortable.

The heating ventilation and air conditioning (HVAC) system at the Commission Headquarters building is designed to keep employees comfortable and healthy by controlling the amount of outside air added to the building’s atmosphere and filtering both incoming and re-circulated air to remove particulates and control the temperature. Ongoing maintenance of the building's system and its components ensures operational function to its intended design.

BOSTON WATER AND SEWER COMMISSION
HEALTH AND SAFETY MANUAL

GENERAL HEAVY EQUIPMENT OPERATIONS

GENERAL HEAVY EQUIPMENT OPERATION (APPLICABLE TO ALL HEAVY EQUIPMENT)

- Only fully trained, licensed and properly authorized personnel shall be permitted to operate Commission hoisting equipment and vehicles. The only exception is when a licensed employee's training requires them to operate equipment under the direction of a fully licensed and trained employee.
- Inspect vehicles at the beginning of each shift to ensure that the parts, equipment and accessories are in safe operating condition. Repair or replace any defective parts or equipment prior to use.
- Operators shall never leave the equipment while the engine is running. When leaving the equipment, the engine shall be completely shut down with all brakes secure. All hoisting equipment should have the buckets lowered or in the locked position.
- Do not operate vehicle in reverse with an obstructed rear view unless it has a reverse signal alarm capable of being heard above ambient noise levels or a signal observer indicates that it is safe to move.
- Vehicles loaded from the top (e.g., dump trucks) must have cab shields or canopies to protect the operator while loading.
- Ensure that vehicles used to transport workers have seats, with operable seat belts, firmly secured and adequate for the number of workers to be carried.
- Prior to permitting construction equipment or vehicles onto an access roadway or grade, verify that the roadway or grade is constructed and maintained to safely accommodate the equipment and vehicles involved.
- Do not modify the equipment's capacity or safety features without the manufacturer's written approval.
- Do not overload vehicles.
- Ensure that loads are balanced and are fully contained within the vehicle. Trim loads, when necessary, to ensure loads do not extend beyond the sides or top of the vehicle.
- Cover and secure loads before moving the vehicle.
- Use hearing protection when working around potential noise sources and when noise levels exceed 90 dBA. A useful "rule of thumb"—if you cannot hold a conversation in a normal speaking voice with a person who is standing at an arm's length (approximately 3 feet), the noise level may exceed 90 dBA.

- All Commission vehicles shall be inspected prior to leaving the property. All vehicle inspection sheets should be filled out properly and turned in at the end of the shift.

Forklift and Powered Industrial Truck (PIT) Operations

- Only handle loads within the rated capacity of the truck.
- Carry loads low.
- When necessary, travel in reverse so the driver/operator has a clear view of the path of travel.
- Ascend or descend grades slowly; when ascending or descending grades in excess of 10 percent, loaded trucks should be driven with the load positioned upgrade.
- Ensure that forklifts/PITs are not modified without the written approval of the manufacturer.
- When left unattended, ensure that the load-engaging means are fully lowered, controls are neutralized, power is shut off, and brakes are set.
- Maintain a safe distance from edges, including those of ramps and platforms.
- Ensure that dockboards or bridge plates are capable of withstanding the load imposed and that they are properly secured before the vehicle is slowly and carefully driven over it.
- Only use safety platforms approved by the manufacturer when lifting personnel. Ensure that the lifting platform is firmly secured to the lifting carriage and/or forks before lifting personnel.
- Always wear your safety belt.

General Operations of Cranes/Derricks

The operator of the aforementioned devices shall perform his/her duties as follows:

- Equipment shall be operated by a qualified operator or trainee that is under the direct supervision of the qualified operator. Exception: Maintenance and test personnel and inspectors, when in the performance of their duties, shall be allowed access only after permission has been granted by the operator.
- The operator, when operating the equipment, shall maintain full attention on the task being performed (e.g., no use of headsets, music, etc.).
- The operator shall ensure that hand signals used during the lift are understood and followed by all involved.
- No loads in excess of the rated capacity shall be lifted, unless for test purposes, and the test shall be an engineered lift.

- Before leaving the crane or carrier unattended, the operator shall land any load, place the controls or master switch in the off position and open the main line device of the specific crane or carrier.
- The main line disconnect shall not be closed until the operator has made sure that no one is on or adjacent to the crane or carrier.
- If the crane or carrier has been locked out or tagged out, the operator shall not remove the lock or tag, unless the lock or tag has been placed there by the operator. To remove someone else's lock or tag refer to the State of Massachusetts Lockout/Tagout program.
- For cab-operated equipment, make sure that all controls are in the “off” position prior to closing the line-disconnect.
- During use of cab-operated equipment, if the power should fail, the operator shall turn off all controllers. Before restarting, the operator shall check the motion controls for proper direction to ensure controls are in the neutral position.
- Persons boarding or leaving cab-operated equipment shall do so at the designated point of access or egress.

Attaching the Load

- Hoist wire shall be free of kinks or twists.
- Hoist wire shall not be wrapped around the load.
- The load shall be attached to the load block.
- Prior to lifting the load, the operator shall make certain that the load, sling, attachments, lifting devices and the load block are unobstructed.
- Chains should not be used for hoisting. Wire Rope Slings, also known as bridles are required when hoisting materials.

Moving the Load

- The person responsible for directing the lift shall make sure that the load is properly secured, balanced and positioned in the sling or other lifting device.
- The person responsible for directing the lift shall make another visual inspection of the hoist chain or rope to make sure there are no kinks or twists.
- The load block shall be brought over the load in a manner that will prevent swinging when lifting the load. During use of cab-operated equipment, if the power should fail, the operator shall turn off all controllers. Before restarting, the operator shall check the motion controls for proper direction to ensure controls are in the “neutral” position.

- The wire shall be inspected to ensure that it is properly seated in the chain sprocket or drum groove.
- Lift equipment shall not be used for side pulls.
- The operator shall not move the load while a person is on the load or hook.
- The operator shall avoid lifting the load over people.
- If the load being lifted approaches the rated load to be handled, the operator shall test the brakes by lifting the load a few inches and applying the brakes.
- The load shall not be lowered below a point where there are less than two wraps of wire on the hoisting drum, unless a lower limit device is provided. If a lower limit device is provided, no less than one wrap shall remain.

Parking the Load

- The operator shall not leave a suspended load unattended.
- The load block of the hoist shall be raised above head level when not in use.

Hand Signals

- Hand signals shall be used unless the participants of the lift are equipped with telephones, radios or other equivalent means of communication.

Backhoe Operations

- Thoroughly review and understand information provided in the backhoe operator's manual with particular attention given to descriptions of safety procedures.
- Always perform a pre-shift backhoe inspection, including; checking fluid levels, lights and signals, tires, hydraulic cylinders/lines, loader bucket/excavator connections and guards and shields.
- Inspect backhoe for worn or loose parts such as lynch/cotter pins or lug nuts.
- If a backhoe fails the pre-shift inspection, notify your supervisor and remove the backhoe from service by attaching a red tag that states "DO NOT USE." Complete red tag with appropriate information.
- Before starting and while operating a backhoe, look for people or obstructions in the vicinity of the backhoe.
- Employees working within an area where a backhoe is operating must wear flagging garments (i.e., orange/yellow vests), a hard hat, steel-toed boots and long pants.
- Never carry passengers on a backhoe.

- Prior to starting, learn the locations of underground and overhead utility lines, ditches, stumps, boulders and other hazards or obstructions in the work area.
- Always extend the backhoe stabilizers prior to starting an excavation task.
- Never exceed the engine, excavator or lift capacities of the backhoe.
- Always swing the backhoe arm uphill when excavating on a hillside.
- When transporting material in a loader bucket, keep the loader bucket as low to the ground as possible to maintain backhoe stability.
- Only raise the loader bucket for the purpose of dumping material.
- Reduce speed when turning, crossing slopes or driving on rough, slick or muddy surfaces.
- Only dismount (or mount) a backhoe when the engine is shut off.
- Never adjust or work on a backhoe unless the engine is shut off and hydraulic pressure has been "deenergized".
- In order, backhoe shutdown procedures are: (1) turn off the engine; (2) lower the loader bucket and backhoe arm; (3) set the parking brake.

Vacuum Truck

All personnel must be:

- Trained in the safe operation of the vacuum equipment.
- Familiar hazards of the petroleum products, by-products, wastes and materials being transferred, aware of relevant government and facility safety procedures and emergency response requirements.
- Trained in the use of required PPE for the products they are handling.
- All personnel shall leave the vacuum truck cab during loading and off-loading operations.
- Trained in the requirements of confined spaces if they have to enter tanks, vessels, manholes, the tank of the vacuum truck, etc.
- Vacuum trucks shall not enter into tank dike area until such areas have been checked/monitored and rendered safe.
- Vacuum trucks' cargo tanks shall be depressurized.
- Vacuum truck operators must be aware of the effect of speeds, turns and the changing center of gravity.

- Vacuum truck operators shall maintain proper distances when operating vacuum trucks inside facilities with restricted clearances.

Sewer Jet Truck

- Safety goggles should always be worn to protect the eyes from a high pressure jet of water. Water pressure above 2,000 PSI requires a full face shield.
- When starting a jetting job, it is extremely important to remember that a jetter hose must be placed into the pipe a minimum of five feet before the high pressure pump is engaged. If this is not done, the jetter hose may exit the pipe prematurely.
- The water pressure must also be turned off when the jetting hose and nozzle come within a minimum of five feet from the pipe opening when retrieving the hose. Otherwise there is the same risk of the hose exiting the pipe under full pressure and causing injury.
- Employees monitoring the upstream and/or downstream manholes must be aware of jetting operation, as the jetter hose may exit the manhole.

BOSTON WATER AND SEWER COMMISSION

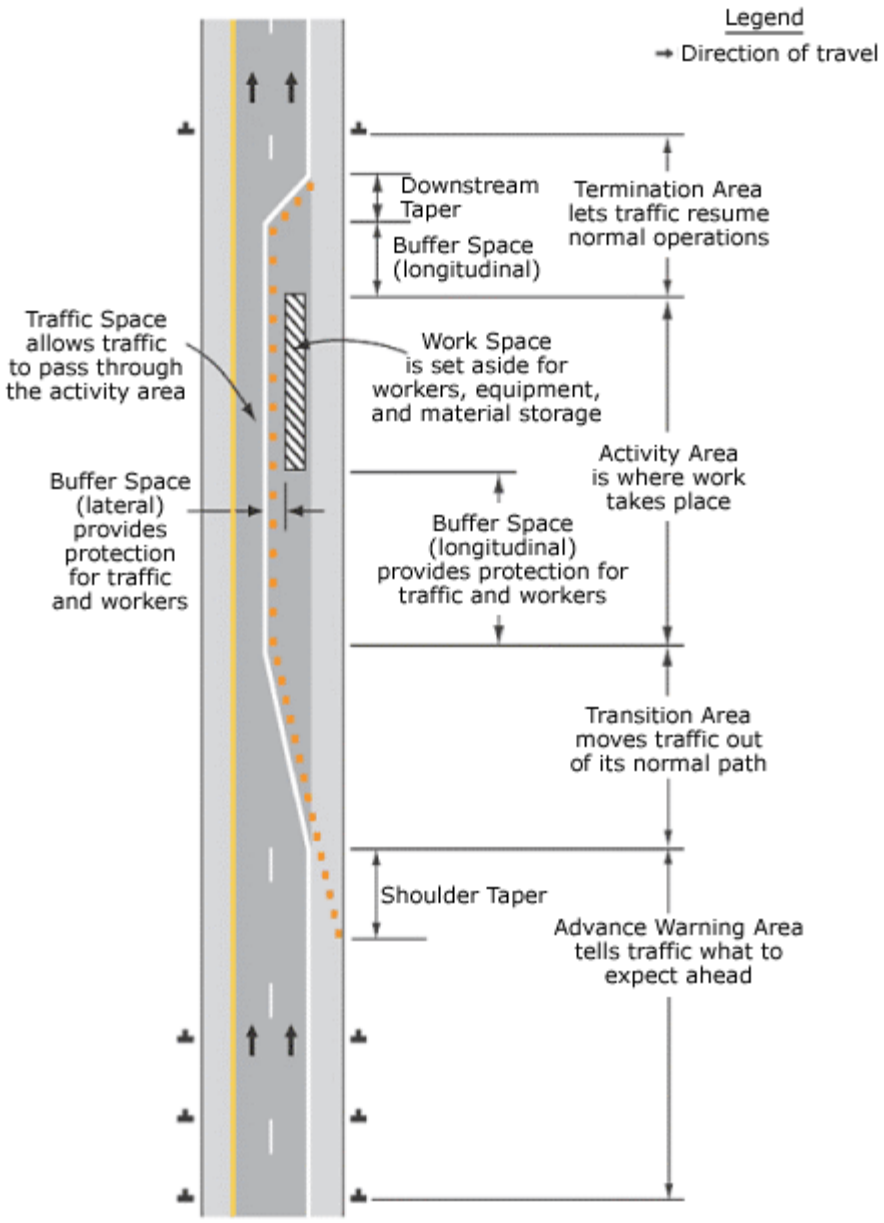
HEALTH AND SAFETY MANUAL

TRAFFIC MANAGEMENT

- Prior to any work being performed, a Supervisor or Manager must determine if a Boston or State Police Detail is required to protect the safety of Commission Employees and the General Public.
- Place “sidewalk closed signs” in areas with advance notice to all disabled pedestrians the ability to cross the street safely.
- Place the “BWSC Worksite” barricade at the start of the work zone.
- Limit access, barricade or set up controlled access zones where the equipment will be used; for equipment that rotates and/or carries/dumps loads, create an access zone that extends beyond the maximum rotation/swing radius of the equipment and/or beyond the area where loads will be carried/dumped.
- Establish traffic control patterns (e.g., cones, barrels, barricades) in work areas.
- Use spotters where visibility is limited.
- Do not drive in reverse gear with an obstructed rear view unless the vehicle has an audible alarm or a signaler is used.
- Ensure that spotters and heavy equipment operators have communications equipment or agree on and use hand signals.
- Commission employees should make eye contact with heavy equipment operators before proceeding near equipment or operating areas.
- Provide barricades around excavations and structures such as debris reduction observation towers.

The following is an example of a Temporary Construction Work Zone:

Figure 1. Component Parts of a Temporary Traffic Control Zone



BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

TRENCH EXCAVATION

Purpose

In order to protect the safety and health of all employees who are required to perform excavating, trenching and shoring, the Boston Water and Sewer Commission ("BWSC") has established this safe work practices written program.

The purpose of this written program is to ensure that personnel hazards are minimized during excavating, trenching and shoring work and that Commission-wide compliance is achieved under the requirements of Massachusetts General Laws, Chapter 149, Section 129A, "Shoring Trenches for Local Governments; Graves Excepted"

This written program has been developed with guidance set forth by the Occupational Safety and Health Administration ("OSHA") Standard 29 CFR 1926 Subpart P- Excavations.

Scope

This written program applies to all excavations that are dug to a depth of five feet (5'-0") to a maximum depth of fifteen feet (15'-0").

Excavations that are deeper than fifteen feet (15'- 0") or any excavation requiring special consideration shall be evaluated by a Registered Professional Engineer. At a minimum, the Professional Engineer shall provide a detailed, stamped, drawing of the protective shoring system to be utilized. This drawing shall remain on-site for the entire time that the excavation is open. All other relevant parts of this program shall apply.

This program does not apply to excavations made in stable rock.

Program Administrator

The Commission's Director of Health and Safety is the overall excavating, trenching and shoring program coordinator who is responsible for administration of this procedure Commission-wide.

The Director of Health and Safety, (hereafter termed the "Program Administrator"), additionally provides periodic excavating, trenching and shoring directives to all Commission departments to ensure uniform implementation and enforcement of this written program.

Definitions

Accepted Engineering Requirements (or Practices) - Those requirements or practices which are compatible with standards required by a Registered Architect, a Registered Professional Engineer or other duly licensed or recognized authority.

Actual Slope- The slope to which an excavation face is excavated.

Safe Slope- The greatest angle above the horizontal plane at which a material will lay without signs of distress.

Bank - A mass of soil rising above a digging level.

Belled Excavation - A part of a shaft or footing excavation, usually near the bottom and bell-shaped, (i.e., and enlargement of cross-section above).

Braces (Trench) -The horizontal members of the shoring system whose ends bear against the uprights or stringers.

Competent Person - A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions of an excavation work procedure which are unsanitary, hazardous or dangerous to employees and has been given the authorization from the Commission to take prompt corrective measures to eliminate such hazards. Responsibilities of a Competent Person are further defined herein.

Distress -The soil condition where a cave-in is imminent or is likely to occur. Evidenced by the appearance of cracks in the face of or adjacent to an open excavation; the slumping of material from the face or bulging of material from the bottom of an excavation; the spalling of material from the face of an excavation; and the appearance of small amounts of material suddenly separating from the face of the excavation and trickling down into the excavation.

Excavation - Any man-made cavity or depression on the earth's surface, including its sides, walls or faces formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, excavation may become a trench.

Hard Compact Soil - All earth materials not classified as running or unstable.

Kickouts - Accidental release or failure of a shore or brace.

Maximum Allowable Slope - The steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins and is expressed as a ratio of horizontal distance to vertical rise (H:V).

Sheet Pile - A pile or sheeting that may form one (1) of a continuous interlocking line, or a row of timber, concrete, or steel piles driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

Short-Term Exposure - A period of time less than or equal to twenty-four (24) hours that an excavation is open.

Sides (Walls or Faces) - The vertical or inclined earth surfaces formed as a result of excavation work.

Slope - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.

Stringers (Wales) - The horizontal members of a shoring system whose sides bear against the uprights or earth.

Trench - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width but the width of a trench is not greater than 15 feet.

Trench Jack - Screw or hydraulic type jacks used as crossbracing in a trench shoring system.

Trench Shield - A shoring system composed of steel plate and bracing, welded or bolted together, which supports the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

Unstable Soil - Earth Material, because of its nature or the influence of related conditions cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

Uprights -The vertical members of a shoring system.

Responsibilities

Management shall provide its employees with all needed equipment, training and supervision in order to comply with this work practice.

Supervisors shall ensure DIG-SAFE(811) is contacted, assign Competent Persons, monitor for compliance and select appropriate protective systems.

Competent persons shall inspect the work site for existing or predictable hazards in the surroundings or working conditions, (i.e. heavy traffic, gas lines); recommend necessary changes to the selected protective system; inspect the excavation prior to workers intially entering the excavation, at the beginning of every work shift, and after all subsequent mechanical digging; check pumps and other controls necessary to prevent water accumulation; remove workers if evidence of a possible cave-in, failure of a protective system, or other imminent hazards are observed.

Employees shall enter excavations initially, only after an excavation entry is authorized by the assigned Competent Person. Employees shall immediately exit the excavation when directed by the Competent Person, the working foreman, equipment operator, or when it is unsafe to continue work within the excavation, (i.e. failure of protective system, water accumulation, etc.).

Equipment Operators shall excavate only when all employees are safely protected, (i.e. inside a shielded system or at a safe distance outside an excavation), adjacent structures have been stabilized and identified utilities have been reasonably located. Excavation equipment shall be kept at least ten (10) feet away from live, overhead electrical transmission lines.

Roadway Safety

Employees shall observe all BWSC safe work practices for roadway work area protection in which they have been trained. Employees shall wear all personal protective equipment deemed necessary by management, including warning vests marked with or made of reflectorized or high-visibility material, hard hats, and safety shoes.

Prior to Excavation

Supervisors or Competent Persons shall contact DIGSAFE, utility companies or property owners to determine the exact location of underground installations in the area.

All limits of excavations shall be laid out by a Supervisor or a Competent Person prior to the commencement of work. The layout shall be marked in paint, indelible marker or by batter boards.

Trees, boulders, and other surface encumbrances, located so as to create a hazard to employees involved in excavation work, shall be removed or supported as necessary to safeguard employees.

Work Area Protection

Walkways and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.

If planks are used for raised walkways or sidewalks, they shall be laid parallel to the length of the walk and fastened together against displacement. Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping. Guardrails must be provided if there are walkways or bridges crossing over an excavation.

Excavated material shall be piled no closer than two feet (2') from the edge of excavations and in piles no greater than two feet (2') in height. Piles should be kept outside the 1.5.1 danger zone if possible and if not the competent person as well as the crew should pay special attention to signs of distress.

Excavations shall be protected when work is suspended for any prolonged period, (i.e. overnight. weekends). This protection may include: barriers, plates or other suitable solutions as approved by the Commission.

Employees shall not be permitted under loads handled by power shovels, derricks or hoists. Employees shall be required to stand away from any vehicle being loaded. Employees shall not be allowed to work in the excavation above other employees unless the lower level employees are adequately protected.

Inspections

Employees shall continuously inspect for the presence of underground utilities while the excavation is being completed. When the excavation approaches the estimated location of such a utility, the exact location shall be determined, and when the utility is uncovered, proper supports shall be provided for the existing utility.

The excavation area, including all adjacent structures, shall be inspected continuously and on a daily basis, for signs of collapse, failure of protective systems, or other hazardous conditions. If the stability of the excavation or adjacent structures is endangered, additional shoring, bracing or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Excavations shall be inspected after every rainstorm or other hazard-increasing occurrence (i.e. blasting), and protection against slides and cave-ins shall be increased if deemed necessary.

Entry/Egress

All employees shall enter excavations by means of a ramp or ladder. Ladders shall be placed less than twenty-five feet (25') horizontally apart and on both sides of obstructions greater than four feet (4’) in height (as measured from the bottom of the excavation). Ladders shall be manufactured for commercial use and be made of appropriate composite materials if contact with electricity is predictable.

Water Accumulation

Employees shall not be permitted to work in excavations where water has accumulated or is accumulating unless adequate precautions have been taken. Water may be controlled by pumps or drains that are sized adequately to control accumulation. Excavation bottoms shall be stoned as directed by the Competent Person or Working Foreman.

Environmental Conditions

An approved four (4) gas monitor shall be continuously used while employees are in an open excavation where a hazardous atmosphere exists or could reasonably exist. Employees shall leave an excavation immediately when an alarm condition occurs and shall not re-enter until authorized by the assigned Competent Person. Worker controls such as respirators or ventilation shall only be used when approved by the Program Administrator. Emergency rescue equipment must be readily available and must be attended when hazardous atmospheric conditions exist or may develop.

Soil Classification

For the purposes of BWSC excavations, it shall be assumed that all soils are Type C as described in OSHA 29 CFR 1926 Subpart P, Appendix A, unless otherwise determined by a Registered Professional Engineer who provides a detailed and certified report (bearing his/her stamp or seal) on the soil conditions.

Type C Soil is cohesive soil with an unconfined compressive strength 0.5 tons per square foot or less. Type C Soils include: granular soils such as gravel, sand and loamy sand; submerged soil; soil from which water is freely seeping; submerged rock that is not stable; or material in a sloped, layered system where the layers dip into the excavation at a slope of four (4) horizontal to one (1) vertical or steeper.

Protective Systems

The Commission shall protect its employees from the hazards associated with cave-ins during an excavation by an adequate protective system. Protective system options may include:

• Proper Sloping or benching of the sides of the excavation; or

• Timber or aluminum hydraulic shoring to support the sides of the excavation; or

• Shields placed between the side of the excavation and the work area. All systems shall be erected from the top down and removed from the bottom up and in accordance with manufacturers' requirements. ·

Sloping or Benching

Sloping or benching designs shall be consistent with OSHA 29 CFR 1926 Subpart P, Appendix B and as further defined herein. If sloping or benching is used to protect employees from cave-ins and soil classification is not made, (i.e., Type C Soil), then the sides of the excavation can be sloped to an angle not steeper than 1-1/2:1 (horizontal: vertical). .Benching is not allowed in Type C soil.

Sloping or benching for excavations greater than 15 feet in depth shall be designed by a Registered Professional Engineer. If an engineered sloping or benching system is utilized, a detailed drawing and design of the system, stamped by a Registered Professional Engineer, shall be maintained on-site at all times while the excavation is open.

Timber Shoring

Timber shoring protective systems shall be consistent with OSHA 29 CFR 1926 Subpart P, Appendix C and as further defined herein. If timber shoring is used as a method of protection from cave-ins and soil classification is not made, (i.e., Type C Soil), then the shoring system configuration shall be as required by Table 1 (See Appendix).

Alternately, other timber shoring system configurations or timber shoring for excavations greater than 15 feet in depth shall be designed and stamped by a Registered Professional Engineer. If an engineering system is utilized, a detailed drawing and design of the system, stamped by a Registered Professional Engineer, shall be maintained on-site at all times while the excavation is open.

Aluminum Hydraulic Shoring

Aluminum hydraulic shoring protective systems shall be consistent with OSHA 29 CFR 1926 Subpart P, Appendix D and as further defined herein. The use of any aluminum hydraulic shoring system as a method of protection from cave-ins shall be based upon the manufacturer's tabulated data and shall conform to the manufacturer's specifications, recommendations and limitations. A copy of the manufacturer's specifications shall be kept on-site while the excavation is open.

For excavations greater than 15 feet in depth or for alternative design options, aluminum hydraulic shoring systems shall be based on tabulated data approved by a Registered Professional Engineer. A copy of these design requirements including tabulated data and recommendations will be maintained on-site at all times while the excavation is open.

Shields

Trench shield protective systems shall be consistent with OSHA 29 CFR 1926 Subpart P, Appendix E and as further defined herein. The use of any trench shield system as a method of protection from cave-ins shall be based upon the manufacturer's tabulated data and shall conform to the manufacturer's specifications, recommendations and limitations. A copy of the manufacturer's specifications for the trench shield protective system shall be kept on-site while the excavation is open.

For excavations greater than 15 feet in depth or for alternative design options, trench shield protective systems shall be based on tabulated data approved by a Registered Professional

Engineer. A copy of these design requirements, including tabulated data and recommendations, will be maintained on-site at all times while the excavation is open.

Materials and Equipment

Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function. Manufactured materials and equipment shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer and in a manner that will prevent employee exposure to hazards.

When materials or equipment that is used for protective systems is damaged, the Competent Person shall examine the materials or equipment and evaluate its suitability for continued use. If the Competent Person cannot assure the materials or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service. A Registered Professional Engineer shall evaluate and approve the structural integrity of all such material and equipment before being returned to service.

Hand Digging

- Wear a hard hat when working in or around excavations.
- Use only tools that are sharp and in good condition.
- Keep safe distance from other workers to avoid striking them with tools.
- Do not jump into an excavation. If the excavation is shallow, sit on the shoulder and slide in.
- In excavations 4ft. deep or more, provide adequate means of an exit ladder. Locate ladders every 25ft. Ladders should be extended from the bottom of the excavation to at least 3ft. above the top. Before climbing out of an excavation, look all ways for traffic. The Competent Person will determine the need for access at depth less than 4 feet.
- Do not place excavated material closer than 2ft. from the edge of an excavation. Keep all tools, working materials and loose objects orderly and away from the excavation shoulder. Continue to monitor the surcharge weights and keep them out of the danger zone if possible. If not, then assure they do not exceed the maximum allowance.
- Keep tools, equipment and excavated materials out of open traffic lanes.
- When possible, keep the spoil bank and/or vehicles between workers and traffic.

- Provide and maintain all necessary barriers, temporary walks, warning signs, flags, flares and lights to protect workers, vehicles and pedestrians.
- Take all necessary measures to prevent accidents to personnel and damage to equipment.
  .
- If walls of an excavation contain glass, wire or other sharp objects, carefully remove them.
- Use extreme caution to avoid striking electric or telephone conduits, gas lines, or other substructures, particularly when using a pick, sharpshooter or air gun. Locate other utility installations before starting work.
- Require workers to wear adequate eye, ear and foot protection when using a jackhammer or when exposed to flying particles or falling objects.
- Frequently inspect the sides and rims of all open excavations to guard against cave-ins. Operate earth-moving equipment from a position that will not endanger personnel or property by a cave-in due to vibration, stress or dead weight.
- When resuming excavation after heavy rains or freezing weather, inspect all banks for cracks. This may indicate earth movement and the probability of cave-in.
- Always face machinery such as clamshells, backhoes or trenching machines; and keep a safe distance (stay beyond one shovel length away from the sweep of buckets or extended booms). If you cannot keep a safe distance, make eye contact with the operator to make sure that they know you are there. Always have an escape route when working around equipment.

Posting Barricades and Warning Signs

Whenever work is being performed in a public area, an overriding concern must prevail; the safety of the public and all workers. Therefore it is of the utmost importance to separate the work and traffic areas to maintain and promote safety during work operations. Placement of barricades should be outside of any potential cave in area.

- Place advance warning, instructional signs, barricades and cones well ahead of the construction area to warn motorists and pedestrians of the area, and safely take them through and past it.
- Protect the work area with barricades and barriers.
- During periods of reduced visibility, use adequate lighting.

- When work is in suspended, place adequate barriers, barricades, flashing lights and signs to warn and divert traffic.
- All personnel should wear protective clothing, including hard hats and high visibility traffic vests.

Open Trenches "Jackie's Law"

According to the Massachusetts Department of Public Safety, "Jackie's Law" is designed to prevent the general public from falling into an unattended trench and suffering an injury or fatality.

This regulation — which does not modify or supersede existing OSHA Excavation Standards — defines a trench as any excavation deeper than three (3) feet, with less than fifteen (15) feet between soil walls as measured from the bottom.

It mandates that all such trenches must be attended, covered, barricaded, or backfilled. Covers must be road plates at least three-quarters of an inch thick. Barricades must be fences at least six feet high, with no openings greater than four inches between vertical supports and all horizontal supports required to be located on the trench-side of the fencing.

All excavators must get a permit for each trench site from the local licensing authority for excavation work on a public way or private property within that municipality.

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

CONFINED SPACE ENTRY

Purpose

In order to protect the safety and health of all employees who are required to enter confined spaces, the Boston Water and Sewer Commission ("BWSC") has established this written Permit-Required Confined Space Entry Program. The purpose of this written program is to ensure that hazards are eliminated and/or minimized during confined space entries performed by Commission personnel.

Scope

All confined space entries conducted by BWSC employees, regardless of ownership, purpose or nature of the work, shall be done as described by this written program's safe work procedures. All employees entering a confined space should be familiar with all manuals for the equipment they will be using.

Program Administrator

The BWSC Safety Department is the Program Administrator for the Permit-Required Confined Space Entry Program and is responsible for administration of the program Commission-wide.

Definitions

Acceptable Entry Conditions - The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attached Entry - A confined space entry completed with all entrants continuously attached to an approved fall protection and retrieval system.

Attendant - An employee stationed outside one (1) or more confined spaces that monitors the authorized entrants and who performs all attendant's duties assigned in the Commission's permit-required confined space program further described herein.

Authorized Entrant - An employee who is authorized by the Commission to enter a permit-required confined space and who performs all authorized entrant's duties assigned in the Commission's permit-required confined space program further described herein.

Confined Space - A space that:

(1) Is large enough and configured so an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit, (i.e., tanks, vessels, storage bins,; and

(3) Is not designed for continuous employee occupancy.

Emergency - Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit-required confined space that could endanger entrants.

Engulfment - The surrounding and effective capture of a person by a liquid or finely-divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.

Entry Permit - The action by which a person passes through an opening into a permit-required confined space. Includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit- The written or printed document that is provided by the Commission to allow and · control entry into a permit-required confined space and contains all of the information specified further herein.

Entry Supervisor - An attendant who remains at the confined space site, (i.e., supervisor, foreman, crew leader, etc.), who has the authority to direct or control other employees. Responsibilities include determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, authorizing entry and overseeing entry operations and performing all authorized entry supervisor's duties assigned in the Commission's permit-required confined space program further described herein.

Hazardous Atmosphere - An atmosphere that may expose employees to the risk of death, disability, impairment of ability to self-rescue, (i.e., escape unaided from a permit space), injury, or acute illness from one (1) or more of the following causes:

1. Flammable gas, vapor or mist in excess of 10 percent of its lower explosive limit ("LEL");
2. Airborne combustible dust at a concentration that meets or exceeds its LEL;
3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in OSHA 29 CFR 1910, Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, and which could result in employee exposure in excess of its dose or permissible exposure limit; and
5. Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work Permit - The Commission's written authorization to perform operations, capable of providing a source of ignition, (i.e., riveting, welding, cutting, burning and heating).

Immediately Dangerous To Life Or Health (IDLH) - Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit-required confined space.

Inerting- The displacement of the atmosphere in a permit-required confined space by a non-combustible gas, (i.e., nitrogen), to such an extent that the resulting atmosphere is noncombustible. (Note: This procedure produces an IDLH oxygen-deficient atmosphere.)

Isolation - The process by which a permit-required confined space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes or ducts; a double block and bleed system; lock or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Linebreaking - The intentional opening of a pipe, line or duct that is or has been carrying flammable, corrosive or toxic material, an inert gas or any fluid at a volume, pressure or temperature capable of causing injury.

Non-Permit Required Confined Space - A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen Deficient Atmosphere - An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen Enriched Atmosphere - An atmosphere containing more than 23.5 percent oxygen by volume.

Permit Issuer - The BWSC designated person who authorizes the confined space entry work but is not necessarily present at the confined space work site.

Permit-Required Confined Space - A confined space that has one (1) or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an entrant;
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

4. Contains any other recognized serious safety or health hazard.

Permit Required Confined Space Program - The Commission's overall program for controlling, and where appropriate, for protecting employees from permit space hazards and for regulating employee entry into permit spaces.

Permit System -The Commission's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited Condition - Any condition in a permit- required confined space that is not allowed by the permit during the period when entry is authorized.

Rescue Service - The personnel designated to rescue employees from permit-required confined spaces.

Retrieval System -The equipment used for non-entry rescue of employees from permit-required confined spaces, including a retrieval line, chest or full body harness, wristlets and a lifting device or anchor.

Special Entries - For purposes of this program refers to a confined space permit entry where the entrant(s) is required to walk a distance from the point of entry to perform work.

Testing - The process by which the hazards that may confront entrants of a permit-required confined space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit-required confined space.

Identification of Permit-Required Confined Spaces

The Commission shall evaluate all potential workplace locations to determine if any spaces are Permit-Required Confined Spaces. Permit-Required Confined Spaces at the Commission may include, but are not limited to:

- Pipe Systems
- Manholes
- Pump Stations
- Meter Pits and Vaults
- Excavations

Should any of the workplace locations contain Permit-Required Confined Spaces, the Commission shall inform all exposed employees by posting danger signs (wherever possible) or by other equally effective means, of the existence, location and danger posed by the permit

spaces. Posted signs shall be prominently displayed and read, "DANGER- CONFINED SPACE-ENTER BY PERMIT ONLY" or by using other similar language. The Commission shall take effective measures to prevent unauthorized entry into all Permit-Required Confined Spaces.

The Permit System

Before any entry to a confined space is attempted, the Authorized Entry Supervisor shall document that the procedures and practices necessary for safe permit space entry operations have been developed and implemented, including, but not limited to, the following:

- Specifying acceptable entry conditions;
- Isolating the permit space;
- Purging, inerting, flushing or ventilating the permit space as necessary to eliminate or control atmospheric conditions;
- Providing pedestrian, vehicle or other barriers as necessary to protect entrants from external hazards; and
- Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

Before entry begins, the Entry Supervisor identified on the permit shall sign the Entry Permit to authorize entry, confirming that acceptable entry conditions are present.

The completed permit shall be available at the time of entry to all authorized entrants, by posting at the entry portal or by any other equally effective means; so that the entrants can confirm that pre-entry preparations have been completed.

The duration of the permit may not exceed the time required to complete the assigned tasks or job as identified on the permit. The Entry Supervisor shall terminate entry and cancel the entry permit when:

- The entry operations covered by the entry permit have been completed; or
- A condition that is not allowed under the entry permit arises in or near the permit space.

The permit system shall include notification of the confined space entry by a phone call to the BWSC Operations Center. The notification shall include the location and time of entry and the approximate length of time required to complete the job. A final phone call shall be made to notify when the confined space has been exited and/or when the permit has been canceled.

The canceled permit must be submitted to the permit issuer at the end of the work shift for review and forward to the Safety Office.

The Program Administrator shall retain each canceled entry permit for at least one (1) year to facilitate the regulatory review of the permit-required confined space program. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the permit-required confined space program can be made.

Entry Permit

The Entry Permit documents compliance with this safe work practices program and authorizes entry into permit-required confined space. The permit shall identify the following:

- The permit space to be entered:
- The purpose of the entry;
- The date and the authorized duration of the entry permit;
- The name of the Permit Issuer authorizing the confined space work;
- The authorized entrant(s) within the permit space, by name, as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrant(s) are inside the permit space;
- The personnel, by name, currently serving as attendants;
- The individual, by name, currently serving as entry supervisor, with a space for the signature of the entry supervisor who originally authorized entry;
- Any hazards of the permit space to be entered;
- The measures used to isolate the permit space and to eliminate or control permit space hazards before entry; (Note: These measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating and flushing permit spaces.)
- The acceptable entry conditions;
- The results of initial and periodic tests performed, (i.e., atmospheric testing), accompanied by the names of the testers and by an indication of when the tests were performed;

- The rescue and emergency services that can be summoned and the means for summoning those services;
- The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
- Equipment, such as personal protective equipment, air monitoring testing equipment (gas detector), rescue equipment (harness/tripod) and flashlights/lighting will be provided for safe entry into confined space; when applicable. Radios/communication equipment, breathable air supplies and lifelines will also be provided.
- Any other necessary information, given the circumstances of the particular confined space, in order to ensure employee safety; and
- Any additional permits, (i.e., for hot work, etc.), that have been issued to authorize work in the permit space.

Duties of the Authorized Entry Supervisors

The Commission shall ensure that each Entry Supervisor (also serves as one of the two (2) Attendants):

- Knows the hazards that may be faced during entry, including information on the signs, symptoms and consequences of the exposure;
- Verifies that all tests specified by the entry permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Terminates the entry and cancels the permit when operations covered by the permit have been completed or a condition that is not allowed under the permit arises in or near the permit space; which includes dramatic changes in weather;
- Verifies that rescue services are available and that the means for summoning them are operable;
- Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
- Determines that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained at intervals dictated by

the hazards and operations performed within the space and whenever responsibility for a permit space operation is transferred.

Duties of Authorized Entrants

The Commission shall ensure that each Authorized Entrant:

- Knows the hazards that may be faced during entry, including information on the signs, symptoms and consequences of the exposure;
- Be trained in how to properly use all equipment such as personal protective equipment, testing equipment and rescue equipment to be provided for safe entry to the permit space;
- Communicates with the authorized attendant as necessary to enable the attendant to monitor the entrant status and to enable the attendant to alert entrants of the need to evacuate the space if hazardous conditions exist or develop;
- Alerts the authorized attendant whenever the entrant recognizes any warning signs or symptoms of exposure to a dangerous situation or whenever the entrant detects a prohibited condition; and
- Exits from the permit space as quickly as possible whenever an order to evacuate is given by the authorized attendant or authorized entry supervisor; the entrant recognizes any warning sign or symptom of exposure to a dangerous situation; the entrant detects a prohibited condition; or an evacuation alarm is activated.

Duties of the Authorized Attendants

The Commission shall ensure that each Authorized Attendant:

- Knows the hazards that may be faced during entry, including information on the signs, symptoms and consequences of the exposure;
- Is aware of possible behavioral effects of hazard exposure in authorized entrants;
- Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants accurately identifies who is in the permit space;
- Remains outside the permit space during entry operations until relieved by another attendant;

- Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;
- Monitors activities inside and outside the space to determine if it is safe for entrants to remain inside the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
    1. If the attendant detects a prohibited condition;
    2. If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
    3. If the attendant detects a situation outside the space that could endanger the authorized entrants; or
    4. If the attendant cannot effectively and safely perform all the duties required of his/her position.
- Summons rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
    1. Warn the unauthorized persons that they must stay away from the permit space;
    2. Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
    3. Inform the authorized entrants and the authorized supervisor if unauthorized persons have entered the permit space.
- Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Pre-Entry Procedures

The following describes the procedures to be adhered to by all BWSC personnel before entering any permit-required confined space:

- A sufficient number of employees must be assigned to a confined space entry work crew. At a minimum, two (2) attendants (one of which should be the entry

supervisor) must be present and remain outside a confined space throughout the duration of entrant occupancy.

NOTE: In certain low-hazard circumstances, the Program Administrator may allow one (1) attendant entry. This waiver must be pre-approved through an on-site, evaluation process and followed-up with written authorization from the program administrator.

- A Confined-Space Entry Permit must be obtained from the Permit Issuer and completed in its entirety. The permit must be kept at the work site and, at no time, shall the scope of work performed exceed that for which the permit has been issued.

- Verify that all safety equipment required for safe entry into the confined space is available and that the equipment is calibrated and in good working condition. Refer to the entry permit for a checklist of the necessary safety equipment. All members of the confined space entry team should have reviewed the equipment manual to ensure that they are comfortable with how the equipment works.

- If necessary, make arrangements to schedule a Police Detail for traffic control at the work location.

- Prepare for emergency communication/response by recording the identifiable location, (i.e., the main street and nearest cross street), of the entry on the permit.

- Determine the duration of the entry which cannot extend beyond the initial job purpose or one (1) work shift, whichever is of the shortest duration. (NOTE: The same crew working overtime represents one (1) work shift.)

- Traffic safety controls must be set up in accordance with safe roadway procedures.

- Atmospheric testing must be completed with a calibrated gas monitor in accordance with the following procedures:

    1. If the confined space has a cover with a vent opening, obtain gas monitor readings before opening the cover by inserting a monitoring probe 3 to 4 inches into cover vent hole. If a reading of 50% LEL or greater is measured, DO NOT REMOVE COVER. The Entry Supervisor must CANCEL the permit and immediately notify the Permit lssuer and the Program Administrator of the elevated readings.

2. Prior to entry, test the confined space for atmospheric hazards. Test for Oxygen Deficiency, LEL and Toxics. UNDER NO CIRCUMSTANCES CAN ENTRY BE ATTEMPTED IF ALARM READINGS EXIST.

3. Positively-forced mechanical air ventilation can be used in an attempt to control atmospheric readings that are outside acceptable levels and cause the gas monitor to alarm. However, at no time, shall an employee be allowed to enter the space until the hazardous atmosphere has been eliminated.

4. If hazardous atmospheric conditions cannot be eliminated, the Entry Supervisor must cancel the permit and immediately notify the Permit Issuer and the Program Administrator of the hazardous atmospheric conditions

No Entry If:

- Oxygen levels are lower than 19.5% or higher than 23.5%; or
- LEL is greater than 10%; or
- Carbon Monoxide levels are greater than 35 ppm; or
- Hydrogen Sulfide levels are greater than 10ppm
- After removing/opening the cover to the confined space, promptly guard the opening to prevent an accidental fall/entry into the space. An attended tripod may be used as a guarding device.
- Positively-forced mechanical air ventilation must continuously be used to control any worker-created airborne hazards inside, the space, (i.e., painting, drilling).

  EXCEPTION: HOT WORK AIRBORNE HAZARDS SUCH AS WELDING REQUIRES LOCAL EXHAUST VENTILATION

  1. Introduce fresh air near the bottom of the immediate area where the worker will be present.

  2. Position the fresh air intake in a clean air zone, away from all potential combustible sources, (i.e., vehicle exhaust).

- Set-up the appropriate Fall Protection and Retrieval System. Options include: a tripod/winch system, another approved mobile system or an approved fixed

facility system. The manufacturer's directions for proper use and maintenance of the fall protection and retrieval system shall be followed at all times.

- Isolate and protect against the release of all potential sources of energy and materials into the space by physically disabling or deactivating equipment and/or systems. The means of reactivation must remain in the possession of one of the authorized entrants at all times.

- All safety-related equipment must be placed in close proximity, (but no closer than two (2) feet from the space edge), to the confined space for immediate use, (i.e., fire extinguisher, lighting, first aid kit). Portable equipment mounted on wheels must be securely locked to prevent accidental movement.

- All signatures must be on the permit prior to entry.

- Determine the attendant who will make radio contact, to inform of time and that entry is underway, the estimated length of time required to perform the job and when the space has been exited and that the permit has been terminated.

- Whenever a contractor's employees plan to enter a BWSC owned or controlled confined space, the BWSC representative must complete procedures listed below.

    1. Inform the contractor of the known or potential atmospheric and physical hazards present.

    2. Inform the contractor that permit space entry is allowed only through compliance with work procedures meeting the requirements of OSHA 29CFR 1910.146.

    3. Inform the contractor of the BWSC confined space work procedures in force.

    4. Coordinate entry operations and emergency or rescue procedures with the contractor whenever BWSC employees will also be working in or near the confined space.

Entry Procedures

The following describes the procedures for all BWSC personnel entering permit required confined spaces:

- Two (2) attendants must be present at and remain outside a confined space site, (unless the BWSC Safety Office has granted a one (1) attendant waiver).

- All attendants must have a cell phone readily available for the purpose of summoning off-site emergency services. Whenever a work crew is not in close proximity to a vehicle mobile radio, they must have a cell phone.

- All authorized entrants must wear a full body harness with attached lifeline, hardhat and safety shoes. Protective clothing, gloves, respiratory, eye and hearing protection must be used if determined to be necessary to protect against specific, identified or potential hazards.

- All entrants must descend into a confined space securely attached to a tripod/winch system, rescue positioning device, safety block or other approved fall protection and retrieval device.

    1. Detachment from the mechanical retrieval system is prohibited unless a preapproved contingency plan is in effect for rescue.

    2. Slack on the retrieval line must be avoided whenever entrants use a ladder or built-in rungs as the primary work platform.

    3. The retrieval system must be continuously monitored by an attendant throughout the occupancy period.

- Atmospheric testing with a gas monitor must be continuous throughout the occupancy period.

    1. If the gas monitor cannot be worn by entrants in close proximity to their breathing zones, (i.e., clipped to full body harness chest strap), it must be affixed close to the work zone with the sample pump drawing air from the breathing zone of the entrant.

    2. If a hazardous atmosphere develops during occupancy and the gas monitor alarms, all entrants must leave immediately.

  WARNING: Certain work activities, (i.e., opening a valve, cleaning debris from within a pipe or agitating water), can activate sudden, life- threatening oxygen-deficient or toxic atmospheres. A gas monitor alarm shall not be relied upon to provide sufficient warning time for self-rescue. It is possible for a worker to become immediately incapacitated and unable to move the moment a sudden life-threatening atmosphere develops. It is also possible that a gas monitor cannot detect the unexpected toxins in the confined space that are causing the life-threatening situation.

- Attendants and entrants must remain in continuous contact with each other throughout the duration of the confined space entry. If visual and audible contact cannot be maintained, effective communication must be maintained by portable radios or some other reliable, pre-approved means.

- All welding and cutting operations carried on in confined spaces must be done with extreme caution.

    1. Gas cylinders and welding machines must be safely secured outside the confined space in a vertical position.

    2. A portable, closed local exhaust ventilation system with freely moveable hood shall be used to control the accumulation of toxic materials or possible oxygen deficiency.

    3. If it is impossible to provide local exhaust ventilation, appropriate respiratory protection must be used.

    4. Fuel gas and oxygen gas flows to the torch must be able to be positively shut-off at some point outside the confined space when not in use for an extended period of time.

- Under no circumstances, can the scope of work of an Entry permit be changed without approval from the Permit Issuer. It is permissible to obtain approval for scope of work changes via radio communication with the Permit Issuer.

- Final Step in the Entry Procedure - the designated attendant will make phone contact with the BWSC Operations Center to advise of the site location, the time the entry is underway, the approximate length of time required to perform the job and when the space has been exited and/or the permit terminated.

Closedown Procedures

All equipment must be handled and stored carefully. All equipment parts must be packed into appropriate storage bags and cases. Rough handling and careless storage can damage equipment and create a safety hazard for future users. Immediately report any damage and deficiencies in equipment to storeroom staff.

Rescue Procedure

In the event of an emergency, the Boston Fire Department will be summoned and will perform all rescue procedures that require entry into the confined space. The designated attendant will contact the BWSC Operations Center to inform of the emergency and will assistance the Fire

Department. If possible, the designated attendant should summon the Fire Department from the scene using the 911 emergency telephone numbers, providing exact location of the emergency.

Personnel Training

The Commission will provide training so that all the BWSC personnel whose work is regulated under this Permit-Required Confined Space Program acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this Program.

Entry supervisors, entrants and attendants must successfully complete a basic training program. The training program must provide employees with the information, hands-on experience, and the skills necessary to safely perform their confined space job duties. Training shall be provided to each affected employee:

- Before the employee is first assigned duties;
- Before the employee assumes newly assigned duties;
- Whenever there is a change in permit space operations that presents a hazard about which an employee has not been previously trained; and
- Whenever the employee has reason to believe that there is either deviation from the Permit-required Confined Space procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

Entry supervisors, entrants, and attendants must be provided with and successfully participate in a refresher training program three (3) years after completing the basic course and every three (3) years thereafter.

The Commission shall certify that the training required above has been accomplished. The certification shall include the employee's name, the signature of the trainer and the dates of training. The certification shall be available for inspection by the employees and their authorized representatives.

Recordkeeping Requirements

Employee training records shall be kept on file in the office of the Training Manager.

The Program Administrator shall keep all cancelled confined space entry permits on file for a period of one (1) year.

Equipment and Maintenance

All equipment used to perform work in permit-required confined space must be rated as explosion proof flashlights, lighting and radios/communication devices.

The Program Administrator will insure that a procedure is in place for the maintenance and repair of all equipment required for confined space entry. All equipment will be maintained according to all applicable requirements and periodically assessed for update and/or replacement. Such equipment will include, but not be limited: to tripods, gas detectors and ventilators

Special Entry

For purposes of this program “special entry” refers to a permit-required confined space entry where the entrant(s) is required to walk a distance from the point of entry to perform work.

Special entries are pre-planned, therefore any special arrangements required for safe entry and exit can be readily provided.

Special Entry Equipment

Equipment such as personal protective equipment; air monitoring and rescue equipment (harness and tripod), flashlights, and lighting must be used for safe entry. Special entries will require communication procedures, a retrieval line and an emergency supply of breathable air.

An escape breathing apparatus is available in the Commission’s Storeroom and must be carried for special entries. All equipment must be examined and deemed to be in good working prior to sign out.

This equipment must be returned to the Storeroom in good working condition after the special entry has concluded. Needed repairs/maintenance and/or replacement to equipment must be reported to Storeroom staff.

Communication

Attendants and entrants must remain in continuous contact with each other throughout the duration of the confined space entry. If visual and audible contact cannot be maintained, an effective communication method must be maintained by some reliable, pre-approved means.

The procedures noted in this section of the manual must be followed by the confined space entry team when a "special entry" is made into an underground configuration via a tripod or by entering directly into a pipe or line from ground level (horizontal entry). These procedures must be followed in conjunction with all safe entry procedures noted in the Commission’s Permit-Required Confined Space Entry Program.

Procedure

Two (2) attendants (one of whom is the entry supervisor) must be present at and remain outside a confined space site.

- All attendants must have radio communication readily available for the purpose of summoning off-site emergency services. Whenever a work crew is not in close proximity to a vehicle mobile radio, they must have a portable radio or cell phone.
- Attendants and entrants must remain in continuous contact with each other throughout the duration of the confined space entry. If visual contact cannot be maintained, effective communication must be maintained by other reliable, pre-approved means.
- All authorized entrants must wear a full body harness with attached tripod cable, hardhat and safety shoes. Protective clothing, gloves, respiratory, eye and hearing protection must be used if determined to be necessary to protect against specific, identified or potential hazards.

Vertical Entry to Horizontal

- The entrant (s) must descend into the confined space securely attached to a tripod/winch system or other approved fall protection and retrieval device.
- Following the entrant (s) safe entry into the space, the entrant (s) will attach a retrieval line and detach from the tripod cable/D-ring prior to departing from the point of entry. Before exiting the space, the entrant will re-attach to the D-ring and detach from the retrieval line for safe exit.
- In the event the exit is proposed from a secondary location, a second confined space team must be stationed at that location with all applicable equipment in place.

Horizontal Entry

- The entrant shall attach to a retrieval line prior to departing from the point of entry. When exit from the space is made vertically via a tripod at a secondary location, the entrant will re-attach to the D-ring and detach from the retrieval line.
- Slack on the retrieval line must be avoided whenever possible.
- The retrieval system must be continuously monitored by an attendant throughout the occupancy period.
- Atmospheric testing with a gas monitor must be continuous throughout the occupancy period.

1. The gas monitor must be worn by entrants in close proximity to their breathing zones, (i.e., clipped to full body harness chest strap).

2. If a hazardous atmosphere develops during occupancy and the gas monitor alarms, ALL ENTRANTS MUST LEAVE IMMEDIATELY.

WARNING: Certain work activities, (i.e., opening a valve, cleaning debris from within a pipe or agitating water), can activate sudden, life-threatening oxygen-deficient or toxic atmospheres. A gas monitor alarm shall not be relied upon to provide sufficient warning time for self-rescue. It is possible for a worker to become immediately incapacitated and unable to move the moment a sudden life-threatening atmosphere develops. It is also possible that a gas monitor cannot detect the unexpected toxins in the confined space that are causing the life-threatening situation.

- In the event of an unexpected life-threatening situation, the escape breathing apparatus must be used by the entrant(s) to return to the point of entry or the secondary point of exit.

- Under no circumstances, can the scope of work of an Entry Permit be changed without approval from the Permit Issuer. It is permissible to obtain approval for scope of work changes via radio communication with the Permit Issuer.

- Final Step in the Entry Procedure - the designated attendant will make radio or phone contact with the BWSC Operations Center to advise of the site location, the time that entry is underway, the approximate length of time required to perform the job, and when the space has been exited and/or the permit terminated.

Emergency Protocol

- The entrant(s) will communicate with the authorized attendant at all times. If the communication method fails, the entrant must immediately return to the point of entry or the secondary point for exit, whichever is safer.

- At the sound of an ALARM, the entrant (s) will use the escape breathing apparatus to return to the point of entry or secondary point for exit, whichever is safer.

- Upon any failure of safety gear, personnel protective equipment, or if the entrant(s) feel(s) his/her safety is threatened; he/she should immediately return to the point of entry and exit the space.

Note: The following electronic devices should not be taken into permit required confined space: cell-phone, pager, watch and IPad.

SAFETY GUIDELINES FOR USING TRIPOD ANCHORAGE CONNECTORS

Applications

Purpose

DBI/SALA tripods are designed to be used as a part of a work positioning, personnel riding, personal fall arrest, material handling or rescue and evacuation system. The tripod is intended to be a support structure or anchorage for these systems.

Limitations

The following application limitations must be recognized and considered before using this tripod. Failure to observe product limitations could result in serious injury or death.

Installation: The tripod must be properly installed in accordance with the requirements from previous sections.

Capacity: The maximum working load for this tripod is 350 lbs.

Personal Fall Arrest Systems: Personal fall arrest systems used in combination with the tripod must meet applicable state and federal regulations.

Physical and Environmental Hazards: Use of this equipment in areas containing physical or environmental hazards may require that additional precautions be taken to reduce the possibility of damage to this equipment or injury to the user(s). Hazards may include but are not limited to high heat such as welding or metal cutting, strong or caustic chemicals such as acids, corrosive environments such as exposure to sea water, high voltage power lines, explosive or toxic gases, moving machinery or sharp edges.

Training: This equipment is intended to be installed and used by persons who have been properly trained in its correct application and use.

System Requirements

Compatibility of Components & Subsystems

DBI/SALA tripods are designed for use with DBI/SALA approved components. Substitutions or replacements made with non-approved components may jeopardize compatibility between equipment and may affect the reliability and safety of the complete system.

Compatibility of Connectors

Connectors (i.e. hooks, carabiners, D-rings, etc.) must be capable of supporting 5,000 lbs. (22kN) minimum. Caution must be used when selecting connectors to assure compatibility

between connecting hooks and mating connectors. Non-compatible connections may accidentally disengage (roll-out). Connectors must be compatible in size, shape and strength. Self-locking snap hooks are required by ANSI Z359.1-1992 and are highly recommended by DBI/SALA.

Structural Strength

The structure (mounting surface) onto which the tripod's erected (floor, tank top, roof, etc.) must meet minimum strength(s) as noted below for the application(s) selected:

Fall Arrest: The structure (mounting surface) selected for personal fall arrest applications shall have strength capable of sustaining static loads, applied in the directions permitted by the personal fall arrest system, of at least: (A) 3,600 lbs. (16kN) when certification exists (Reference ANSI Z 359.1-1992 for certification definition) or (B) 5,000 lbs. (22.2kN) in the absence of certification. When more than one tripod is to be installed to a structure (for fall arrest) and the systems will be used simultaneously, the strengths set forth in (A) and (B) above shall be multiplied by the number of systems attached to the structure.

Work Positioning: The structure (mounting surface) selected for work positioning applications must be capable of sustaining a static load of a least 5,000 lbs., applied in the direction(s) permitted by the work positioning system when in use. Each tripod installation must independently be capable of sustaining this load.

Personnel Riding: The structure (mounting surface) selected for personnel riding applications must be capable of sustaining a static load of at least 2,500 lbs., applied in the directions(s) permitted by the personnel riding system when in use. Each tripod installation must independently be capable of sustaining this load.

Material Handling: The structure (mounting surface) selected for material handling applications must be capable of sustaining a static load of at least 2,500 lbs., applied in the direction(s) permitted by the material handling system when in use. Each tripod installation must independently be capable of sustaining this load.

Rescue: The structure (mounting surface) selected for rescue applications must be capable of sustaining a static load of at least 2,500 lbs., applied in the direction(s) permitted by the rescue system when in use. Each tripod installation must independently be capable of sustaining this load.

Operation and Use

Before Each Use

Before each use of this equipment, carefully inspect it to assure that it is in serviceable condition. Check for worn or damaged parts and ensure all parts (nuts, bolts, etc.) are present and secure. Check legs to ensure they are straight, free of cracks, dents, and ensure the leg chain is in place and remove any excess slack. Make certain pulleys rotate freely and overall system is free of corrosion. Do not use if inspection reveals an unsafe condition.

Planning

Plan your work positioning, personnel riding, personal fall arrest, material handling or rescue and evacuation system before starting your work. Take into consideration factors that affect your safety at any time during use. Some important points to consider when planning your system are as follows:

Hazard Evaluation: An evaluation of job-site hazards is necessary prior to starting work. Consult applicable OSHA and industry standards for guidelines and regulatory requirements on issues such as; confined space entry, personal fall arrest systems, single point adjustable suspended scaffolds, etc.

Work Site Geometry: An installation and usage of the tripod must be consistent with the geometric requirements. When suspending working lines from the tripod, check for obstructions or sharp edges in the work path. Avoid working where the user may swing and hit an object or where lines may cross or tangle with those of another worker in the area. ·

Secondary or Back Up Fall Arrest System: When using the tripod as a support for suspending a worker at a work level, a secondary or backup fall arrest system is required, see OSHA 29CFR 1910.28 and 1926.451. The tripod has provisions for connection of a secondary or back up personal fall arrest system (PFAS).

Rescue: In the event of an accident with injuries or other medical emergency, it is critical that a means of dealing with such a situation has been planned in advance. Response time often plays an important role in the survival of an injured worker. Users of this equipment must be trained in emergency procedures.

Requirements for the Personal Fall Arrest Systems

Personal fall arrest systems (PFAS) used with this tripod must meet applicable OSHA requirements. When in use, the PFAS should be rigged to minimize any potential free fall and never allow a free-fall greater than 6 feet. The PFAS used with this equipment will be a full-body harness as the body support component. PFASs that incorporate full body harnesses must

maintain fall-arrest forces below 1,800 lbs. and arrest the fall within 42 inches. A typical PFAS includes; a full body harness, a connecting subsystem or component (ex. Self-retracting lifeline or a lifeline and rope grab) and the necessary connectors to couple the system together.

Installation Requirements of a Tripod

Load Requirements: Depending on the application, the strength requirements for the supporting structure onto which the tripod is erected vary. If an installation may be used for more than one type of application, always select the loading for the application with the greatest load requirements.

Geometric Requirements: The tripod must be mounted where it can be leveled using the leg adjustments and footing must be solid under each leg and capable of supporting the intended loading. Position the tripod so that the lifeline will be directly over the work area when installed. Do not position the tripod where the worker will have to move horizontally (swing) under the tripod to reach the work area. Avoid positioning the tripod where, when in use, the working line may scrape against sharp edges. (Fig #3)

Warning: Never allow the working line(s) to extend outside of the legs of the tripod, if so the tripod could tip.

To Erect Tripod: The tripod is shipped with the legs set at full retraction. Erect as follows:

1) Lay the tripod on the working surface.
2) Adjust legs to required working height.
3) Tilt the tripod into an upright position.
4) Spread the legs out; make sure legs are against bearing surface on head (legs fully spread). Note: the legs will automatically lock in place when leg is spread out (to collapse tripod, pull leg downward to disengage leg-lock and push or swing leg in).
5) Position tripod over opening so working line(s) will be located approximately in the center of the opening; make sure footing is solid under each leg and capable of supporting the intended load, then level the tripod by adjusting the leg height.
6) Adjust the leg-chain by removing excessive slack.

Warning: Except for emergency situations where leg chains may interfere with rescue, the tripod must never be used without the leg-chains in place.

Important: The tripod must be positioned such that the working line(s) will be directly over the intended work area when in use. It also must be positioned in a way to ensure a safe working area for the operator.

Warning: The tripod must never be used if one or more of the legs are not locked into the erect position (completely spread out).

Connecting Equipment to the Tripod

The tripod has been designed for multi-purpose applications that may involve the use of one or more systems attached to the tripod. The following details the connection of equipment to DBI/SALA tripods (see associated equipment instructions for more information).

Eye-Bolt: A component (ex. Self-retracting lifeline, rope grab/line system, etc.) can be attached to either one of the eye-bolt anchorage points. (Fig.#4) Connection of equipment to the eye-bolt anchorage point may be accomplished by using a clevis and pin (minimum breaking strength of 5,000 lbs.), automatic locking carabiners or self-locking snap hooks.

Quick-Mount Bracket: Fig #5 shows the tripod quick-mount leg bracket 1850-092 (optional on 11717 and Ll718 models). To install the quick-mount bracket to the tripod leg, assemble as shown in Fig #5.

1) Adjust bracket to desired position on the leg.

2) Tighten bolts to 15 ft. /lbs. each (Do not over-tighten).

3) Do not install quick-mount bracket onto the lower (smaller/telescoping) leg.

4) The quick-mount bracket must be used for connection of the Salalife® winch (L1850 Series), the Work Winch (13139 Series) and for leg mounting of DBI/SALA Self Retracting Lifelines.

Head Mount Pulleys: The 1850-076 and 1850-077 model tripods come equipped with head-mounted pulleys. These pulleys should be used for mounting the line of the primary use system over the tripod head when used in the leg-mounted position. The head-mount pulleys will accommodate up to a ¼" diameter line. (See Figs.#5,#6,#7)

Leg Mount Pulley: Fig. #5 and #6 show the optional leg-mount pulley model L3238. This pulley is used when more than one device is mounted to the tripod leg, requiring a directional pulley. The leg-mount pulley will accommodate up to ¼" diameter line. Refer to instructions supplied with the leg-mount pulley for installation details.

Snatch Block Pulley: Fig. #5 and #7 shows the optional snatch block pulley assembly model L3205. The snatch block is used when more than one device is mounted to the tripod, requiring

a directional pulley. The snatch block is attached to one of the unused eyebolts and will accommodate up to ¼" diameter line. Do not use the Winch with the snatch block pulley due to possible uneven winding of the cable onto the winch drum.

Salalift® Winch: When using the Salalift® Winch (L1850 Series) with the tripod, the winch must be mounted to the leg in-line with the head mount pulleys. Route the winch line over the head mount pulleys as instructed in the Salalift® Winch user instruction manual. Do not use winch with snatch block pulley.

Warning: Multiple Systems may be attached to the tripod (ex. primary support lifeline and secondary or back-up lifeline), but the tripod is for one person use only. Exception: Emergency rescue applications only. A maximum of one system can be attached to any one tripod leg. A maximum of two systems should be attached to any one tripod, except back-up lifelines (fall arrest) which are limited to one system.

Important: Knots must not be used for load-bearing and terminations. Some knots reduce the strength of the lifeline by 50% or more.

Inspection Steps for the Tripod

Frequency

Before Each Use: Visually inspect tripod.

Monthly: A formal inspection of the tripod should be done by a competent person. They must record results in Inspection and Maintenance Log.

After Fall Arrest: Inspect entire tripod and base.

Warning: If the tripod has been subjected to fall-arrest or impact forces, it must be immediately removed from service and inspected. If the tripod fails to pass the inspection, do not use, the equipment must be destroyed or sent to DBI/SALA for possible repair.

Important: Extreme working conditions (harsh environment, prolonged use, etc.) may require increasing the frequency of inspections.

Inspection Steps for Tripod:

Step 1. Inspect all bolts and nuts; make certain they are securely attached and tight. Check to see if any bolts, nuts, locking detent pins or other parts are missing or have been substituted in any way. Inspect tripod for signs of corrosion, which may weaken or affect parts in their function.

Step 2. Check each leg to see that it can be telescoped in and out freely. Inspect legs for straightness. Ensure legs lock into place when tripod is erect.

Step 3. Check feet on each leg: ensure they pivot and the rubber pad is in place.

Step 4. Check leg chain and connections; make certain they are tight and undamaged, chain must be free of defects and hook must be in place and work properly.

Step 5. Check head; make certain eye-bolt anchorage points are in place and are free from damage, ensure cable sheaves (pulleys) are clean and rotate freely (1850-076 and 1850-077 models only).

Step 6. Inspect labels; make certain all labels are present and fully legible.

Step 7. Record results of inspection in the Inspection & Maintenance Log

Step 8. Inspect each system component (ex. winch, self-retracting lifeline, connectors, etc.) per associated manufacturer's instructions.

If inspection or operation reveals a defective condition, remove the tripod from service immediately.

Maintenance – Service - Storage

Periodically clean the exterior of the tripod using water and a mild soap detergent solution. Clean labels as required.

Replacement parts, as well as additional maintenance and servicing procedures, must be completed by a factory-authorized service center. Both authorization and a return number must be issued by DBI/SALA.

Clean and store body support and associated system components according to separate instructions provided with that equipment.

Store this equipment in a cool, dry and clean environment out of direct sunlight. Avoid areas where chemical vapors may exist. Inspect after any period of extended storage.

SAFETY GUIDLINES FOR USING AND CALIBRATING THE LUMIDOR MICRO MAX GAS MONITOR INTERNAL PUMP MODEL

Introduction

- It is important to ALWAYS test the atmosphere of a confined space before entering.
- ALWAYS wear the monitor into the confined space because the conditions of the atmosphere can become hazardous at any time.

- Follow the operating instructions, which have been provided by the manufacturer for the Micro Max Gas Monitor regarding basic operating procedures.

Operating Instructions

Turn On

After the NiMH battery pack has been fully charged or fresh alkaline cells have been installed, turn the MicroMax on in a fresh air area by depressing the ON/OFF switch until the word "ON" appears on display.

Self-Test

The "Self-Test" and "Auto Zero" functions will commence and continue for approximately 30 seconds after which the alarm setpoints are displayed followed by current readings. Four range positions are always indicated. Unused range positions will read “xxx”.

Caution: Always confirm that the proper number of ranges is displayed.

Test Alarms

Prior to use, proper alarm functions can be verified by applying Lumidor's calibration alarm-check gas. Use of alarm-check gas is not intended to replace routine calibration, but to confirm proper function between calibrations. Test "low flow alarm" by placing finger over inlet fitting on internal pump. CAUTION: If instrument does not go into low-flow alarm when inlet-fitting is blocked, the instrument must be serviced prior to use.

Mode Functions

Cycle through the mode functions, if desired, by depressing the mode switch.

1. Battery voltage (BT)-Current battery voltage (Full charge is 2.5 volts to 2.7 volts, battery warning comes on at 2.1 volts and low battery fail occurs at 1.9 volts.) Elapsed time (ET)-standard units. Data logging units display local time.
2. Peak (P). Peak readings for combustible and toxic gases and lowest oxygen reading. Peak readings can be cleared, without clearing STEL and TWA, by depressing the on/off button while in this mode.
3. STEL (S). Short term exposure limit values for toxic gases.
4. TWA (A). Time weighted average for Oxygen, LEL and toxic gases.
5. Clear Memory- Press on/off button to clear Peak, STEL and TWA values from memory.

To exit any MODE function, press the MODE button repeatedly until current readings are displayed or wait 15 seconds and display will automatically return to current readings.

Note: The MicroMax has an alarm priority feature which overrides modes if a gas alarm condition is detected.

Remote Sampling:

Remote areas and confined spaces may be sampled prior to entry by using the 10 foot sampling hose. WARNING: Remote sampling is for pretesting only! It is not recommended for continuous monitoring.

Steps for Remote Sampling

1. Turn MicroMax on in fresh air and allow to cycle through self-test and auto zero functions.
2. Check gas levels as mentioned earlier.
3. Connect 10 foot hose to instrument.
4. Place hose in area to be sampled.
5. Wait two minutes for full response.
6. Take readings.
7. Retrieve hose and disconnect from instrument.

NOTE: Hose lengths up to 100 feet may be used for remote sampling for most gases. Add one second per foot to the two minute waiting period for full response.

Alarms

In the event of an alarm, evacuate the area immediately. Investigate the cause of the alarm when you are safely out of the potentially hazardous area. The gas and level that generated the alarm can be indicated by accessing the "PEAK" function using the MODE button.

- One or more gas concentrations in excess of the immediate alarm value triggers an audible alarm and two visual alarms (Flashing red LED and flashing display which alternates between gas range(s) and "ALM" message).
- Low battery warning- Occurs when battery voltage drops to 2.1volts. A beep every 15 seconds indicates there are approximately 15 minutes of operation left before low battery alarm and shut-down.

- Low battery alarm- Occurs when battery voltage drops to 1.9v. A constant audible and visual 10 second alarm is followed immediately by unit shut-down. To continue operation, replace the NiMH battery pack with a charged pack or fresh alkaline batteries.
- WARNING: Replace batteries only in an area known to be Non-Hazardous.
- Low Flow Alarm- occurs when flow rate drops below an acceptable level.
- Sensor voltage drops below an acceptable level.

Turn Off

To turn the MicroMax off, press and hold the ON/OFF switch until 5 or 6 beeps occur, and beeping tone changes to a steady tone, then release.

Testing / Calibration

CAUTION: Use only factory supplied, calibration gas for calibration. Accurate calibration can be achieved only if specific concentrations of the correct gas are used. Please refer to the Micro Max Manual located in the Health and Safety Department or Storeroom.

Calibration Frequency

- It is very important to verify accuracy on a regular basis to guard against any unexpected loss of sensitivity due to exposure of the sensors to poisons present in the atmosphere being monitored (such as high concentrations of combustible gas, tetra-ethel-lead, sulfides or silicone containing lubricants), loss of sensitivity due to aging or lack of moisture of the sensors, mechanical damage due to dropping of immersion or loss of sensitivity due to other causes.
- Gas monitors are calibrated and assessed for proper operating conditions by the safety manager.
- The calibration date for each monitor is noted on the unit as well as in the BWSC Calibration Log. Dates of maintenance repair or required factory service for each monitor are also noted in the Log.
- Gas monitors are calibrated according to the procedure noted below and a copy of the Calibration Log is filed in the Safety Office.

Calibration

- Make sure monitor is in a clean air environment and NiMH battery pack is fully charged (or monitor has a fresh set of alkaline batteries.)

- Turn monitor on.
- Use Mode button to scroll through mode functions to User Setup.
- Depress ON/Off button to enter user setup.
- Use Mode button to scroll to Calibrate, the instrument will count down to zero (0).
- Apply gas when “Apply Gas” is displayed
- The instrument will display “Calibrating” and count down to zero.
- Once “Cal Complete” is displayed, remove gas and turn off gas flow.
- The instrument will go into “purging” and countdown to zero (0).
- After purging, the instrument automatically clears memory.
- Calibration is now complete.

Maintenance

NiMH Battery Charging

CAUTION: Use only MPRO NiMH battery pack. Usage of any other pack will void the intrinsic safety design of the instrument.

WARNING: Do not change or charge batteries in a hazardous location.

- To charge the NiMH battery in the Micro Max, turn the monitor off and connect an approved Micro Max charger to the charge jack located on the side of the instrument.

  CAUTION: Leave Micro Max on charge when not in use. Instruments will not turn on if the battery pack is dead. There is a small current drain on the pack when instrument is off so leaving the monitor off charge for long periods will drain energy from the pack. If monitor will not be used for a week or longer always charge battery before such periods of inactivity.

Alkaline Battery Installation

CAUTION: Do not change batteries in a hazardous location.

- Open the MicroMax case.

- Place 4 approved size AAA alkaline batteries in battery holder observing polarities indicated on the battery holder.
- Connect alkaline battery holder to the connector on the board.

NOTE: Instrument may turn on automatically when battery pack is plugged in.

- Remove alkaline batteries when not in use. A loop is provided for easy removal of the connector without undue strain on the wires.

NiMH Battery Installation

CAUTION: Do not change batteries in a hazardous location.

- Open MicroMax case.
- Connect battery pack connector to connector on board.
- NOTE: Instrument may turn on automatically when battery pack is plugged in.
- Replace cover.
- Charge instrument fully prior to use.

Senor Removal, Replacement and Adding a Sensor

CAUTION: If you are adding or removing a sensor, be aware of the following:

- REMOVING A SENSOR: (e.g. reducing a four gas to a three gas unit) Plug the vacant hole above the sensor being removed with a hold plug. (XJF055)
- ADDING A SENSOR: (e.g. adding an additional sensor to a three gas to make it a four gas unit). Remove the plug above the new sensor.

Sensor Replacement

- With instrument turned off, open the Micro Max case by loosening the four screws on the back panel.
- Lift the gas plate to allow access to the sensors.
- Remove sensor by lifting straight up.

Oxygen Sensor Replacement

- Align the pins on the new sensor with socket receptacles on circuit board. Push directly down to secure sensor to board.
- Replace gas plate.
- Secure case halves together and tighten the four (4) screws on rear of case. Do not turn instrument on for one hour to allow proper stabilization of the sensor.

Combustible Sensor Replacement

- Align the pins on the new sensor with socket receptacles on the circuit board. Push directly down to secure sensor to the board.
- Replace gas plate.
- Calibrate instrument.
- Replace calibration port screw. This completes installation of the combustible sensor.

Toxic Sensor Replacement

NOTE: Toxic sensors have a small circuit board attached and any reference to toxic sensors is deemed to refer to the toxic sensor and board combination.

- If there is a honing clip attached to sensor pins, remove it now.
- With instrument off, align the pins on the new sensor with socket receptacles on the circuit board. Push directly down to secure sensor to board.
- Replace gas plate.
- Secure case halves together and tighten four (4) screws on rear of case. Do not turn instrument on for 30 minutes to allow proper stabilization of the sensor.
- Calibrate instrument.
- Replace calibration port screw. This completes installation of the toxic sensor.

Cleaning

- Clean the exterior of the MicroMax with a clean, damp cloth. Do not use solvents, soaps, polishes etc. on the monitor.

Pump Inlet Filter

CAUTION: Do not attempt to remove the pump inlet filter. It is not a user replaceable item. It is an integral part of the instrument case. If the pump inlet filter located inside the inlet fitting, becomes obstructed by debris:

- With the instrument off, open the MicroMax case by loosening the four (4) screws on the back panel.
- Use tweezers to pull out tubing and filter.
- Install new filter.
- Close up back cover and calibrate.

10 Foot Sampling Hose

- Check water trap (pan # GFV196) and porous dust cap (pan # 20HFC) periodically to make sure they are clean and unobstructed. Replace periodically.

Storage

- First, charge NiMH battery pack.
- Remove NiMH pack or alkaline batteries.
- Remove Oxygen Sensor if two years old or more.
- Store MicroMax in a contaminate-free area.
- Store MicroMax at circulating temperature.

SAFETY GUIDELINES FOR USING PORTABLE VENTILATION BLOWERS

Overview

The portable ventilation blowers referred to herein have been designed for industrial heavy duty applications in confined space ventilation. These blowers are the primary tool for providing fresh, clean, ventilation air to remote work locations.

General Specifications

8" (20.3cm) intake and exhaust flanges on standard models - intake flange optional on economy models.

Welded steel finger-guards installed on inlet and exhaust flanges. Aluminum non-sparking blower wheel on all standard models. Sealed lubricated motor bearings.

Corrosion resistant powder coal anti-chip paint.

Spring anti-vibration mounts on gas model.

Blower wheels dynamically balanced to 300.0 RPM

Motor shaft guard installed to meet OSHA regulation.

Integral steel welded handle (s) CE registered blowers.

Blower Specifications

SVB-G8 Model

Motor Specifications: 3.5 HP Briggs &·Stratton gasoline engine with 5ft (1.5m) remote flexible steel exhaust hose and custom gas-tight muffler.

Free Air Delivery cfm/dm3: Min 2095/988

Max 3000/1415

Air Delivery w/Ducting: 25ft. (7.6m)

8ft (20.3cm)

1 - 90 degree bend

Weight Lbs/kg: 471bs/21kg

Caution: Air quality should be tested prior to ventilating a confined space, and tested continuously during confined space occupancy to ensure a stable atmosphere and workers safety. Remember, atmospheric conditions can change rapidly in a confined space. Gasoline engines produce carbon monoxide. The exhaust snorkel must be used while operating this device. Do not use standard gasoline blowers if volatile or explosive vapors are suspected.

General Setup Procedures

1. Test air with a gas meter prior to entry and prior to turning "on" the blower.

2. Inspect all hoses and unions for leaks prior to using the blowers.

3. Install duct cuff with cinch strap to exhaust flange, depending on ventilation requirements.

4. Set blower a minimum of 5 ft. (1.5m) away from the opening of the manhole.

5. Start blower if air test is "ok". Keep bends and kinks inducting to a minimum.

Warning: Air quality should be tested prior to ventilation and prior to confined space entry and continuously while the confined space is occupied.

Operating Instructions

Caution: Do not run gasoline blowers without attaching ventilation duct.

- Install exhaust muffler hose assembly securely to the pipe union on the gasoline motor.
- Locate end of exhaust snorkel down-wind and away from the blower intake and manhole area.
- Check engine oil levels prior to operation (Fill to proper level).
- Check engine intake filter and replace if necessary.
- Check fuel level and fill with unleaded gas as necessary.
- Follow safety precautions and run procedures found in Briggs & Stratton motor manual prior to starting engine.
- Do not exceed throttle "stop" setting at maximum adjustment. Serious blower wheel and engine damage could result.
- Start engine by placing throttle adjustment at idle and choke adjustment as "start" position and pull start cord. Once started, return choke to "run" position.
- Run "new" gas blowers for 30 minutes on initial set-up to remove oils that may be present in the exhaust muffler pipe.

Shutdown Procedures

1. Insure that all workers are removed from the confined space site.
2. Shut off blower and remove all ducting.
3. Warning! Allow exhaust snorkel to cool five (5) minutes before removing.
4. Prior to gas engine maintenance, turn unit off, allow to cool adequately and consult the Briggs and Stratton manual supplied with the motor.

Maintenance

- Keep blower motor dry and free from contaminants and dust.

- Check periodically to ensure that moving parts are free from obstructions.
- Check oil level before each usage; follow Briggs and Stratton manual for service on gasoline blowers.

SAFETY GUIDELINES FOR OPENING MANHOLE COVERS WITH VENT HOLES

The following safe operating procedures should be followed for all work crews whenever the manhole cover has a small vent opening in it that has not been sealed over with concrete or asphalt the following should be done.

1. If the opening is blocked by debris, clear the opening with a non-sparking tool made of nonferrous beryllium, bronze, or copper based material, wood or plastic to avoid creating an ignition source.
2. The flammable vapor concentration inside the space must be tested by connecting a short sampling hose to the monitor and inserting the hose 3 to 4 inches through the opening in the cover.
    - If the LEL reading is 50% or less, the cover may be removed.
    - If the LEL reading is greater than 50% DO NOT remove the cover. Notify the Permit Issuer of the elevated LEL readings.
3. If the LEL readings range between 10% and 50%, the manhole cover must be removed with extreme caution. Only crew members removing the cover are to remain in close proximity to it.
4. Danger: Entry into a confined space is not permissible unless the confined space atmospheric LEL reading is 10% or less. If natural or mechanical ventilation does not lower an initial reading range between 11% and 50% LEL to 10%, or lower within a reasonable time period, entry plans must be terminated. The Permit Issuer must be notified.

Figure #1
Tripod Parts Identification: L1717 and L1718

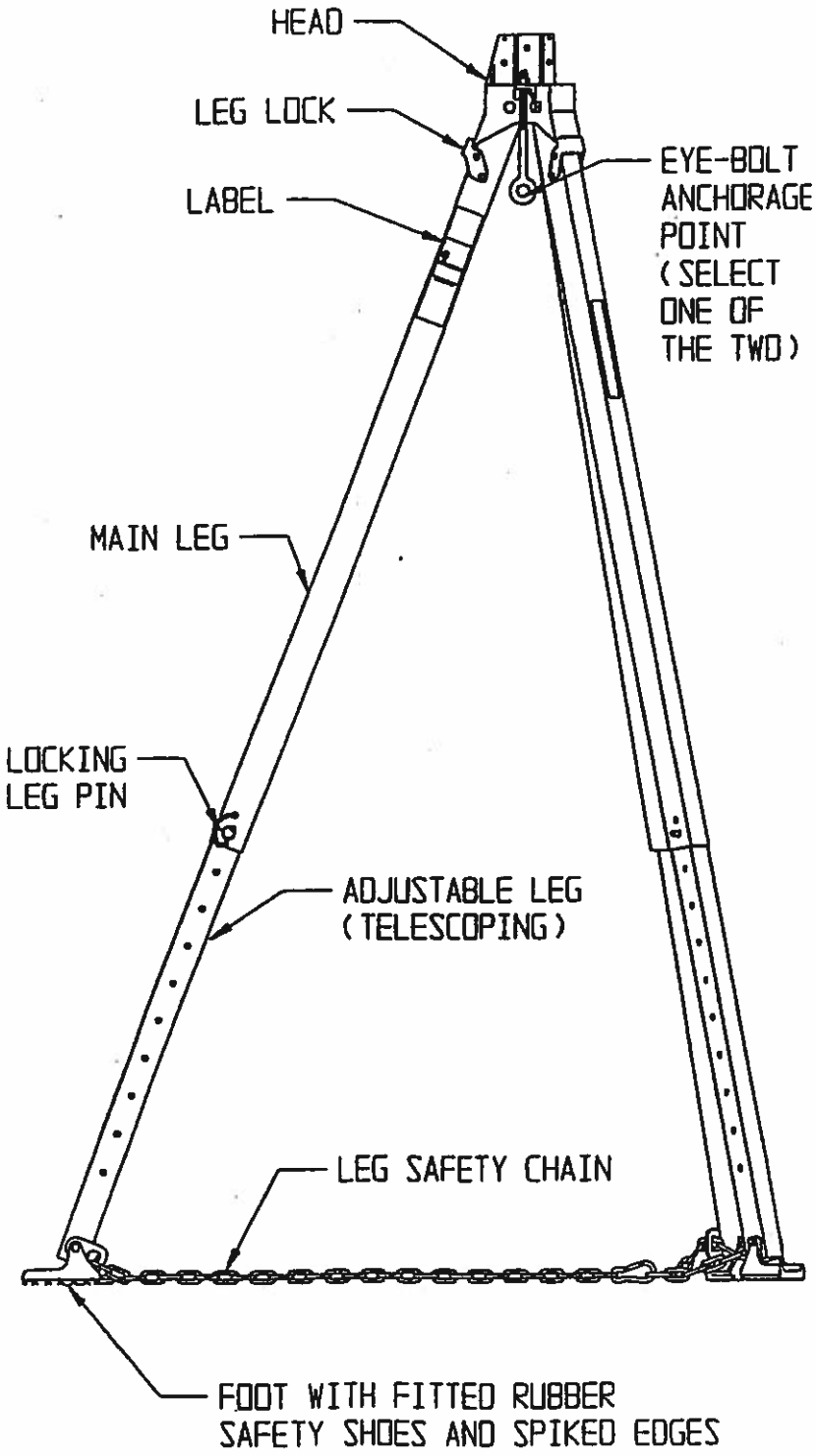


Figure #2
Tripod Parts Identification: 1850-076 and 1850-077

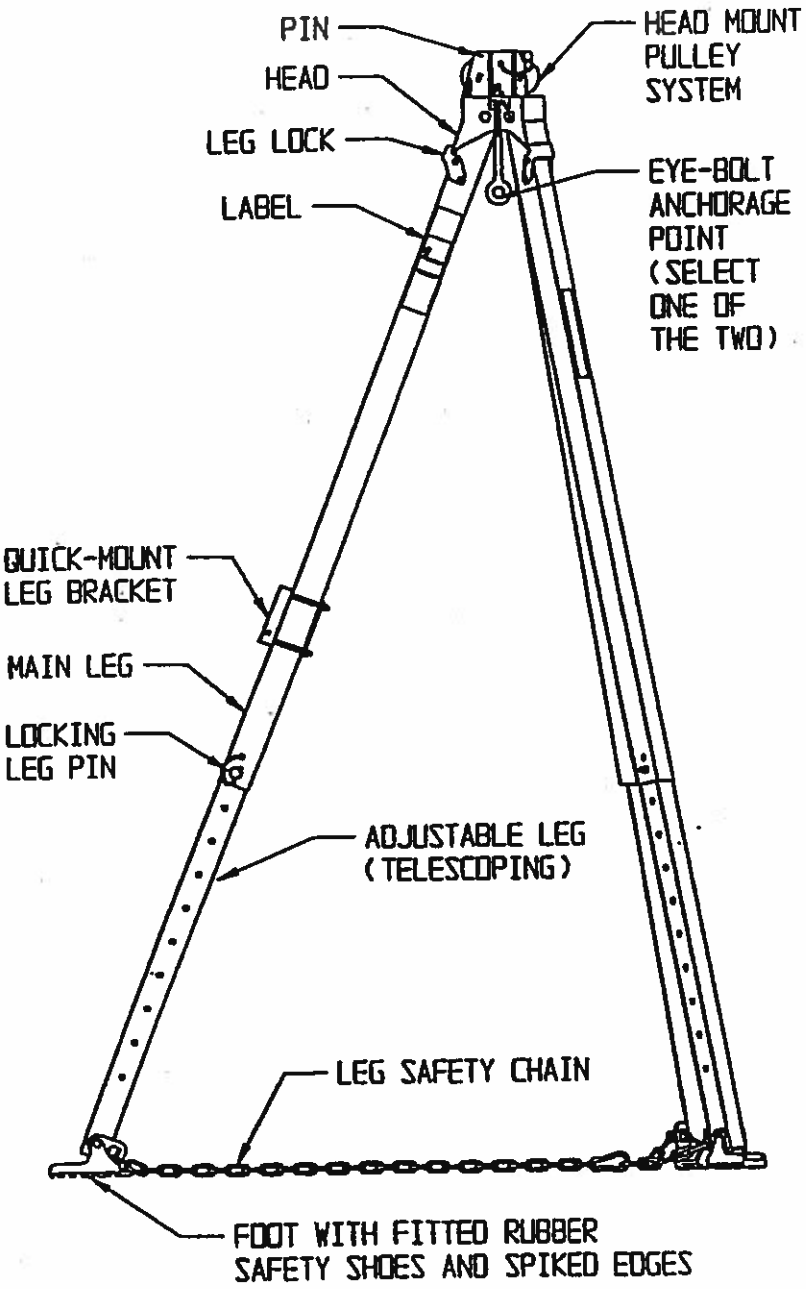
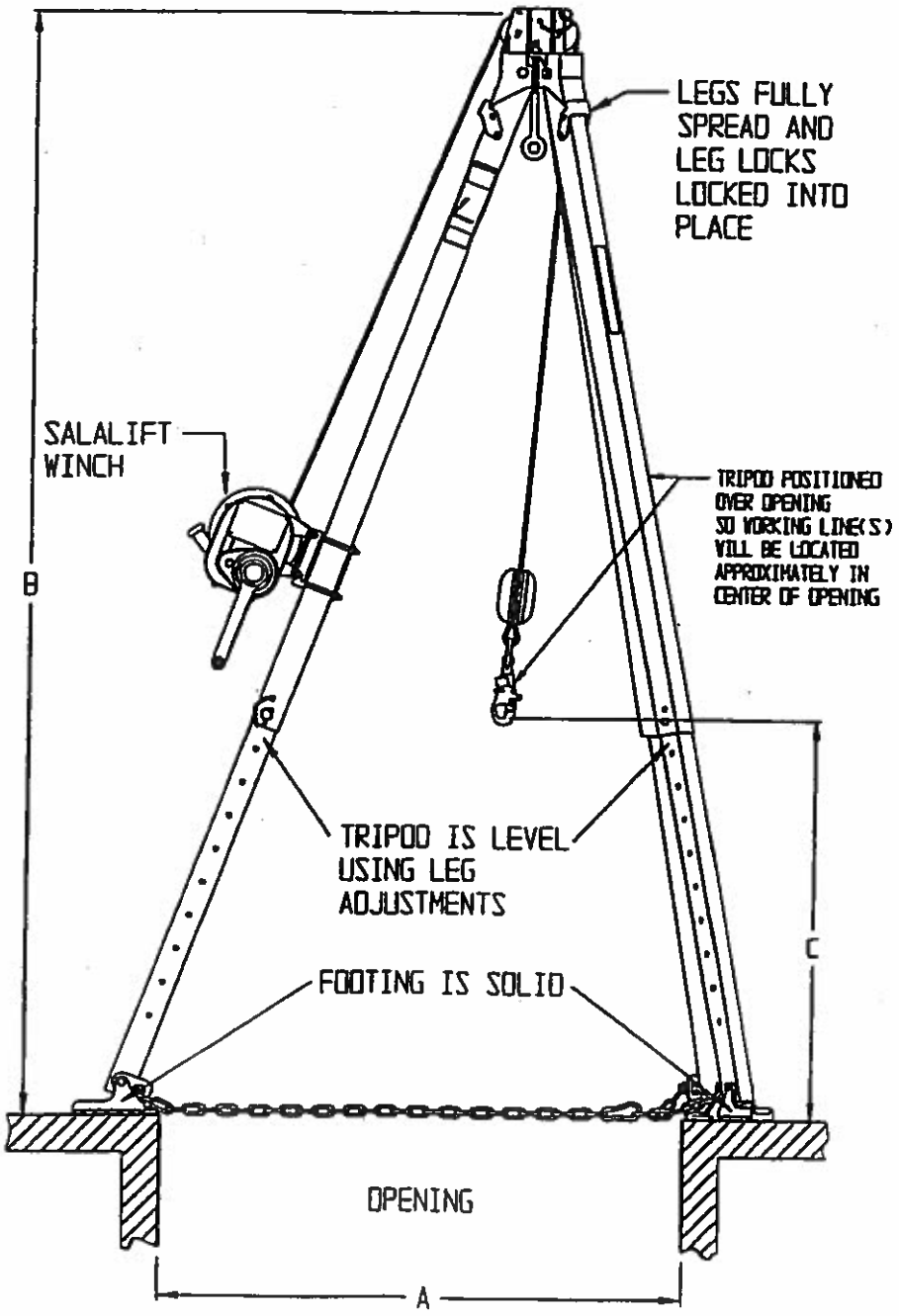


Figure #3
Geometric Requirments / Dimensions / Errection Procedures



WARNING: *Except for emergency situations where leg chains may interfere with rescue, the tripod must never be used without the leg chains in place.*

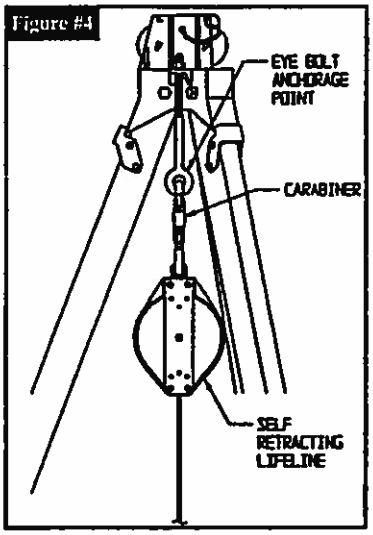
IMPORTANT: *The tripod must be positioned such that the working line(s) will be directly over the intended work area when in use. It also must be positioned in a way to ensure a safe working area for the operator.*

WARNING: *The tripod must never be used if one or more of the legs are not locked into the erect position (completely spread out).*

3.5 **CONNECTING EQUIPMENT TO THE TRIPOD:** The tripod has been designed for multi-purpose applications that may involve the use of one or more systems attached to the tripod. The following details the connection of equipment to DBI/SALA tripods (see associated equipment instructions for more information):

A. **EYE-BOLT:** A component (ex. self retracting lifeline, rope grab/lifeline system, etc.) can be attached to either one of the eye-bolt anchorage points, see figure #4. Connection of equipment to the eye-bolt anchorage point may be accomplished by using a clevis and pin (minimum breaking strength of 5,000 lbs.), automatic locking carabiners or self locking snap hooks.

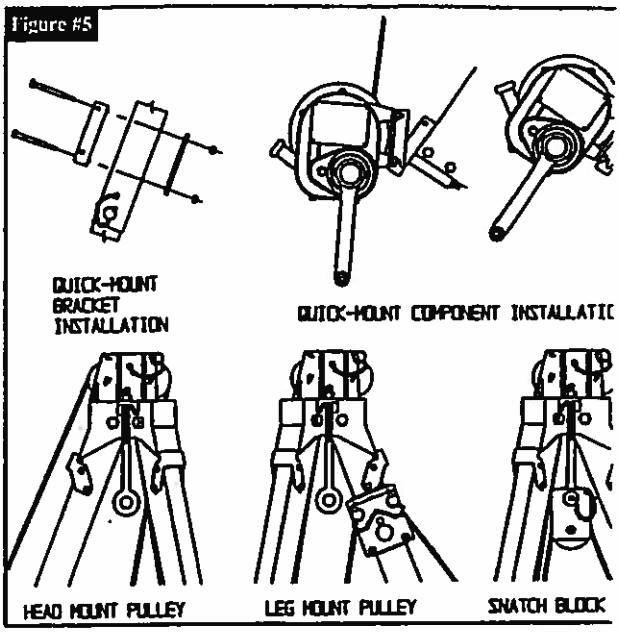
Figure #4



B. **QUICK-MOUNT BRACKET:** Figure #5 shows the tripod quick-mount leg bracket 1850-092 (optional on L1717 and L1718 models). To install the quick-mount bracket to the tripod leg, assemble as shown in figure #5. Adjust bracket to desired position on the leg then tighten bolts to 15 ft./lbs. each - do not over tighten. Do not install quick-mount bracket onto the lower (smaller/telescoping) leg. The quick-mount bracket must be used for connection of the Salalift® winch (L1850 Series), the Work Winch (L3139 Series) and for leg mounting of DBI/SALA Self Retracting Lifelines.

C. **HEAD MOUNT PULLEYS:** The 1850-076 and 1850-077 model tripods come equiped with head mounted pulleys. These pulleys should be used for mounting the line of the primary use system over the tripod head when used in the leg mounted position. The head mount pulleys will accommodate up to a 1/4" diameter line.

Figure #5



model L3238. This pulley is used when more than one device is mounted tripod leg requiring a directional pulley. The leg mount pulley will accon up to 1/4" diameter line. Refer to instructions supplied with the leg moun for installation details.

E. **SNATCH BLOCK PULLEY:** Figure #5 and #7 shows the optional snatc pulley assembly model L3205. The snatch block is used when more than o device is mounted to the tripod requiring a directional pulley. The snatch b attached to one of the unused eye-bolts and will accommodate up to 1/4" dia line. Do not use the Salalift® Winch with the snatch block pulley due to p uneven winding of the cable onto the winch drum.

F. **SALALIFT® WINCH:** When using the Salalift® Winch (L1850 Series) tripod, the winch must be mounted to the leg in-line with the head mount p Rout the winch line over the head mount pulleys as instructed in the Salali Winch user instruction manual. Do not use winch with snatch block pulley

Figure #6
Two Salalift® Winches Mounted To Tripod
(Lifelines Routed via Head Mount Pulley & Leg Mount Pulley)

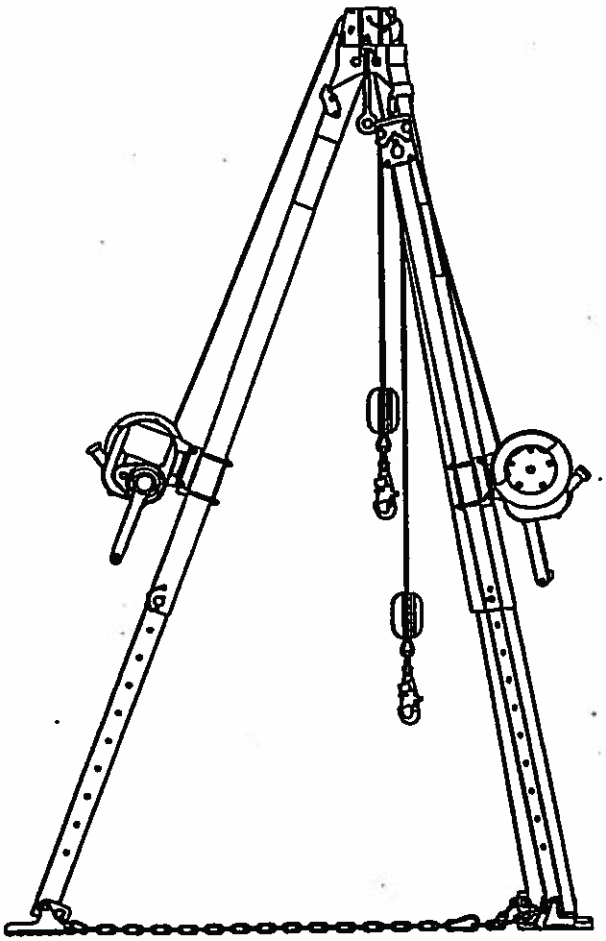
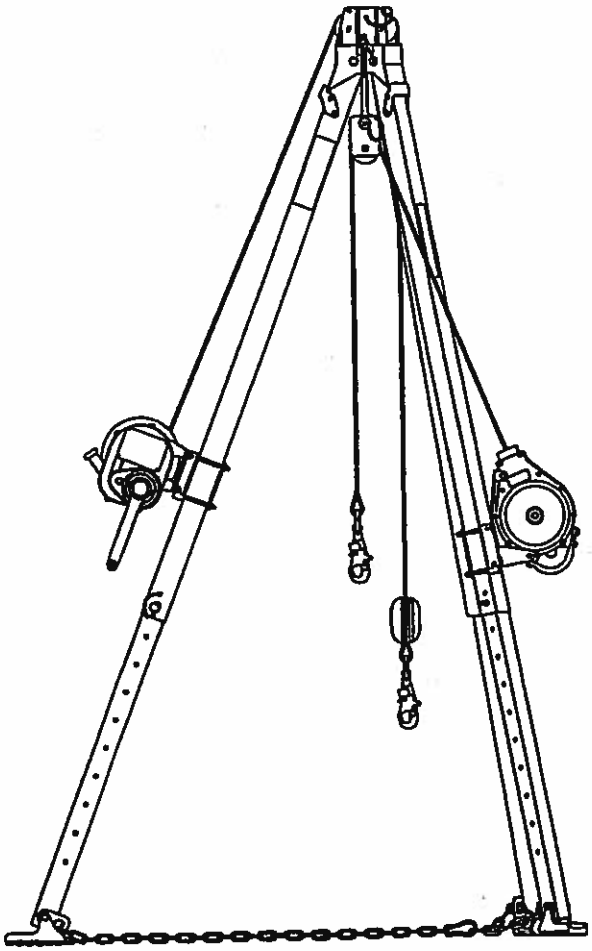


Figure #7
Salalift® Winch & Self Retracting Lifeline Mounted To Tripod
(Lifelines Routed via Head Mount Pulley & Snatch Block Pulley)



6.0 SPECIFICATIONS

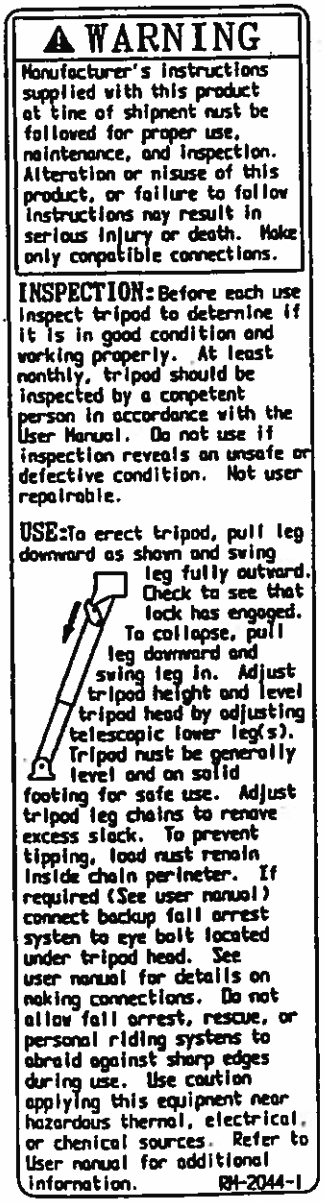
Rated (safe) Working Load	350 lbs. for work positioning or personnel riding applications 310 lbs. for fall arrest applications
Weight: L1717 Tripod L1718 Tripod 1850-076 Tripod 1850-077 Tripod	37 lbs. 46 lbs. 47 lbs. 56 lbs.
Material	Predominantly aluminum and zinc plated steel

Dimension (Reference Fig. #3)	7 ft. Models		9 ft. Models	
	Minimum inch (mm)	Maximum inch (mm)	Minimum inch (mm)	Maximum inch (mm)
Storage Length	70 (1778)	—	102 (2591)	—
Hole Diameter Spanned *"A"	23 (584)	32 (813)	33 (838)	44 (1118)
Overall Height "B"	68 (1727)	93 (2362)	95 (2413)	120 (3048)
Available Lift Height "C"	49 (1245)	74 (1880)	76 (1930)	101 (2565)
Height Increments	3 (76)	—	3 (76)	—

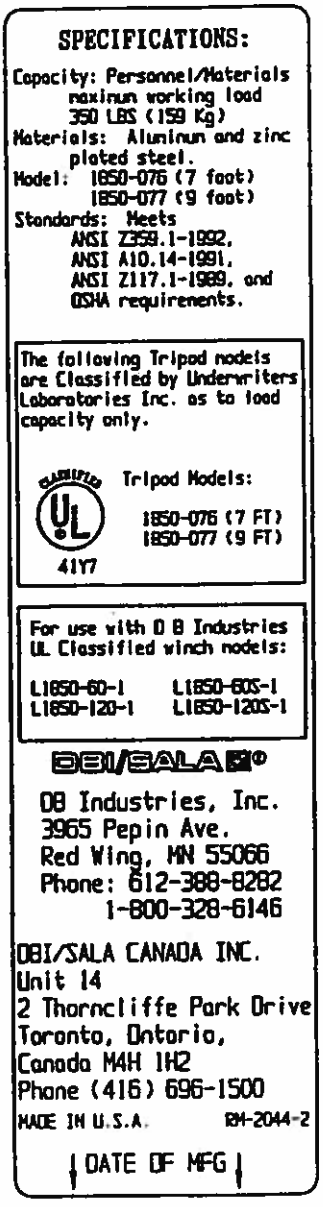
* Note: Tripods will span larger opening, however, leg chains will cross over a portion of the opening.
- These tripods meet ANSI Z359.1-1992, ANSI A10.14-1991 and OSHA requirements.
- The 1850-076 & 1850-077 are U.L. Classified (see product label for specific details).

7.0 LABELING

These labels should be securely attached to the tripod



Tripod Warning Label



Tripod Identification Label

Confined Space Entry Equipment Check List

Date: _____ **Circle TRIPOD 1 2**

Employee Name: (PRINT)_____

Equipment	**Present**	**Absent**	**Returned**
Tripod			
Safety Chains			
Leg Extension Lock Pins			
Cable Locking Pin			
Winch mount			
Tripod legs			
Tripod feet			
Safety rope anchorage			
Winch			
Mount			
Mount Lock pin (Detent pin)			
Crank Handle			
Cable			
Counterweight			
Snap hook			
Carrying bag			
Instruction Manual			
Lanyard / Energy Absorber			
Self locking snap hook (1)			
Self locking snap hook (2)			
Condition of webbing			
Safety line			
Fall arrester			

Date Returned _____

Any missing equipment must be listed on the back of this form.

Return this completed form to the Supervisor

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

EMERGENCY EVACUATION RESPONSE PLAN

Purpose

The purpose of the Boston Water and Sewer Commission's (BWSC) Emergency Evacuation and Response Plan is to ensure the timely and orderly handling and evacuation of Commission employees and visitors from 980 Harrison Avenue in the event of an emergency. The plan outlines procedures for handling evacuations, designates primary exit routes for each floor, assigns a meeting location and establishes a notification process for re-entering the building. The plan defines the responsibilities of the Emergency Response Team and has been designed as a management tool for this purpose.

Emergency Telephone Numbers - 911

Ambulance/Paramedics - 911

Fire - 911

Boston Police - 911

Municipal Police- 7101 (business days)

7100 (4pm – 8am M-F, Sat/Sun and Holidays)

Emergency Response Team

The Commission has established the following chain of command to address emergency situations. The Director of Health and Safety or his/her designee will be responsible for the overall safe and orderly evacuation of employees from the facility and for purposes of this plan will serve as the Emergency Response Team Coordinator.

- Director of Health and Safety – Determines with others when the evacuation of the building is necessary and when to return employees to the building. He/she is responsible for communicating with all inside and outside emergency personnel including police, fire and medical staff.
- Safety Manager – Oversees the efforts of the Emergency Response Team. Receives roll call reports, acts on reports of disabled employees requiring assistance exiting the building and investigates unaccounted for employees.
- Emergency Floor Steward – Oversees the evacuation of employees on his/her assigned floor. Reports findings to the Safety Manager. Collects roll call information (including the names of unaccounted for employees and the names and location of employees needing assistance from floor counters) and provides it to the Safety Manager and/or to outside emergency personnel.

- Emergency Floor Checker - Monitors the flow of employees to the proper emergency exits. Three are assigned to each floor. Checks public areas, lounges, large conference rooms, and restrooms before leaving his/her assigned area. Reports to the Floor Steward the names and the location of employees requiring additional assistance to evacuate the floor.

- Department Counter - The manager of each department or his/her designee will serve as counter. Prior to exiting the building, he or she will check any libraries, file rooms, conference /meeting rooms in the immediate area to ensure they are empty. They will take a roll call of all employees at the outside-designated meeting area and provides the names of unaccounted for employees to the Emergency Floor Steward or Safety Manager.

Security Personnel

Assigned security personnel will assist Boston Water and Sewer Commission employees, customers and visitors in the evacuation of the building when required. Security personnel will respond to the emergency by assisting individuals safely across Harrison Avenue to the outside emergency meeting area. Two security personnel will be stationed outside the building. One will be positioned at the customer entrance and the other at the location of the security office entrance.

Emergency Communication

All employees will follow directions given by members of the BWSC Emergency Response Team, Security personnel or outside emergency personnel.

An alarm will be sounded to alert occupants of the evacuation of the building. Employees will follow normal evacuation procedures.

A public address system may be used to inform all employees and visitors of an emergency and provide instructions to follow. A back-up communication system will be used in case of electrical outage.

Alternative means of communication will be utilized (i.e. cell phones/email) by the BWSC Emergency Response Team to communicate needs to other team members and to be updated by the Emergency Response Team Coordinator as to the status of the emergency.

Emergency Exits

All employees and visitors will exit the building and proceed across Harrison Avenue to the outside emergency meeting area, which is located in Parking Lot 4. Within the outside

emergency meeting area, departments will be organized by floor. Employees will report to their respective department area within the outside emergency meeting area.

1st Floor Employees: will use exit. #2 (Atrium), the employee exit# 4 (middle of building) and the security exit #8 (rear of building) to Harrison Ave.

2nd and 3rd Floor Employees: will use stairwell #2, #4 and #8 to exit to Harrison Avenue.

Fleet Employees- will proceed to the nearest exit ramp, open doorway, or exit #10, at the end of the building, and proceed to the BU Medical Center parking lot located at the entrance of the BWSC facility on Albany Street. It will be the responsibility of the Manager of Fleet or his/her designee to redirect any traffic from entering the BWSC facility. Further, the Manager of Fleet or his/her designee shall direct a Fleet employee to Fellows Street in order to redirect any traffic away from the BWSC facility.

Employees who are positioned outside the facility for any reason during an emergency situation, are to proceed across Harrison Avenue to the outside emergency meeting area (Parking Lot #4) and report to their department manager.

Fire Extinguishers / Flashlights

Fire extinguishers are located in visible places throughout the facility and are readily accessible. Make note of the location of the fire extinguisher nearest your workstation, however, only those employees who have been trained on how to operate fire extinguishers should use them.

Members of the Emergency Response Team will be provided flashlights, which shall be easily accessible in the case of an emergency. Members of the Emergency Response Team will be responsible for the maintenance of the flashlights.

Emergency Evacuation Procedure Guidelines

When a decision has been made to evacuate the building, an alarm may sound or the announcement may be made via an automated public address system. Emergency Response Team members will immediately begin evacuation procedures. Exit route(s) to be used will depend on the type of emergency, therefore it is imperative that all employees listen to the announcement and follow the directions.

Responsibilities

Department Counters/Managers:

- Notify all employees within their department to evacuate immediately.

- Instruct handicapped or other employees requiring additional assistance to remain at the top of the departments' designated stairwell and wait for assistance from outside emergency personnel.
- Check all small conference rooms, supply rooms or other obscure locations within your immediate area to ensure they are vacant.
- Take your roll call list. (A list of employee names, which is prepared and updated daily for easy identification of the employees who are present or off-site in order to ascertain who needs to be accounted for).
- Take roll call immediately at the outside meeting area.
- Report the roll call status (including unaccounted for employees) and any other important information to the designated Floor Steward.

Employees will:

- Leave their work area quietly and immediately for their designated exit and report to the outside meeting location. Remain at the outside meeting location, until otherwise instructed.
- Use the primary escape route assigned (the nearest established exit). When a secondary route is required, floor stewards will instruct and direct employees accordingly.
- Employees must go directly to their assigned exit route. No one should linger at their workstation or return for possessions. Do not stop to lock doors. Do not use the elevators or wait for friends.
- Fleet personnel will report to the designated area with the exception of the Emergency Response Team Member and other assigned designee(s). The Team Member and other designee(s) shall directly report to the BU Medical Center Parking Lot and/or Fellows Street to redirect incoming traffic away from the BWSC facility.
- The directions of the Emergency Evacuation Team must be followed to ensure an expedient and safe egress from the building. Team members and all employees must be cognizant of possible direction to an alternate route.
- All visitors will be informed of the appropriate exit route to use in an emergency. Handicapped individuals and/or those identified as requiring assistance will be ushered to the top of the designated stairwell to wait for assistance from emergency personnel. Employees must report to the outside emergency designated meeting area immediately after exiting the building.

- Employees must locate their department manager so that an accurate roll call report can be made of all employees.
- Employees must remain in the designated location until advised by the Director of Health and Safety or designee that re-entry to the building has been approved or for further instructions.
- The local Fire and Police Departments will handle rescue and medical duties.

Off Hours Evacuation Procedure

- Off hour employees will exit the building using the exits established for their department.
- The Visitors Parking Lot, at the corner of Thorndike and Harrison Ave, has been designated as the outside emergency meeting area for all off hour employees. Roll call will be taken at this location.
- Off-Hour Emergency Evacuation Coordinators:
    - Monday through Friday 4:00 pm to Midnight, Operations Managers or their designee will act as the Coordinators.
    - Third Shift and Weekends, Operations Supervisors will act as Coordinators.
    - Fleet personnel will report to the designated area (visitor's parking lot) with the exception of the Emergency Response Team Member. The Team Member shall directly report to BU Medical Center Parking Lot and redirect incoming traffic away from the BWSC facility.

Re-Entry Procedures

The Director of Health and Safety will notify the Safety Manager who will then notify members of the Emergency Response Team and department managers when authority has been received to re-enter the building.

Upon the re-entry of the building, all employees will immediately go to their assigned departments for a head count.

In the event that an emergency causes structural damage to the BWSC facility and re-entry is forbidden, the Executive Director or his/her designee, will instruct all field employees, to go to a safe reporting area. Employees presently in the designated meeting area will be instructed as to same.

First Aid

Members of the Emergency Response Team will be responsible for maintaining the contents of First Aid Kits located within their work area. First Aid Kits are located in designated areas throughout the Commission. Signs are posted identifying their exact locations. Department managers and members of the Emergency Response Team will know the exact locations.

Should an employee become injured or ill due to an industrial or non-industrial problem and need immediate medical aid, report to your department manager or his/her designee.

All injuries, regardless of how small, must be reported and treated as soon as possible. Failure to receive medical treatment may result in serious infections or complications to your health.

Emergency Response

When a fire is discovered in the building:

- The Fire Department should be called immediately.
- Security personnel and the Director of Health and Safety should be notified immediately. The location and type of fire should be reported (small/large, electrical, wastepaper basket).

Things to do in a fire emergency: (included in employee training sessions)

- Report the fire. Do not assume someone else has called or will call the fire department.
- Do not fight the fire.
- Close all doors in and around the fire area (when possible).
- Walk to the nearest exit and evacuate the building.
- If confronted by smoke, keep low to the floor.
- Always use the assigned stairways. NEVER USE THE ELEVATOR
- Feel the doors with your hand before opening. If the door is hot to touch – DO NOT OPEN
- Locate the safest route possible.
- Follow the evacuation procedures and go directly to the designated meeting location.

Emergency - Bomb Threats

Recipients of a bomb threat via the telephone should be attentive to the following elements of the conversation:

- Listen to exactly what is said.
- Attempt to ascertain age, sex, and ethnic group of the caller.
- Listen for any background noise.
- Write down the caller ID number (or try *69)

Immediately following the conversation Notify:

- 911
- Department Manager/Division Chief
- Director of Health and Safety

Each bomb threat contains certain elements that dictate how it should be handled. The Director of Health and Safety is charged with the responsibility of making the decision as to what course of action(s) will be taken based on the information received.

In case of a bomb threat, the proper authorities must be notified. Depending on local public safety policy, either the police or fire department or both will appear at the facility. They should assist in evacuating the building, and again depending on local policy, they will advise as to whether or not an extended evacuation is necessary and for how long a period of time.

In the event that the facility is to be evacuated, management should make every effort to secure the building.

The Director of Health and Safety as well as Security and Local Authorities will secure the "safe route" out of the building and commence evacuation. A direct route to exit the building should be determined and secured as the “safe route". Key personnel will direct employees and non-employees to leave using the “safe route” if an emergency situation exists.

Local authorities will provide specific direction as to whether or not the building may be opened or should remain closed. The local authorities will be the deciding factor.

Other Disasters (earthquake. violent storms, etc.)

Safe Areas and Safety Guidelines

- Take cover to protect yourself from injury.

- Identify the safe areas located in the facility/department:
- In doorways
- Under doorsills
- Under desks or tables
- Beside heavy upright beams.
- Avoid areas under glass skylights or near glass windows.
- Know what things might fall or tip over in your area and stay clear of them.
- Report injured employees to a member of the BWSC Emergency Response Team or outside emergency personnel.

DO NOT run from the building. Most injuries and fatalities occur outside the building from falling debris or objects or from fallen high-voltage wires.

The Commission is concerned for the safety of all employees and will ask them to remain in the building until it is safe to leave.

Employees should advise their families to tune into local radio and television stations for information on emergency conditions or call the Mayor's 24 Hour Hot Line at 617-635-4500.

Priorities are to be established immediately after the disaster. The first things to consider are the following:

Managers

- Assist in the evacuation of employees and follow directions of the emergency response team.
- Assist in damage assessment of your department (if asked).
- Do not turn on any lights or electrical equipment as it is a high fire risk.
- Provide assistance to injured individuals.

Maintenance

In the event that the building has experienced serious damage, the following must be considered immediately:

- Main gas valves must be shut off.

- Power to ALL electrical main Switches must be shut down.
- Main water supply must be shut down.
- In the event of broken water pipes, the main water supply must be shut off
- Take proper steps to turn off the air conditioning. If the main water valve is turned off for more than 30 minutes, severe damage to the air conditioning unit could result.

Power Failures

All employees should stay in the building during a power failure unless otherwise instructed by the Emergency Response Team Coordinator through the department manager. When evacuation is necessary, follow normal evacuation procedures unless otherwise instructed.

Emergency Training and Program Review

- The Emergency Evacuation and Response Plan will be reviewed annually by the Emergency Response Team or whenever building conditions change.
- All employees will receive an annual review of the Emergency Evacuation procedures or whenever changes have been made to any procedures or building construction.
- All fire extinguishers and emergency exits will be adequately marked to assist employees in locating them.
- A map showing the location(s) of all exits and fire extinguishers will be included with this document. The maps will be updated annually or whenever changes have been made to building construction or evacuation procedures.
- A test of the alarm system and a drill of the emergency evacuation procedures will be conducted annually, at a minimum.

Active Shooter

An “active shooter” is an individual who is engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms(s) and there is no pattern or method to their selection of victims.

Victims are selected at random

Event is unpredictable and evolves quickly

Knowing what to do can save lives

When an Active Shooter is in your vicinity, you must be prepared both mentally and physically to deal with the situation

Run

- Have an escape route and plan in mind.
- Leave your belongings behind.
- Evacuate regardless of whether others agree to follow.
- Help others escape, if possible.
- Do not attempt to move the wounded.
- Prevent others from entering an area where the active shooter may be.
- Keep your hands visible.
- Call 911 when you are safe.

Hide

- Hide in an area out of the shooter's view.
- Lock door or block entry to your hiding place.
- Silence your cell phone (including vibrate mode) and remain quiet.

Fight

- Fight as a last resort and only when your life is in imminent danger.
- Attempt to incapacitate the shooter.
- Act with as much physical aggression as possible.
- Improvise weapons or throw items at the active shooter.
- Commit to your actions, your life depends on it.

The first officers to arrive on scene will not stop to help the injured. Expect rescue teams to follow initial officers. These rescue teams will treat and remove injured.

Once you have reached a safe location, you will likely be held in that area by law enforcement until the situation is under control and all witnesses have been identified and questioned. Do not leave the area until law enforcement authorities have instructed you to do so.

When Law Enforcement Arrives

- Remain calm and follow instructions
- Drop items in your hands (e.g., bags, jackets)
- Raise hands and spread fingers
- Keep hands visible at all times
- Avoid quick movements toward officers, such as holding on to them for safety
- Avoid pointing, screaming or yelling
- Do not ask questions when evacuating

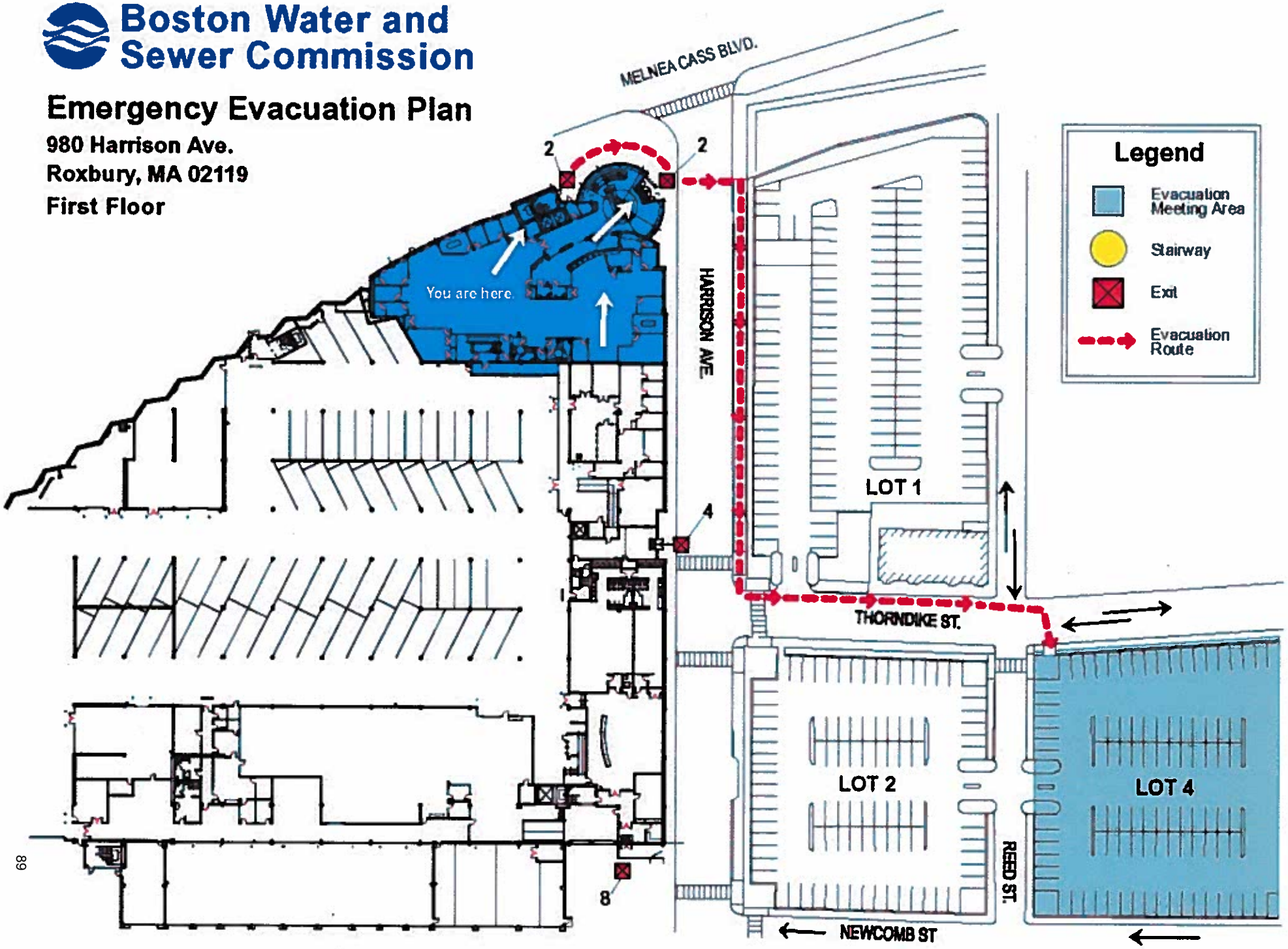
Information to provide to 911 operations:

- Location of the active shooter
- Number of shooters
- Physical description of shooters
- Number and type of weapons shooter has
- Number of potential victims at location

Boston Water and Sewer Commission

Emergency Evacuation Plan

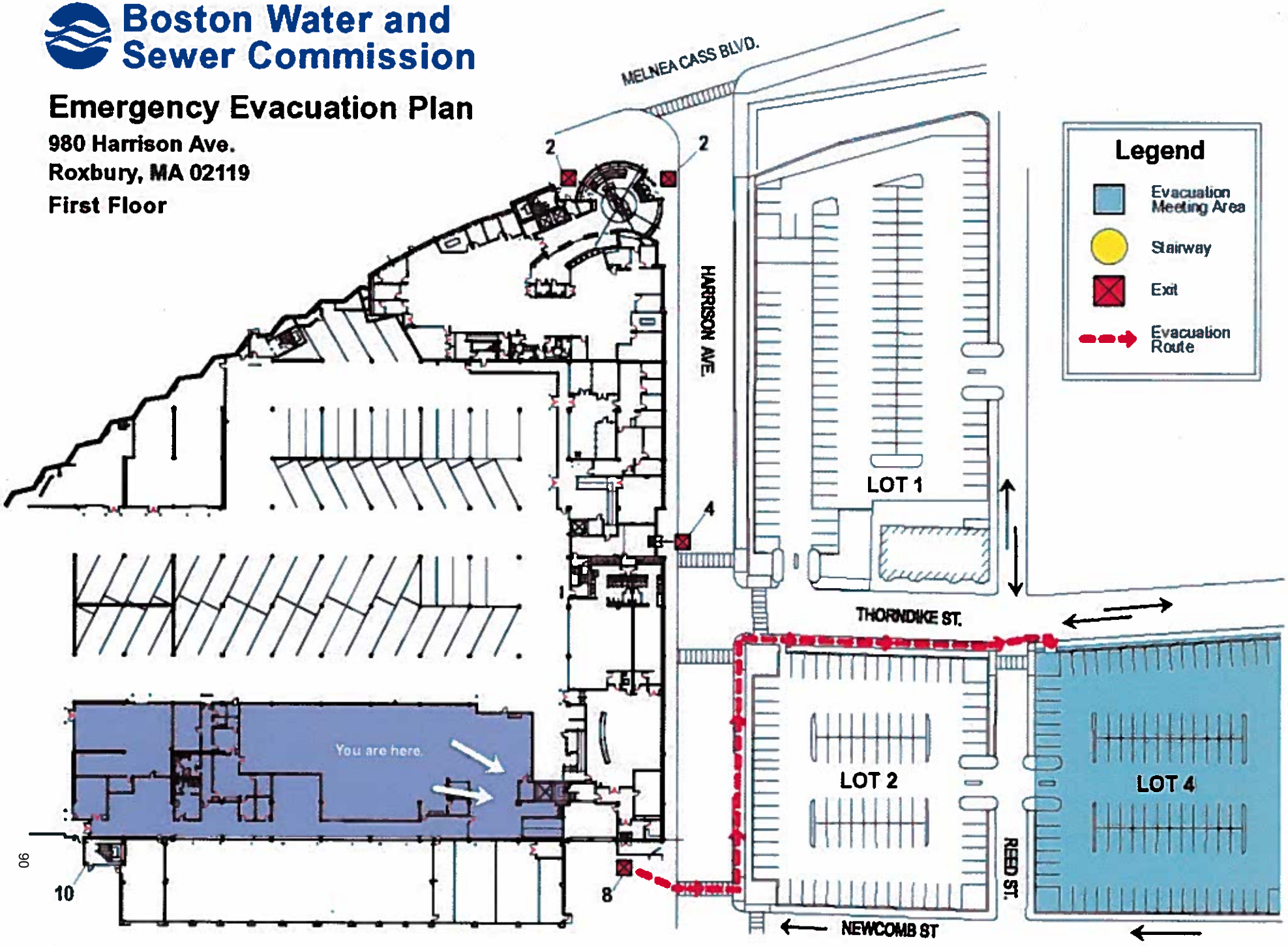
980 Harrison Ave.
Roxbury, MA 02119
First Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

980 Harrison Ave.
Roxbury, MA 02119
First Floor

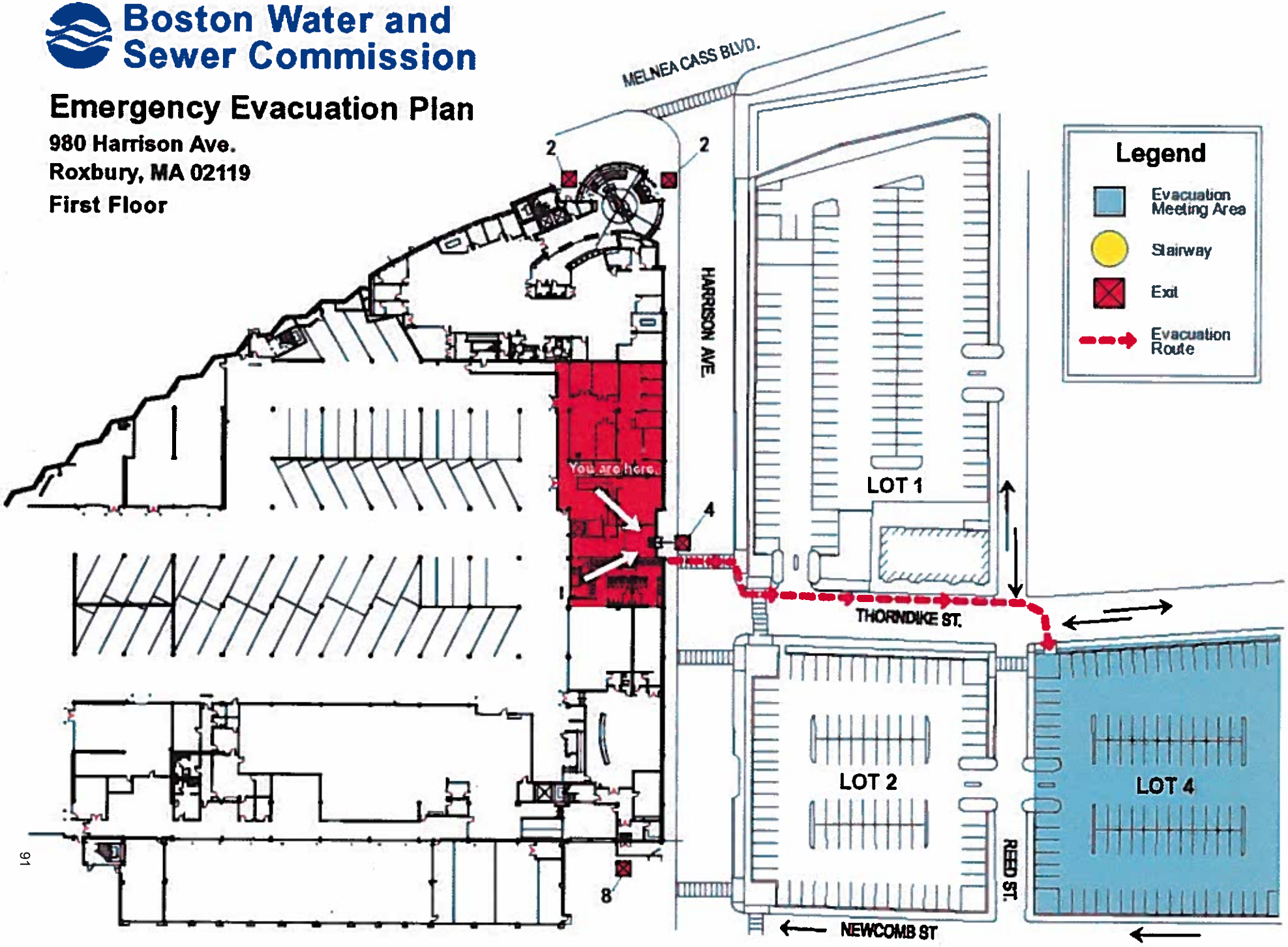


06

Boston Water and Sewer Commission

Emergency Evacuation Plan

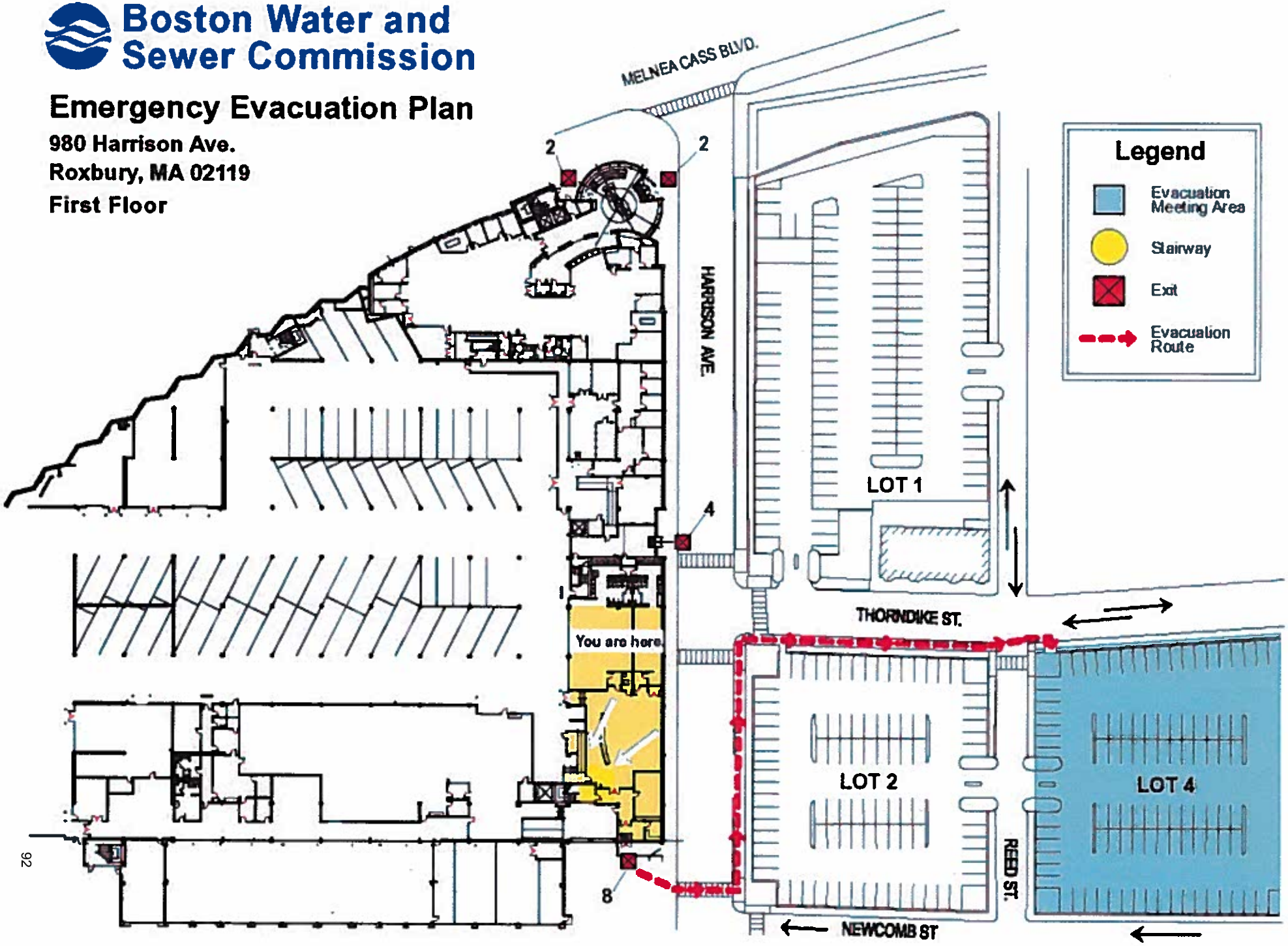
980 Harrison Ave.
Roxbury, MA 02119
First Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

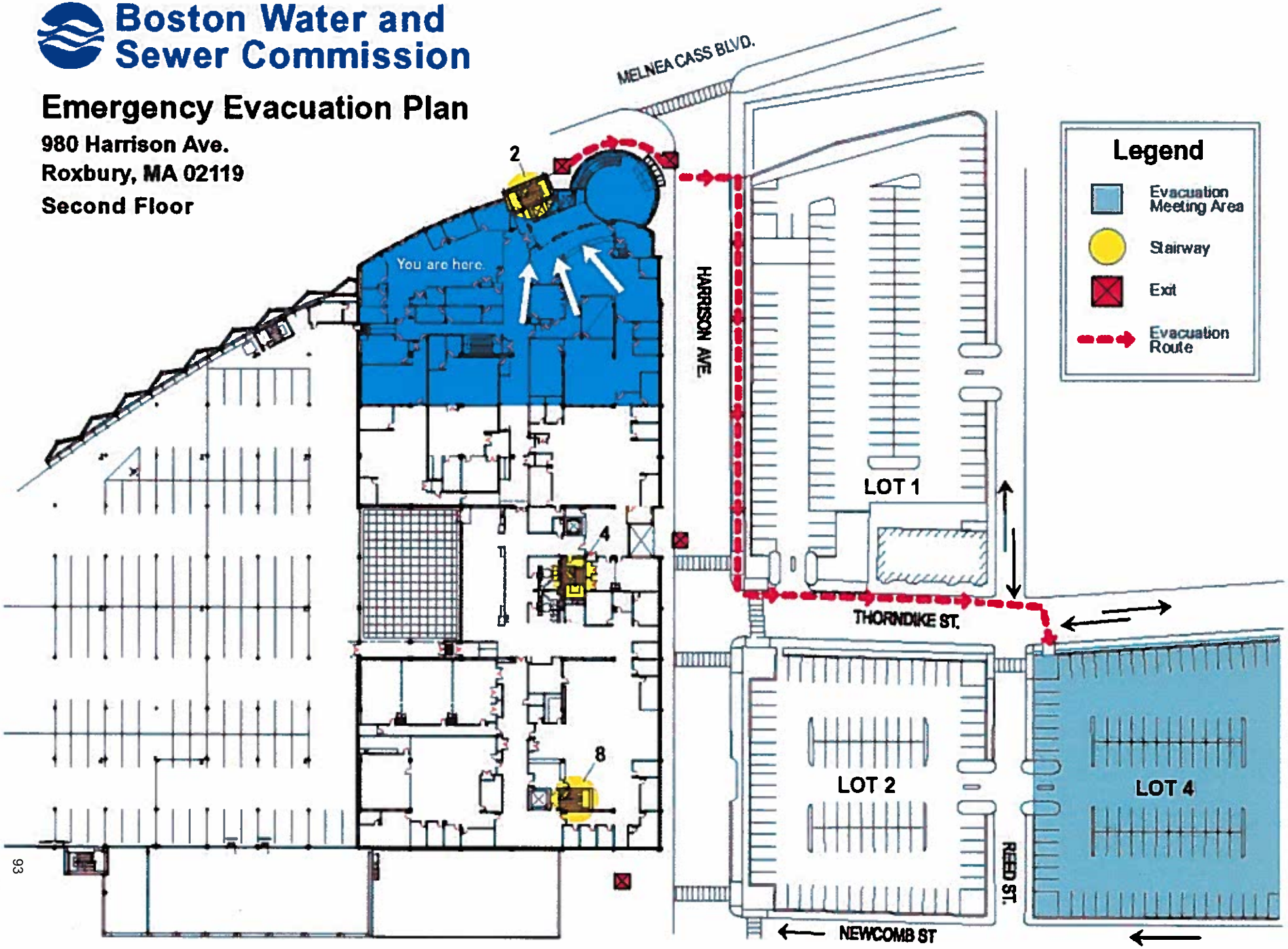
980 Harrison Ave.
Roxbury, MA 02119
First Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

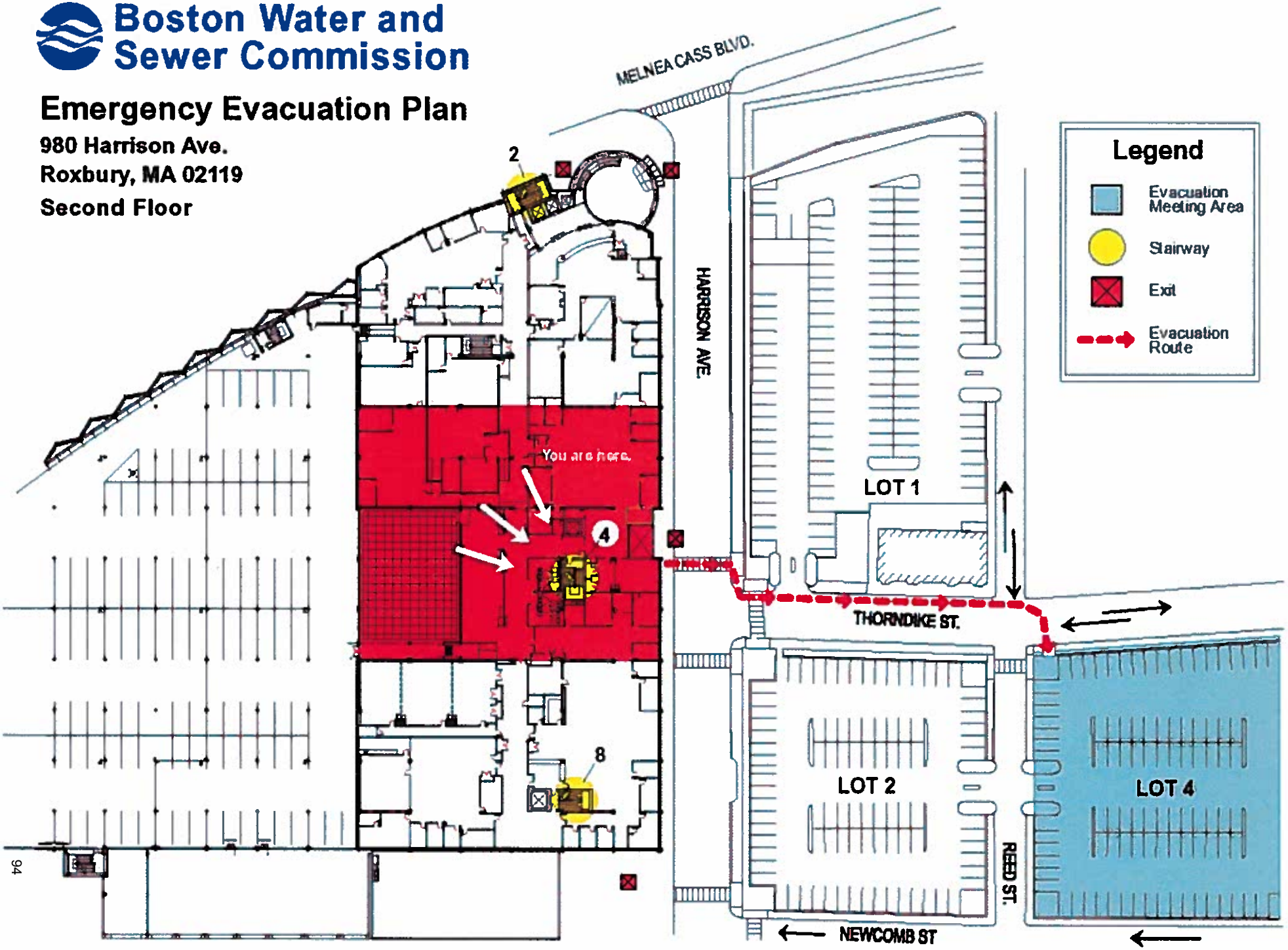
980 Harrison Ave.
Roxbury, MA 02119
Second Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

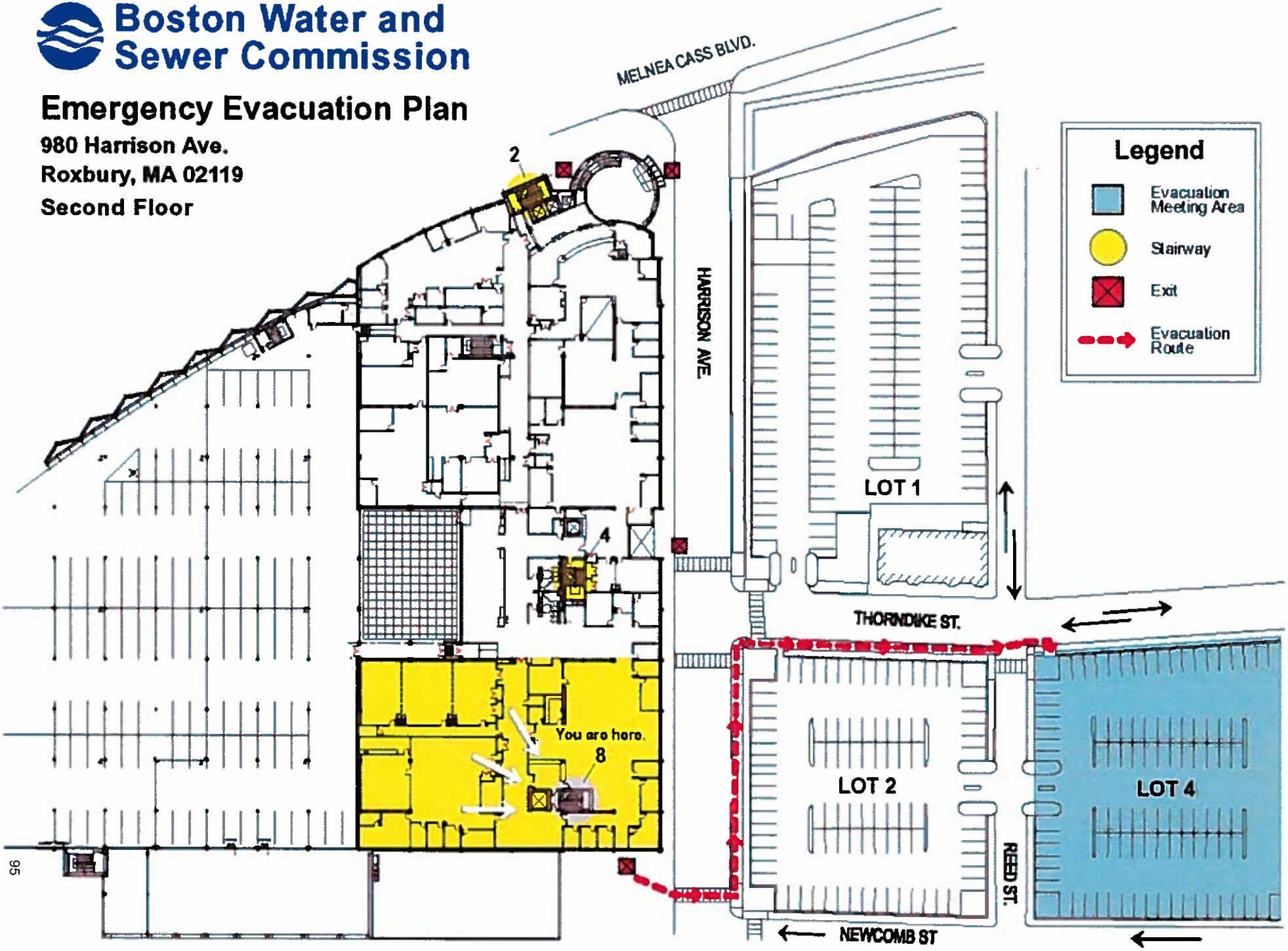
980 Harrison Ave.
Roxbury, MA 02119
Second Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

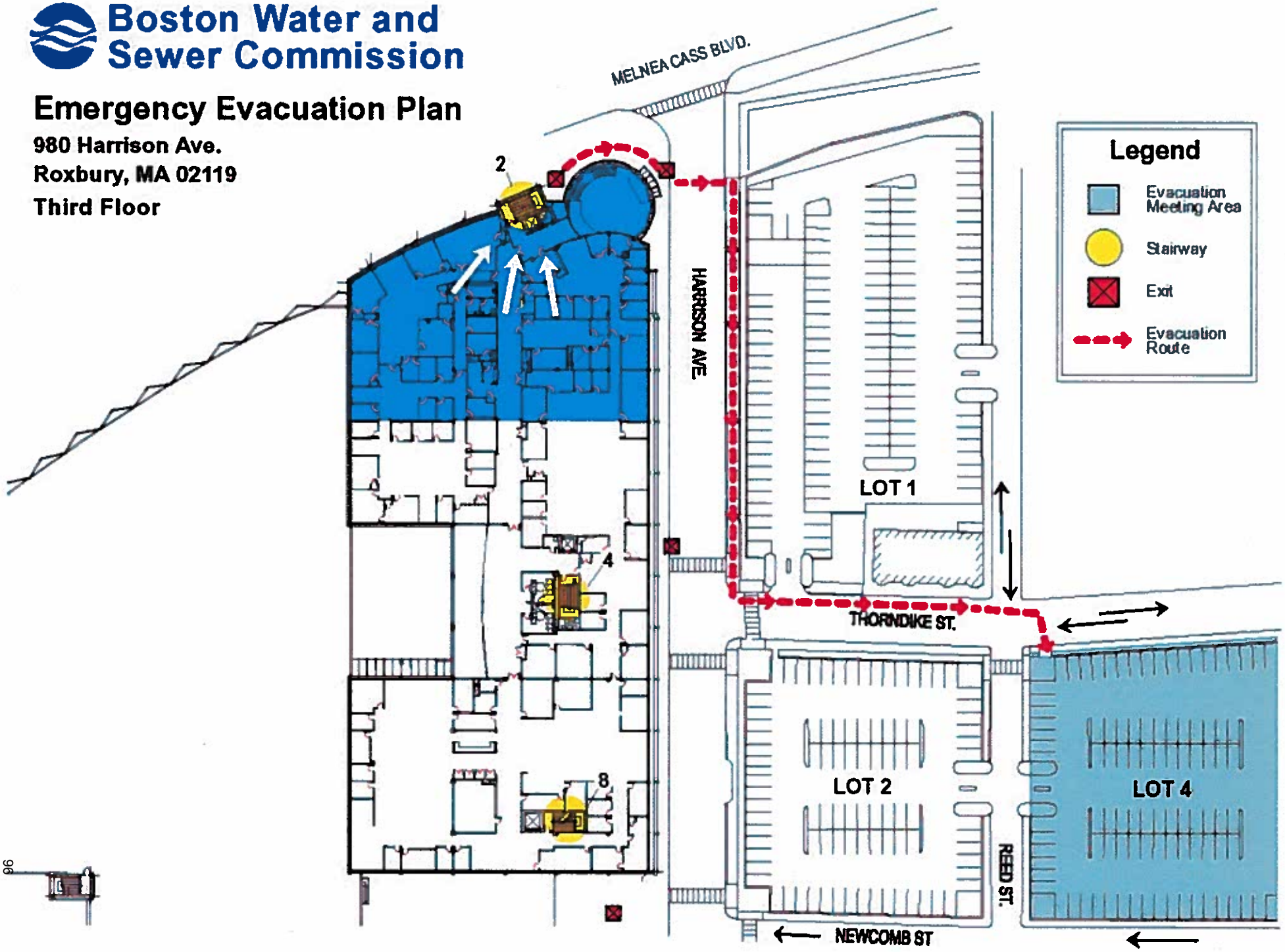
980 Harrison Ave.
Roxbury, MA 02119
Second Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

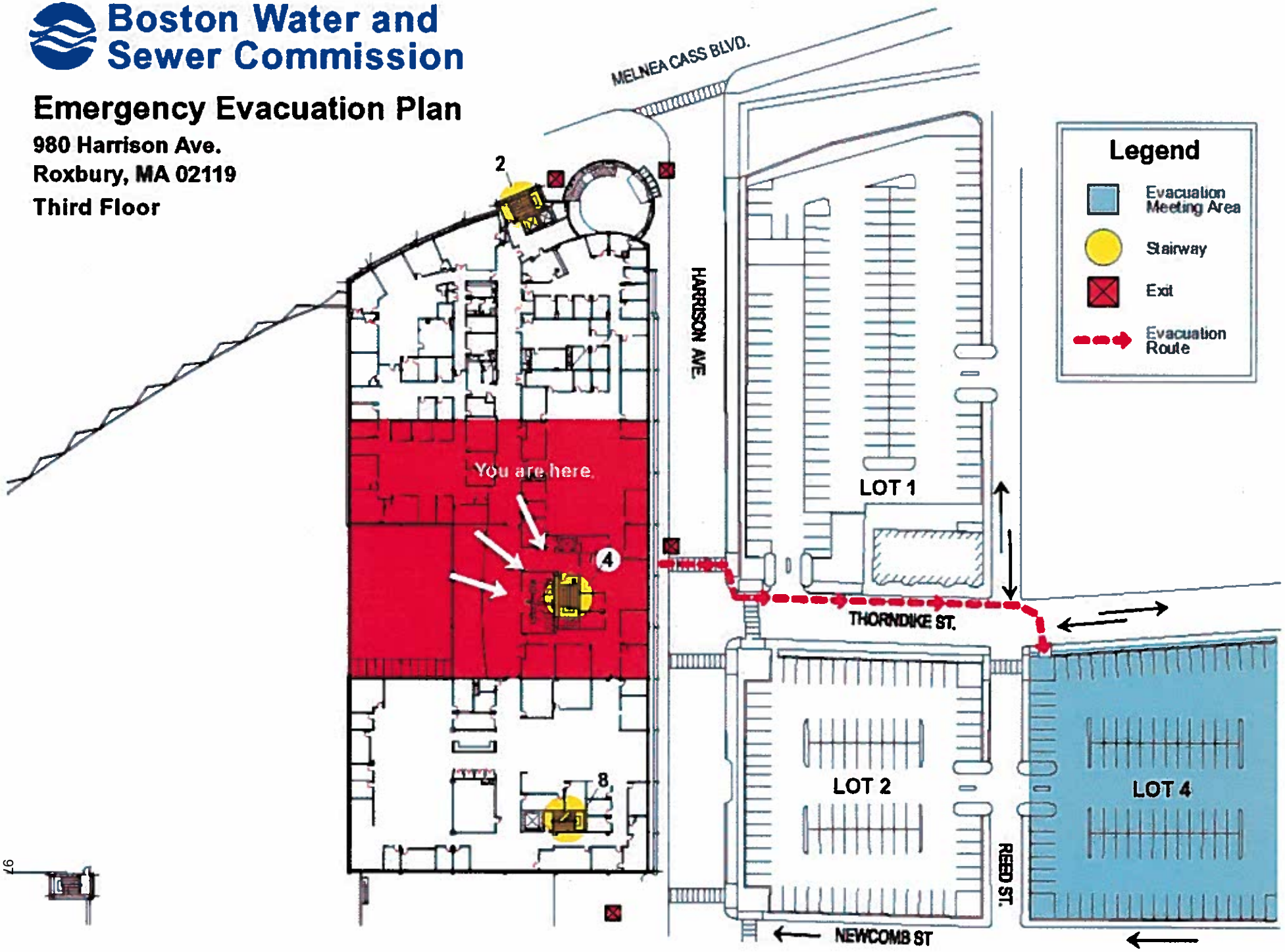
980 Harrison Ave.
Roxbury, MA 02119
Third Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

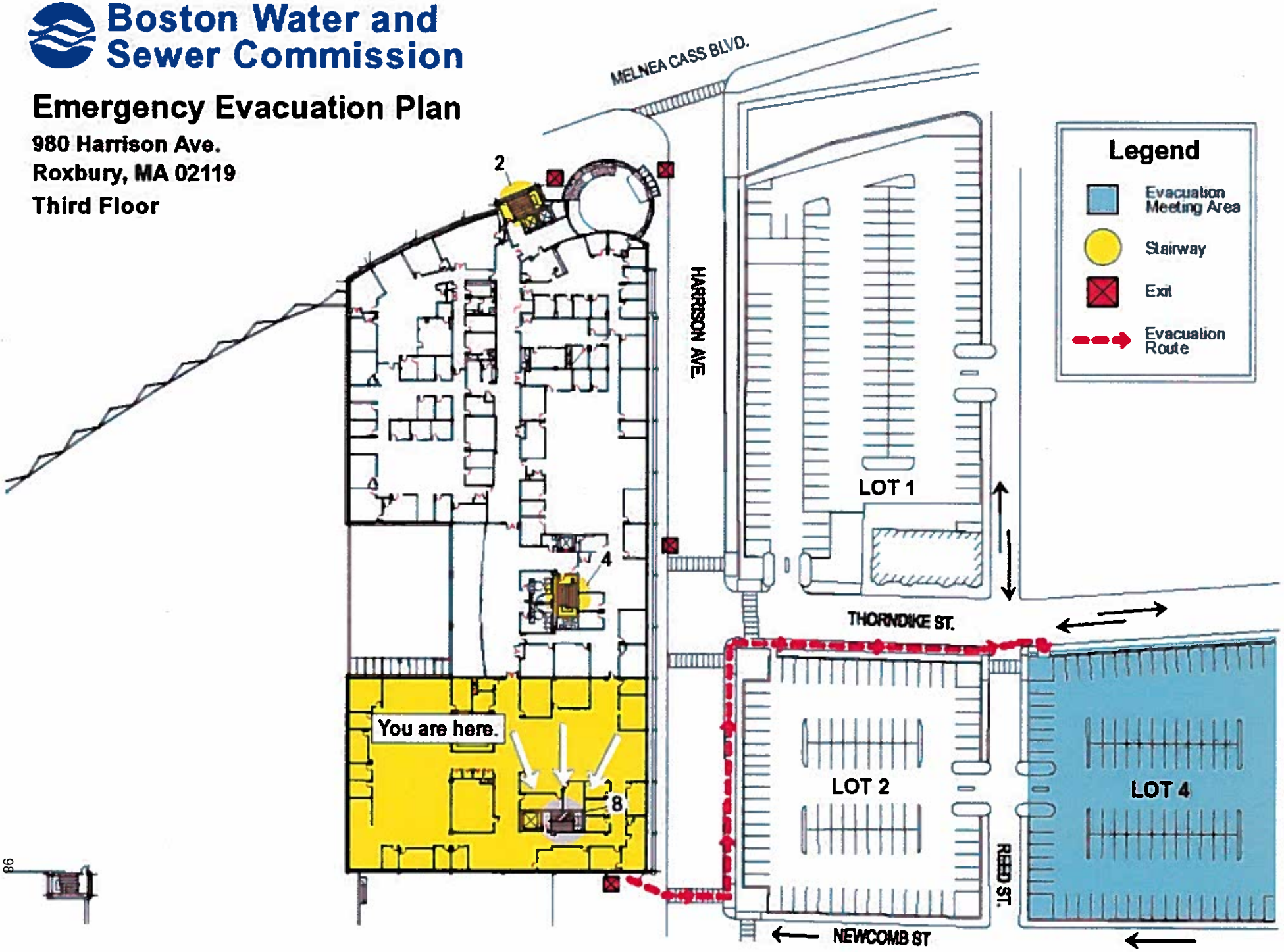
980 Harrison Ave.
Roxbury, MA 02119
Third Floor



Boston Water and Sewer Commission

Emergency Evacuation Plan

980 Harrison Ave.
Roxbury, MA 02119
Third Floor



BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

SPCCP

SPILL PREVENTION CONTROL AND COUNTERMEASURES

Purpose

The Commission has developed a Spill Prevention Control and Countermeasures Plan (SPCC) in accordance with United States Environmental Protection Agency regulations. The Plan is designed to reduce the potential for discharges of oil into the environment from the Commission's Headquarters. Excerpts from the Plan have been selected for inclusion in this manual to provide employees with concise pertinent information for spill prevention and controlling potential spills at the facility. A copy of the complete SPCC Plan is maintained in the Commission's Facilities Manual.

Headquarters Overview

The Commission's Headquarters building is a three-story office building with an attached two-story garage and one-story vehicle maintenance facility. The building totals approximately 316,000 square feet in area, which includes approximately 165,000 square feet of garage space. The Facility also includes a fueling station, a truck wash, and the surrounding yard where maintenance equipment and materials are stored. The facility is operational 24 hrs per day, seven days per week.

The facility is located on an irregularly shaped site on the north side of Melnea Cass Boulevard between Harrison Avenue and Albany Street. East Lenox Street, Pike Street and Randall Street border the northeast side of the site.

The topography of the site is relatively flat to moderately sloped. Most surface drainage is directed to stormwater catch basins located at the northeast side of the building. The catch basin located nearest to the fuel pump island and the basins located alongside the service bay area are connected to particle separators which discharge to the public storm drain on Fellows Street. Other catch basins located on the former Randall Street, Fellows Street, in the storage yard, and in the parking lot adjacent to the Albany Street entrance drain directly into the public storm drain. The catch basin at the loading dock located at the northeast corner of the building drains to a public storm drain located on Harrison Avenue.

Floor drains in the vehicle maintenance bays and garage drain to underground oil and grease traps which discharge to the public combined sanitary/storm sewer on Harrison Avenue. Drainage from the truck wash is recycled. Overflow from the recycle system is discharged to an oil and grease separator, which discharges to the combined sewer on Harrison Avenue.

On the following pages oil storage at the facility is outlined in Table I and the location of each potential spill source outlined in Table 2.

Oil Storage

Oil Storage at the facility includes two underground storage tanks totaling approximately 30,000 gallons (10,000 gallons of gasoline, 20,000 gallons of diesel fuel) and aboveground storage tanks totaling approximately 3,700 gallons. Aboveground storage includes diesel fuel (emergency generator), lubricating oils (virgin and waste), automatic transmission fluid (virgin and waste), antifreeze (virgin and recycled), elevator hydraulic fluid, vehicle lift hydraulic fluid, machine shop cutting oil, and transformer dielectric fluid.

TABLE 1 provides a detailed list of the specific oil storage areas. Storage containers less than 55 gallons, although not subject to PCC regulations, are presented for informational purposes. (See next page)

TABLE 1
LOCATION OF OIL STORAGE TANKS
BOSTON WATER AND SEWER COMMISION -VEHICLE MAINTENENCE FACILITY

Location	Description
Gasoline and Diesel UST and Fueling Station	• (1) 10,000-gallon double-wall FRP UST used for the storage of gasoline. • (1) 20,000-gallon double-wall FRP UST used for the storage of diesel fuel • USTs and fuel distribution lines installed in accordance with 40 CFR 280. • Pad Mounted Electric Transformer- Dielectric fluid (property of NSTAR) • Fuel dispensing pump island located adjacent to the UST • Stormwater collection basin connected to particle trap located approximately 110 feet from UST fill area and approximately 15 feet from the fuel dispensing pump island. Spills may also enter other catch basins that discharge directly to the Fellows Street storm drain.
Chemical Storage Shed (Located adjacent to truck wash building)	• (3 to 6) 55-gallon drums of windshield washer fluid (methanol) • (3 to 6) 55-gallon drums of hydraulic fluid • Number and contents of drums may vary, 820 gallons of containment volume integral with shed.
Lube Room- Ground Level of Garage building Adjacent to Service Bays	Indoor bulk storage of petroleum products used in vehicle maintenance operations (2) 500-gallon virgin motor oil AST, double wall steel tank (1) 280-gallon waste oil AST, double wall steel tank (1) 280-gallon automatic transmission fluid AST, double wall steel tank (1) 200-gallon antifreeze tank AST, double wall steel tank (1) 165-gallon windshield washer fluid, single wall plastic tank (1) 100-gallon antifreeze recycling system holding tank, single wall plastic tank (12) 30- to 55-gallon steel drums of various petroleum products (quantity varies) • No floor drains in Lube Room. 4"x3" angle iron installed to abut concrete walls for full containment of ASTs • Drums stored on spill control pallets

TABLE 1
LOCATION OF OIL STORAGE TANKS
BOSTON WATER AND SEWER COMMISION -VEHICLE MAINTENENCE FACILITY

Vehicle Maintenance Service Bays	• (3) 16-gallon waste oil collection cans • (1) 30-gallon hydraulic oil (for vehicle hydraulic systems) • (1) "Orner" hydraulic vehicle lift -Approximately 15-gallon fluid reservoir • (5) "Forward Manufacturing" hydraulic vehicle lift- Approximately 5-gallon fluid reservoir • (1) Oil filler crushing machine - Approximately 5 gallon plastic jug waste oil reservoir • (1) Parts cleaner (Safety Kleen) - Petroleum Distillates, Approximately 30 gallon reservoir in single wall steel tank. • Trough style floor drains located along perimeter wall at bay entrances. Floor drains connected to oil & grease trap.
Steam Room (adjacent to service bays)	• (1) "Orner" hydraulic vehicle lift - Approximately 15-gallon fluid reservoir • Trough style floor drains located along perimeter wall at bay entrances. Floor drains connected to oil & grease trap.
Machine Shop - Ground Level of Garage building Adjacent to Service Bays	• (5) 5- to 7-gallon cutting oil reservoirs for metal lathes, cutting saw, milling machine, and radial drill • (1) Replacement fluid stored in 5-gallon container
Storage Area - Ground Level at Northeast Comer of Garage Building	• (1) 750-gallon diesel fuel ASTs double wall steel tank in above ground concrete block enclosure • Concrete block enclosure approximately 118" x 167" with 10" high concrete curb around entire perimeter (including at entrance), no floor drains • Single wall steel pipe fuel supply and return lines pass through parking garage to emergency generator located on second level of garage on south side of garage.
Parking Garage, Second Level, South Side- Emergency Generator	• (1) 175-gallon AST, single wall steel tank in steel secondary containment, located inside emergency generator enclosure
Freight Elevator Machine Room	• (1) hydraulic fluid reservoir, Approximately 150 gallons • Concrete block room, approximately 129" x 106", no floor drains, 106" - 4"x3" angle iron installed to complete containment for reservoir

TABLE 1 LOCATION OF OIL STORAGE TANKS BOSTON WATER AND SEWER COMMISION -VEHICLE MAINTENENCE FACILITY	
Passenger Elevator Machine Room (Room 1005)	• (2) hydraulic fluid reservoir, Approximately 150 gallons • Gypsum board construction, Approximately 91" x 119", no floor drains, 4"x3" angle iron installed to surround reservoir for containment
Passenger Elevator Machine Room (Room 1017)	• (1) hydraulic fluid reservoir, Approximately 150 gallons • Concrete block room, approximately l12" X 98", no floor drains, 112"-4"x3"angle iron installed to complete containment for reservoir (Recommend installing 4"concrete curb at door)

Potential Spill Sources

The location of each potential spill source, potential failure type, material contained, direction and rate of flow under failure conditions, and current secondary containment or other spill abatement method is summarized in Table 2 - Spill Potential.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Underground Storage Tanks						
Diesel UST	Leak or Rupture	20,000	20,000	Into surrounding soil/rock	Secondary Containment Tank	Double wall FRP tank. Interstitial Leak detection provided.
Gasoline UST	Leak or Rupture	10,000	10,000	Into surrounding soil/rock	Secondary Containment Tank	Double-wall FRP tank. Interstitial Leak detection provided.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Aboveground Storage Tanks

Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Emergency Generator Main Diesel Fuel Tank	Leak or Rupture	750	750	Into Secondary Containment Tank	Secondary Containment Tank> 110% of primary tank (per manufacturer)	Double wall steel tank. Located in a concrete and concrete enclosure that provided tertiary containment. Tertiary containment provided by concrete curb- Approximately 850 gallons.
Emergency Generator- Day Tank	Leak or Rupture	175	175	Into Secondary Containment Tank	220	Single wall steel tank located in a steel secondary containment tank. Located inside emergency generator enclosure.
Used Engine Oil	Leak or Rupture	280	280	Into Secondary Containment Tank	Secondary Containment Tank> 110% of primary tank (per manufacturer)	Double wall steel tank. Interstitial leak sensor (Veeder Root monitoring system).Rupture of both primary and secondary tanks wall - spill onto concrete floor. No floor drains in immediate area. An impermeable berm surrounds all ASTs in the Lube Room to provide secondary or tertiary containment for stored oils and other fluids.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Virgin Engine Oil AST (2 Tanks)	Leak or Rupture	500	500	Into secondary containment tank	Secondary Containment Tank> 110% of primary tank (per manufacturer)	Double wall steel tank. Interstitial leak sensor (Veeder Root monitoring system). Rupture of both primary and secondary tanks wall - spill onto concrete floor. No floor drains in immediate area.
Automatic Transmission Fluid AST	Leak or Rupture	280	280	Into secondary containment tank	Secondary Containment Tank> 110% of primary tank (per manufacturer)	Double wall steel tank. Interstitial leak sensor (Veeder Root monitoring system). Rupture of both primary and secondary tanks wall - spill onto concrete floor. No floor drains in immediate area.
Antifreeze AST	Leak or Rupture	200	200	Into secondary containment tank	Secondary Containment Tank> 110% of primary tank (per manufacturer)	Double wall steel tank. Interstitial leak sensor (Veeder Root monitoring system). Rupture of both primary and secondary tanks wall - spill onto concrete floor. No floor drains in immediate area.
Antifreeze Recycling System Tank	Leak or Rupture	100	100	Onto Floor of Lube Room	0	Single wall polyethylene tank. No floor drains in immediate area

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Windshield Washer Fluid Distribution System	Leak or Rupture	165	165	Onto floor of Lube Room	0	Single Plastic Tank. No floor drains in the immediate area
Chemical Storage Shed 55 Gallon Drums	Leak or Rupture	55	55	Into storage shed secondary containment	Secondary containment integral with storage shed 820 gallons	
Lube Room Storage Drums (30-55 gallon drums)	Leak or Rupture	55	55	Into drum spill control storage pallet, or onto Lube Room floor		No floor drains in immediate area. Store drums on appropriately sized spill control pallets.
Vehicle Lift Hydraulic Fluid Reservoirs	Leak or Rupture	15	15	Onto floor or service bay, into floor drains.	Excluded from secondary containment requirements.	Floor drains connect to oil and grease trap.
Waste oil collection cans	Leak, Rupture or Tip Over	16	16	Onto floor or service bay, into floor drains.	Excluded from secondary containment requirements.	Floor drains connect to oil and grease trap.
Machine Shop Cutting Oil Reservoirs	Leak or Rupture	7	7	Onto floor or service bay, into floor drains.	Excluded from secondary containment requirements.	Floor drains connect to oil and grease trap.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Elevator Machine Hydraulic Fluid Reservoirs	Leak or Rupture	150	150	Onto floor of elevator machine room.	150- 175 with 4" curb around machine room perimeter.	No floor drains in immediate area. Berms installed to complete containment in elevator machine rooms.
Delivery Truck Unloading Operations						
Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Diesel & Gasoline UST's	Hose Rupture or connection failure	2,500	2,500	South toward on-site stormwater catch basin.	Spill will accumulate over catch basins adjacent to the building. Available volume not determined.	Portable spill berms are utilized for containment around affected catch basins. Large spills may enter building. A contingency plan is in place in the event of a spill; oil suppliers are responsible for spill response for spills during deliveries.
Diesel & Gasoline UST's	Overfill	5	5	South toward on-site stormwater catch basin	5	Fill port equipped with overfill prevention valve. USTs equipped with a Veeder Root tank monitoring system. Includes overfill alarm .5-gallon overfills containment provided.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Diesel for Emergency Generator AST	Hose Rupture or connection failure	2,500	2,500	Northwest toward on-site stormwater catch basin	Spill will accumulate over catch basins adjacent to the bldg. Available volume not determined	Portable spill berms are used for containment around affected catch basins; large spills may enter building. A contingency plan is in place in the event of a spill; oil suppliers are responsible for spill response for spills during deliveries.
Diesel for· Emergency Generator AST	Overfill	5	5	South onto on-site grassy/soil area	0	AST equipped with a Veeder Root tank monitoring system. Includes overfill alarm. Fill port equipped with "whistle" alarm for overfill.
Virgin Engine Oil and Automatic Transmission Fluid	Hose Rupture or connection failure	2,500	2,500	Loading area located directly over catch basins adjacent to the building	Spill will accumulate over catch basins adjacent to the building. Available volume not determined.	Portable spill berms are utilized for containment around affected catch basins. Large spills may enter building. A contingency plan will be implemented in the event of a spill; oil suppliers are responsible for spill response for spills during deliveries

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Virgin Engine Oil and Automatic Transmission Fluid	Overfill	5	5	Into steel containment enclosure around fill ports. Drains into waste oil tank.		ASTs equipped with a Veeder Root tank monitoring system. Includes overfill alarm. Fill port containment drains to waste oil AST. Audible Alarm warns delivery driver of overfill situation.

Facility Transfer Operations

Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Piping From USTs	Piping Leak	5	5	Into surrounding soil/rock	Double wall fuel line construction. Interstitial space drains to sump located at UST	Double wall fiberglass piping (underground) to fueling island. Leak detector would shut off flow to prevent additional release. Piping sumps equipped with liquid sensor (Veeder Root monitoring system)

Piping From Emergency Generator AST	Piping Leak	10	10	Onto floor of storage area or garage, into floor drains	0	Single wall supply and return lines to day tank. Volume based on capacity of 200 feet of 1" pipe.

TABLE 2
SPILL POTENTIAL
Boston Water and Sewer Commission- Vehicle Maintenance Facility

Piping From Virgin Oil/ATF AST Service Bays	Piping Leak	2	2	Onto floor of service bays, into floor drains	0	Single wall steel pipe system. Floor drains connected to oil and grease traps.
Transfer of Waste Oil into AST	Hose/pump leak or Overfill	15	15	Onto floor of Lube Room	0	No floor drains in immediate area. Impermeable berm installed to surround all ASTS in the Lube Room.
Fuel Dispensing						
Potential Spill Source	Type Of Release	Maximum Spill Volume (Gallons)	Rate of Release (gpm)	Direction of Flow	Containment Volume (Gallons)	Comments/ Other Engineering Controls
Gasoline or Diesel Fuel Dispensing	Tank Overfill, hose/fitting leak, hose rupture, miscellaneous spillage	50	10	South toward on- site stormwater catch basin	0	Assumes nozzle shut off fails and pumps 10 gpm for 5 minutes before overfill is noticed. Minor spills would be due to splash back or drips from nozzle.

Spill Contingency Plan

The BWSC has a contingency plan and commitment of manpower in the event that a spill occurs that has a potential to enter the stormwater collection system.

- Interior floor drains are connected to oil and grease traps and stormwater catch basins that may be impacted by loading/unloading are protected utilizing portable spill berms and drain covers. However, these systems may only provide temporary containment of a spill and human error or a large oil spill may result in containment failure.

- Designated employees will monitor all oil loading/unloading operations and will be trained to provide initial response to spills (e.g., containment and notification procedures). In addition, oil loading/unloading procedures will include the use of neoprene drain covers, or equivalent, and portable berms to prevent spilled oil from entering the stormwater collection.

- Fuel suppliers and oil recyclers are required to accept responsibility for response to spills during fuel deliveries or used oil pick-up.

The Commission maintains and operates a mobile emergency response vehicle with appropriately trained personnel that are equipped to respond to oil spills throughout the City of Boston. This vehicle is also available for on-site spills.

Spill Kits and Equipment

Spill kits and containment equipment are maintained at the site. The spill kits contain sorbent pads, sorbent pillows and sorbent booms, and miscellaneous supplies for containing and cleaning up small spills. The location of equipment and supplies are presented below.

- Proximate to Lube Room - Loyola Sphag Sorb 55-gallon spill kit or equivalent. Kit contains:
    - 55-gallon USDOT approved drum, 1 each
    - pads, 10 each
    - pillows, 5 each
    - 4" x 4' socks, 2 each
    - 4" x 8' socks, 2 each
    - Tyvek suits. 3 each
    - Nitril gloves, 3 pair
    - Safety goggles, 3 pair
    - Disposal bags, 5 each

- Proximate to Fuel Pump Island/Truck Wash Building - Breg Poly Drum Spill Kit #9003-3 or equivalent.
    - 200 oil only mats

- 4 brooms
- 5 oil only snakes
- 6 disposal bags

➢ Proximate to Truck Bay/Garage Entrance at lubricating oil fill ports.

- Six Neoprene drain covers
- Spill berms - four 10-foot sections with connections or equivalent as needed to prevent oil spill (e.g., unloading/loading operations) from entering building at overhead garage doors.
- Drain covers for building trench drains located at truck bay and garage entrance.

Loading – Unloading Procedures

These procedures have been developed to ensure appropriate measures are taken to prevent spills and/or leaks during fuel loading and unloading operations with the potential to discharge into the drainage system.

Responsibility - Fleet Department personnel

Procedure

In accordance with the Commission's Spill Control and Countermeasures Plan, the following steps must be taken to prevent discharge into the drainage system.

1. Verify the available volume of the receiving tank is adequate for the amount of fuel being unloaded. Tanks should not be filled more than 90% of total capacity.

2. Clearly explain to the fuel delivery driver his/her responsibility for the cleanup of spills that occur during or as a result of transfer operations.

3. Before delivery driver initiates fuel-unloading procedures, plug all storm drains in the area with spill containment supplies located in the Commission's Fleet Department.

4. Clearly identify the receiving tank fill-port to the fuel delivery driver.

5. Check to ensure all valves to the tank are open.

6. Check to ensure the truck's unloading hose is secure to the fill port.

7. DO NOT OPERATE THE DELIVERY TRUCK EQUIPMENT OR DIRECT UNLOADING OPERATIONS IN ANY WAY. Operate and/or supervise Commission equipment and procedures only.

8. Upon completion of unloading, verify the fuel delivery truck driver inspects the lower most drain and all connection points prior to truck departure.

9. Visually inspect area for evidence of fuel spillage. If no fuel spill is evident, remove drain protectors and return supplies to storage area.

10. If spill occurs during loading operations; refer to Emergency Spill Response Procedures.

The same process shall be used during the loading operations for the removal of hazardous waste oil from the facility.

Emergency Spill Response Procedures

The procedure noted below must be followed when spills/leaks and or discharge occurs with a potential for entering the drainage system. ·

Responsible Personnel

Personnel in the Facilities, Storeroom and Fleet Departments

- Spill detection- when a spill is discovered, it is extremely important to act quickly.
- If closing a valve, shutting a pump, redirecting a pipe or hose or shutting down equipment can stop further release; and doing so is not a threat to employee safety, DO SO IMMEDIATELY.

If you have not completed training in spill response, do not attempt to contain or clean up the spill. Notify the Supervisor on Duty as soon as possible before initiating any authorized action to prevent any further release.

Procedure

The following steps must be taken in response to all spills.

1. Contain spill utilizing available spill containment equipment and materials, which are located in the Fleet Department.
2. Alert the Supervisor on Duty or the Director of Operations. From there the Director of Operations or designee will make the determination of the volume of the spill and type of material spilled.
3. If the spill is non-hazardous and less the ten (10) gallons, the Director of Operations or designee may direct spill clean-up and disposal of substance.
4. If the spill is non -hazardous. and greater than ten (10) gallons, and is not in danger of entering water or leaving the property, The Director of Operations or designee may initiate spill clean-up and complete required "Spill Response Action" report.

If assistance is needed for spill clean-up, the Director of Operations or designee may call an environmental consultant.

Reporting Requirements

In the event of a spill of any size that results in a fire or the potential for a fire, call immediately:

City of Boston Fire Department: 911

Massachusetts General Laws Chapter 21E, (the Massachusetts Contingency Plan (MCP)) and 310 CMR 40 regulates the actions that the Commission must undertake when there is release or the threat of a release of oil and/or hazardous material. When required, MADEP must be notified at:

MADEP (617) 556-1133 or (888) 304-1133

For the purpose of the statute the following definitions are applicable:

- Oil – insoluble or partially soluble oils of any kind or origin or in any form, including, without limitation, crude or fuel oils, lube oil or sludge, asphalt, insoluble or partially insoluble derivatives or mineral, animal or vegetable oils and white oil.
- Hazardous Material – material, including, but not limited to, any material in whatever form which, because of its quantity, concertration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or the environment, when improperly stored, treated transported, disposed of, used, or otherwise managed.
- Imminent Hazard – a hazard which would pose a significant risk of harm to health, safety, public welfare or the environment if it were present for even a short period of time.

Releases which are exempt from reporting requirements under the MCP:

- Less than 10 gallons of petroleum and which does not impact a waterbody
- Oil or waste oil of less than a Reportable Quantity that result in a sheen on a surface water
- Less than one pound of hazardous chemicals and which does not pose an imminent hazard
- Fuel from passenger vehicle accidents or a vault or building with a watertight floor and with walls that completely contain all released chemicals

- Releases of oil that occur during normal handling and transfer operations at an oil facility, if the releases are completely captured by a properly functioning oil/water separator; provided, however, that releases of oil from the oil which exceed the capacity of the oil/water separator, and that releases of oil from the oil/water separator, itself, in excess of its discharge permit limits, shall be subject to the notification requirements.

Regardless of whether MassDEP notification is required, all spills of oils and hazardous materials must be cleaned up to the extent that no risk to human health is present.

Releases or Threats of Release which require notification within 24 hours:

- A discharge of oil to the environment of 10 gallons or more or spills less than 10 gallons that cause a sheen on surface waters (including storm water runoff).
- A threat of release to the environment of oil and/or hazardous material which poses or could pose an Imminent Hazard irrespective of the quantity likely to be released.

Releases which require notification within 72 hours

- A release to the environment indicated by the presence of Nonaqueous Phase Liquid (NAPL – liquid such as oil that does not dissolve readily in water) in a groundwater monitoring well, excavation or subsurface structure.
- A release to the environment indicated by the presence of oil and/or hazardous material within ten (10) feet of the exterior wall of an underground storage tank.

Responsible personnel as specified in the Notification Chain of Command

If the quantity of oil spilled is 10 gallons or more and the BWSC responding employee is unable to contact the Director of Operations or Supervisor on Duty within two hours after obtaining knowledge that the release has occurred, the BWSC responding employee shall verbally notify the Massachusetts Department of Environmental Protection. The Director of Operations or Supervisor on Duty will then prepare and submit the required written Release Notification Form (Appendix C at www.state.ma.us/dep/bwsc/files/forrns/trforms.html) within 60 days thereafter.

Oral notification to the Massachusetts DEP shall consist of the following information to the extent known to the person responsible for providing the notification. All information provided to the Massachusetts DEP should also be included on a copy of the Spill Incident Report Form.

1. The name and telephone number of the caller;
2. The location of the release or threat of release;
3. The date and time the release occurred;
4. The set(s) of notification criteria that is the basis for notification;

5. The name of the oil and/or hazardous material(s) released or of which there is a threat of release;
6. The approximate quantity of the oil and of hazardous material(s) which has been released or of which there is a threat of release;
7. The source of the release or threat of release;
8. A brief description of the release or threat of release;
9. The name and telephone number of the Commission;
10. The name and telephone number of a contact person at the Commission;
11. A description of Immediate Response Actions, taken or proposed to be taken, in response to the release or threat of release;
12. The names of other federal, state or local government agencies that have been notified of and/or have responded to the release or threat of release; and
13. Any other information, including without limitation, potential environmental impacts, that is relevant to assessing the degree of hazard posed by the release or threat of release.

Inspections and Testing

Underground storage tanks are subject to the inspection and testing requirements. Underground storage tanks are equipped with leak detection sensors and the Commission maintains detailed inventory control records.

All equipment, pumps, fuel lines and above ground tanks are visually inspected on a monthly basis (more often if potential operational problems are noted). Written inspection reports are signed by the inspector and his/her supervisor, and maintained for a minimum of three years as part of the Commission's normal maintenance and monitoring program.

The electronic sensor system (Veeder Root) for monitoring tank liquid level, overfill sensors and alarms, and leak sensors are calibrated and tested in accordance with the manufacturer’s instructions. Test results will be maintained for a minimum of three years.

Training

Commission personnel handling oil will receive training as required to carry out the requirements of the SPCC Plan. Documentation of such training will be maintained with the SPCC Plan for a minimum of three years.

Employees who may be responsible for spill prevention and response will receive instruction regarding:

- The contents of the SPCC Plan.

- Applicable rules and regulations regarding spill prevention and employee response.
- General facility operations.
- Operation and maintenance of equipment to prevent discharges.
- The facility's practice regarding spill prevention and employee response.
- Minimum notifications and actions to be taken in response to the discovery of a spill.

Emergency Contacts

Joseph Donahue – Manager of Facilities	617-989-7213
David O'Donnell – Safety Manager	617-989-7242
CYN Corp – 24 Hr. Spill Contractor	781-341-1777
Boston Fire Department	911 or 617-343-2880
Boston Police Department	911 or 617-343-4250
Massachusetts State Police	508-820-2300
Massachusetts Department of Environmental Protection	978-694-3200
USEPA	617-918-1111
National Response Center	800-424-8802
Boston Medical Center Hospital	617-638-8000

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

CPR AND DEFIBRILLATOR TRAINING

Introduction

The automated external defibrillator (AED) has recently become an important medical tool that allows non-medical personnel to use these simplified electronic devices to treat a person in cardiac arrest. The AED guides the users through its application and process by audible or visual prompts without requiring any discretion or judgment. Employees trained to use the AED could save the life of a co-worker in the event of sudden cardiac arrest.

The Commission regards the health and safety of its employees to be of paramount importance and therefore has implemented the use of AED's within the facility. As these devices are intended for use by lay rescuers, the Commission offers informational training on the operation of the device and how to apply it in an emergency situation.

Location

The three (3) external defibrillators located at the 980 Harrison Avenue facility can be found:

- 1st floor garage - on the wall between the Operations Muster Room and the Meter Shop.
- 2nd floor of the building- next to the elevator.
- 3rd floor of the building- next to the elevator.

Training

The Cardiopulmonary Resuscitation (CPR) and Defibrillator Training program developed to promote health awareness prepares and enables an employee to offer assistance to fellow workers in times of medical emergencies.

- CPR and Defibrillator Training is held annually.
- A qualified Red Cross instructor or an equivalent provides the training.
- Training will consist of lectures and hands on practical application in classes.
- Dates for annual training will be posted. Interested parties may contact the Commission's training manager.

Only trained personnel will administer CPR and/or use the AED.

Emergency Medical Services (911) should be contacted in cases of medical emergencies requiring the use of CPR or Defibrillators.

Caring for the Victim

The following are general guidelines for caring for a victim, in a medical emergency:

- Do not move the victim, unless danger still exists at the site.
- Call 911.
- Have someone stay with the victim to provide reassurance.

Calling 911

- Remain calm when speaking to the 911 operator.
- Report the exact location of the emergency.
- Indicate the telephone number that you are calling from.
- Advise the 911 operator as to the type of incident (heart attack, fire, vehicle accident).
- Advise as to the type of aid being given to the victim (CPR, Defibrillator).
- Notify security, facilities manager and safety manager of person and location.

First Aid Kits

First aid kits are located throughout the Commission facility. Supplies will be replenished by an outside vendor on a regular basis.

Medical Emergency Procedures

Purpose

To ensure that proper medical services are provided to employees who become ill at work.

Procedure

The procedures noted below should be followed in the event that an employee requires medical assistance which requires an ambulance during normal business hours:

- Supervisor or designee will call 911 immediately and alert the Boston Municipal Police Officer (BMP) in the Atrium at Ext.7101and the Safety Manager. The emergency medical staff (EMS) should be directed to the Employee Middle Entrance at 980 Harrison Avenue.

- The BMP Officer will report to the scene and the mobile officer will meet the ambulance and EMS at the scene.
- The Safety Manager or designee will provide temporary security coverage in the Atrium until the officer returns from the scene.

Procedure for off-hour shifts:

- During off-hour shifts the BMP Officer located in the Command Center at the rear entrance should be notified at Ext. 7100.
- A BMP Officer will report to the scene and the mobile officer will meet the ambulance and escort EMS to the employee. The mobile officer will then provide security at the Command Center until the Command Center Officer returns.

If the employee does not require emergency treatment, the supervisor should arrange for transportation for the employee to their physician or their home.

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

RIGHT TO KNOW

Purpose

The Boston Water and Sewer Commission intends to protect the health and safety of all employees by providing them with information relative to the potential dangers of hazardous chemicals used in the workplace and to comply with state regulations through the implementation of a Hazard Communication Program.

Right to Know

The Massachusetts Right-To-Know-Law, Chapter 111F of the Massachusetts General Laws, require the Commission to provide employees with information about hazardous and toxic substances that he/she may be exposed to at work.

Work Place Notice

Posted in central locations throughout the Commission employees will find copies of the Right-To-Know-Workplace Notice informing them of their rights under this law.

Labels

The label on a container provides an immediate source of information concerning its contents. It serves to identify the chemical found in the product and some of the hazards surrounding its handling. Labels provide a link to more detailed hazard information found on Safety Data Sheets (SDS).

Labeling requirements for Hazardous Substances

- Contents of containers greater than 1 gallon or 5 pounds must be labeled identifying the chemical name.
- Contents of containers greater than 5 gallons or 30 pounds and are classified as flammable and/or combustible must be labeled with the appropriate NFPA label (National Fire Prevention Assoc.)
- Containers of mixtures must be labeled with the chemical name of each toxic or hazardous component when the components comprise one percent or more of the mixture.
- Labels must be clear, prominent, in English and weather resistant.

Note: Containers, which are labeled in accordance with the OSHA Hazard Communication Standard, will also uphold the labeling requirements of the Right-To-Know-Law. Under the OSHA Hazard Communication Standard, containers must be labeled with the name of the

product as listed on the SDS, the health hazard warnings and physical hazard warnings (such as flammable or corrosive). Most manufactures label containers in accordance with the Standard.

- All transfer or secondary containers will be labeled.
- Supervisory staff in each division will ensure that all transfer or secondary containers are labeled with generic labels, which have the name of the contents noted as well as the hazard warning.

Safety Data Sheet (SDS)

- Safety Data Sheets are technical fact sheets developed by the product manufacturer that provide important information regarding toxic or hazardous substances. SDSs also provide information on the proper precautions, handling practices, and necessary PPE in the use of or exposure to the toxic or hazardous substance. An SDS master file for each chemical used at the Commission is kept in the Safety Office.
- SDSs on products received through and distributed from the Storeroom are on file at that location.
- SDSs on products received and used at specific locations throughout the Commission are kept on file by management staff at those locations.
- Supervisors/managers will review incoming SDS's for new and significant health & safety information, insure that the information is passed on to the affected employees and notify and provide the Safety office with a copy of the SDS.
- If an SDS is missing or obviously incomplete, the Safety Manager will immediately request a new SDS from the manufacturer or supplier.
- SDSs must be available to all employees in the work area for review during the work shift. If an SDS is not available or a new hazardous substance (s) in use does not have an SDS, contact the Safety Manager immediately.

The following information is found by section on Safety Data Sheets:

Section 1. Identifies the name, address, and emergency phone number of the manufacturer or supplier of the product. The date the SDS was prepared is also noted here.

Section 2. Hazardous Ingredients, chemical ID and common names of the product are listed. Worker exposure limits to the chemical, such as the OSHA PEL (Permissible Exposure Level) and TLV (Threshold Limit Value) are also included.

Section 3. Physical and Chemical Characteristics are listed such as;

- Boiling point
- Vapor pressure
- Vapor density
- Melting point
- Evaporation rate
- Water solubility
- Appearance and odor under normal conditions

Section 4. Fire and Explosion data explains ways to handle these hazards with firefighting equipment and procedures.

Section 5. Reactivity tells you whether the substance is stable and will advise of situations to keep away from so the product will not react.

Section 6. Health Hazards and First Aid Procedures: this section tells you how the chemical could enter the body (inhalation, absorption or ingestion) and notes the possible health hazards that could come from exposure and signs and symptoms of exposure. It also advises if the chemical is believed to be a carcinogen.

Section 7. Precautions for Safe Handling and Use explains what to do if the substance spills or leaks, how to dispose of the substance, equipment and procedures needed for cleaning up spills and leaks, how to handle the substance properly, how to store it and other precautions.

Section 8- Control Measures are found in this section to reduce harmful exposure. Personal Protective Equipment that should be used when handling the substance is also noted (respirator, gloves, eye protection, protective clothing) as is special work or hygienic practices.

Note: Not every material safety data sheet will provide exactly the same amount of information. However, you will find everything that is known about the substance, its hazards, and the things you can do to avoid injury and illness when handling that hazardous substance.

Location of Safety Data Sheet Files

A copy of Safety Data Sheets for all hazardous substances used at the Commission is on file in the Operations/Facilities Safety Office and the Storeroom. When new or substitute products are received at the Storeroom, copies of SDSs are forwarded to departments where the substance is used. Each Department maintains a file of Safety Data Sheets for substances used routinely by

their employees. The Safety Manager oversees the process for ensuring SDS are current and updated and filed accordingly.

How to Obtain a Copy of an SDS

An employee may obtain a copy of an SDS from the Safety Manager by providing a written request for the information.

Receiving Delivery of Substances that have a SDS

When hazardous substances are delivered to the Commission individuals taking delivery of those products must follow the procedure noted below:

- Insure that the containers are clearly labeled according to requirements.
- Note appropriate hazard warnings for storing.
- Insure that the SDS has been provided upon delivery, filed and/or distributed appropriately.
- Insure that copies of any new SDS are forwarded to the Safety Office.

Employee Training

The Commission will provide training to all employees on the hazards and safe handling procedures of regulated substances in use at the Commission.

New Hires - The New Hire Orientation Program includes information on the Massachusetts Right to Know Law and the Commission's Hazard Communication Program.

Annual - A training program, to address the handling and storage of regulated substances, will be presented annually to appropriate employees.

Recordkeeping

The names and dates of individuals that attend training on the Commission's Hazard Communication Program will be kept on file in the office of the Manager of Training.

THE COMMONWEALTH OF MASSACHUSETTS
Executive Office of Labor and Workforce Development
Department of Labor Standards

RIGHT TO KNOW WORKPLACE NOTICE for Public Employees

The **RIGHT TO KNOW LAW, Chapter 111F** of the Massachusetts General Laws, provides rights to Public Sector employees regarding the communication of information on toxic and hazardous substances. These rights include:

LABELING - All containers in the workplace containing toxic or hazardous substances must be labeled. Labels must be clear, prominent, in English and weather resistant. When a chemical product is transferred to a smaller container, the smaller container must also be labeled. In 2014, manufacturer labels will begin to include pictograms. Products purchased before 2014 do not need pictograms. Tips for understanding pictograms are available at www.osha.gov.

MATERIAL SAFETY DATA SHEET (MSDS) - Public Employers must maintain Material Safety Data Sheets in an accessible location for employees. In 2014, manufacturers will begin calling the MSDS a "Safety Data Sheet" to comply with changes in the OSHA Hazard Communication Standard. Public Employers must update their MSDS / SDS files when a manufacturer updates the sheets.

TRAINING - Public Employers must provide annual training to employees who work with chemical products. New employees must receive training within thirty days from date of hire. The training must be conducted by a competent person. At a minimum, training must include an explanation of employee rights, information on how to read a chemical Safety Data Sheet, the specific hazards of the chemicals used or stored in the workplace, the type of personal protective equipment to be worn, and information on labeling of hazardous substances. This training must be done with pay during the employee's normal work hours. A record of this training must be maintained by the employer. A sample training outline is available at www.mass.gov/dols/wslip.

WORKPLACE NOTICE - Public Employers must post this Right-to-Know notice in a central location in the workplace informing employees of their rights under the law. This notice is not required for private companies covered by the OSHA Hazard Communication standard.

NON-DISCRIMINATION - An employee who believes he or she has been discharged or disciplined by an employer for exercising rights granted under the Law, may file a complaint with the Director of the Department of Labor Standards. A copy of the complaint must be sent to the employer at the same time by certified mail.

All Right-to Know inquiries should be addressed to:
Department of Labor Standards
167 Lyman Street, Westboro, MA 01581
Tel: 508-616-0461 or Email: safepublicworkplace@state.ma.us

More safety and health information for public sector workplaces is available at www.mass.gov/dols/wslip.

This form may be reproduced September 2013

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

REPORTING ACCIDENTS / INCIDENTS / INJURIES

Purpose

To inform all employees of the requirement to immediately report any and all job related accidents/incidents/injuries to their supervisor. This ensures timely investigation and adherence to the policies and procedures as they relate to accidents/incidents/injuries. Therefore, any and all accidents/incidents/injuries or illnesses that occur on the job must be reported immediately regardless of severity.

Importance of Reporting Accidents/Incidents/Injuries

One of the most important reasons for reporting all accidents/incidents/injuries promptly is prevention. This not only means accidents that cause injury or damage, but also near- miss accidents. A thorough investigation immediately following the accident can uncover the accurate cause or causes of the occurrence. Once the cause has been determined, the information can be used to evaluate existing safety procedures, personnel, equipment, materials and the work environment.

Post vehicle accident drug and alcohol testing is a requirement for all drivers immediately following a motor vehicle accident. In order for the requisite testing to be administered and / or any other protocol as it may relate to job related accidents, an immediate accident/incident/injury report form must be completed.

Employees who fail to immediately report a vehicle accident/incident will be subject to disciplinary action up to and including discharge.

The Commission defines a motor vehicle accident to be:

> an occurrence, regardless of causation or fault: that takes place during vehicle operation involving a Commission vehicle or any other vehicle used to conduct Commission business that results in (1) a fatality: (2) bodily injury to a person who as a result of the injury receives medical attention; (3) two or more vehicles coming in contact (regardless of personal injury or property damage); (4) or one motor vehicle causing or incurring damage. Vehicle operation shall be defined as a person behind the wheel of a vehicle used for Commission purposes. This shall also include any illegally parked vehicle that sustains damage. Further, any employee involved in an accident while operating a backhoe, derrick, catch basin truck, rodding truck, jet truck or vactor truck resulting in a (1) fatality and/or (2) bodily injury to a person who as a result of the injury receives medical attention will be tested for drugs and alcohol and if found positive, may be terminated.

Accident Investigation

All accidents must be investigated. The depth and complexity of the investigation will vary with the circumstances and seriousness of the accident. The supervisor responsible for drivers

involved in the accident will ensure that an investigation is conducted and appropriate, corrective action is taken.

The first priority following an accident is to deal with the emergency and ensure that any injuries or illnesses incurred receive prompt medical attention. The accident investigation should begin immediately thereafter to ensure, details are clear and reported accurately.

Why should supervisors perform the initial accident investigation?

- Supervisors have a responsibility to provide their workers with a safe and healthful workplace.
- Supervisors are most familiar with the work environment and have knowledge of the employees involved in the work situations. They are in the best position to gather the facts and find a practical solution to the problem.
- Supervisor accident investigations can help promote better relations with workers by demonstrating concern for their safety and attention to accident prevention.

Causes of Accidents in the Workplace

Accidents are derived from four basic categories. Every accident, without exception, can be attributed to one of the following causes:

- Employee error
- Failure of or lack of policy/procedure
- Equipment/Materials
- Environment

Accident Investigation Process

When an accident is reported to a supervisor, the following will occur:

- Medical attention is arranged, if necessary.
- Drug and alcohol testing is arranged, when applicable.
- Hazard is eliminated.
- Area is secure.
- Facts are gathered.

- Witnesses interviewed.
- Tests of equipment and/or material.
- Inspect/ photograph /sketch.

As with most other tasks, skills in conducting effective accident investigations improve with experience. A good, basic approach is to find out what caused the accident and what can be done to prevent or minimize the chances of a similar accident occurring. Some suggestions that may help supervisors get the facts and reach a conclusion include:

- Maintain objectivity throughout the investigation. Its purpose is to find the cause of the accident, not to assign blame for its occurrence.
- Check the accident site and circumstances thoroughly before anything is changed.
- Discuss the accident with the injured person and ensure medical treatment is provided, when applicable. Talk with anyone who has witnessed the accident and those familiar with conditions immediately before and after it occurred.
- Be thorough. Small details may point to the real cause.
- Reconstruct the events that resulted in the accident, considering all possible causes. Determine unsafe conditions or actions that, separately or in combination, were contributing factors. Prepare diagrams or take photographs at the scene for inclusion in the investigation process.
- If help is needed in determining the cause, ask for it. The Safety Manager can provide assistance with accident investigation.

The Safety Manager analyzes the facts and assigns a cause and explanation of the accident. Supervisors/managers should take action to control or eliminate the conditions that caused the accident once these have been conclusively identified. The supervisor or Safety Manager may recommend training, if necessary, in handling/storage of materials, defensive driving, maintenance of equipment/tools and/or the importance of reading signs/labels on containers. Such training should assist in the elimination of the hazard.

Procedures for Reporting Accidents, Incidents and Injuries

Every effort is made to eliminate or reduce the risk of accidents on the job. However, when an employee is involved in an accident and the employee is injured or has suffered a work-related illness, a report must be completed by the employee. His/her supervisor, as well as any witnesses to the occurrence, must also file a report.

Employee's Responsibility:

- Immediately notify his/her direct supervisor when an accident / incident/ injury has occurred (or a representative of the Commission, should his/her direct supervisor be unavailable.)
- Notify the Director of Health and Safety in the Organizational Diversity Department immediately following the accident, or as soon after as is possible, of any injuries experienced by involved employees.
- Complete a BWSC Accident / Incident report by the end of the work shift or as soon as possible.
- Submit to requisite drug and alcohol testing as the driver of a Commission vehicle or a personal vehicle being used to conduct Commission business involved in a motor vehicle accident.
- (As the driver) complete a BWSC Vehicle Accident Report by the end of the work shift or as soon after as is practical (this report is required in addition to the BWSC Accident/Incident Report.)
- Complete a BWSC Accident/Incident Report if you are injured while riding as a passenger in a vehicle being used to conduct Commission business that has been involved in a motor vehicle accident.
- Complete a Witness Statement if you are a witness to the work related accident/incident/injury by the end of the work shift or as soon after as is practical.

Employees can obtain all reporting forms from their supervisor/manager. Employees must complete the forms accurately and legibly and provide completed forms to their supervisor/manager by the end of the work shift or as soon after as is practical.

Note: The term "as soon after as is practical" is applicable only to employees who have sustained such severe injuries or have had experienced mitigating circumstances surrounding the accident that makes it impossible to complete requisite forms by the end of the work shift.

Supervisor/Manager Responsibility

- Promptly report to the scene of the accident.
- Notify the Safety Manager or Director of Health and Safety.

- Arrange transportation for employees who are injured to a medical facility designated by the Commission. For severe, or life-threatening injuries, to the nearest medical facility.

    1. Minor Injuries: Monday - Friday 8:00 am to 4:00 pm
       Boston University Medical Center (BUMC)
       Occupational Health
       720 Harrison Ave Suite 703
       Boston, MA 02118

    2. Minor Injuries Off Hours
       Boston University Medical Center (BUMC) Emergency Room
       751 Albany St
       Boston, MA 02118

- Transport drivers to undergo requisite drug and alcohol testing following motor vehicle accidents

    1. New England Baptist Hospital (Mon – Fri 8:00 am – 4:00 pm)
       125 Parker Hill St
       Boston, MA 02120

    2. On Site Testing (Off Hours/Holidays)
       980 Harrison Ave

- Conduct an accident investigation and complete the Supervisor's Accident Investigation Report by the end of the work shift.

- Provide involved employees with applicable reporting forms and ensure each is complete, accurate and legible.

- Submit (when employees have been injured) the following reports to the Labor Relations Department

    1. BWSC Accident/Incident Report

    2. BWSC Supervisor's Accident/Incident Report

    3. BWSC Witness Statement

Submit a copy of the above reports and the BWSC Vehicle Accident Report to the Safety Manager.

Note: In cases of motor vehicle accidents where the driver is injured, requisite drug and alcohol testing will be administered immediately following medical treatment for injuries.

Upon discharge from the Emergency Room, drivers will either be transported to a medical facility designated by the Commission to undergo testing, or driven back to Commission Headquarters, 980 Harrison Avenue to undergo testing.

In cases of severe injury where the driver is hospitalized, a certified technician will be dispatched to the hospital to administer the tests pending approval of the treating physician.

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

HAZARDOUS/REGULATED WASTE MANAGEMENT PROGRAM

Introduction

The Massachusetts Department of Environmental Protection (MADEP) administers state laws and regulations aimed at preventing pollution, protecting natural resources, promoting safe disposal and recycling of hazardous wastes and ensuring timely clean-up of hazardous waste spills. The U.S. Environmental Protection Agency (EPA) administers similar federal laws and regulations, but delegates much of its enforcement authority to MADEP. The activities of the Commission's vehicle maintenance facilities potentially generate hazardous waste and regulated waste and must adhere to the regulations issued by the EPA and the MADEP.

Purpose

This Hazardous Waste Management Program has been developed for the Commission's vehicle maintenance facilities to ensure compliance with mandated regulations as they pertain to the vehicle maintenance operations at the Commission's Headquarters building.

The Commission has notified the MADEP of their hazardous waste generation activities, which includes the type and amount of waste that is routinely generated by its vehicle maintenance operations. Based on this information, MADEP categorized the Commission as a Very Small Quantity Generator (VSQG) of hazardous waste and a Small Quantity Generator (SQG) of waste oil; this program has been developed accordingly. In the event a change is made to generator categories, revisions to this program will be required.

The Commission's Fleet personnel is trained to identify generated wastes, determine if they are hazardous wastes, and properly manage and ship hazardous wastes for off-site treatment and disposal. The components of this program are intended for that purpose.

Program Components

- Responsibility
- Identifying Wastes
- Labeling
- Wastes of Concern to Vehicle Maintenance Facilities
- Wastes of Concern to the Commission's Vehicle Maintenance Facilities (VMF)
- Determining Generator Status
- Identification Number (permit)
- Procedures for Managing On-Site Waste

- Procedure for Spill Reporting
- Contingency Planning
- Procedure for Completing Hazardous Waste Manifest and Shipments
- Training
- Recordkeeping

Responsibility

The Commission's Safety Manager is responsible for implementing and maintaining the components of this program, including the review and update of written materials and employee training.

Identifying Wastes

As a generator of waste materials, the Commission is responsible for disposing of hazardous waste properly so that it does not threaten human health or the environment. The first step in the hazardous waste management process is to determine if the waste is hazardous or non-hazardous.

Most vehicle maintenance facilities (VMF) typically generate hazardous waste because:

- They use degreasers and cleaners that may contain chlorinated solvents.
- The process of engine maintenance and cleaning may pick up metallic contaminants, which may produce hazardous wastes.
- Silver, lead and chrome are heavy metals that are toxic to the environment, if disposed of improperly.
- Flammable, corrosive and toxic materials may also be used in VMF processes that become hazardous waste when they are no longer useful and must be discarded.

VMF processes may also contaminate non-hazardous materials with hazardous materials, creating hazardous waste (such as gasoline and sulfuric acid).

Therefore, staff must:

- Identify if the waste is excluded from regulation.
- Determine if the waste is listed as a hazardous waste.

- Determine if the waste is hazardous waste by either testing the waste for hazardous waste characteristics or applying knowledge of the hazardous characteristics of the waste in light of the materials or processes used.

In order for a waste to be a hazardous waste, it must first be considered a solid waste. A solid waste is any discarded material which can be a solid, liquid or gas.

Simply stated, a solid waste is any material that is inherently waste-like and is no longer usable and/or ready to be discarded.

The two (2) waste streams of concern to the Commission's VMFs are oil and part washing cleaning solution (SafetyKleen parts washer).

Labeling

For proper labeling and management, materials must be labeled with the type of waste material (i.e., waste oil) and the associated hazard (i.e. toxic, corrosive, ignitable, etc.) However, materials that the Commission uses, intends to use or is in the process of using are not considered wastes and not subject to the hazardous waste regulation until they are no longer useful.

Oil caddies should be labeled "oil in process" and emptied at the end of the work shift. Once the oil is transferred from the caddy to the aboveground storage tank (located in Fleet Lube room) it becomes "waste oil".

The parts washer (when in process) uses a solvent that is constantly being recycled. New solvent is added approximately four (4) times a year. The recycling process generates petroleum based waste oil called Naphtha (approximately 20-30 gallons of waste oil per year). Once this oil is transferred from the caddy to the aboveground storage tank it becomes "waste oil".

Wastes of Concern to Vehicle Maintenance Facilities EPA-MADEP

A waste material is a hazardous waste if it:

- Is listed by the U.S. EPA in 40 CFR 261 Subpart D ("Listed hazardous wastes are identified at F-, K-, U and P listed waste).
- Demonstrates a characteristic of a hazardous waste as detailed in 40 CFR 261 Subpart C or 310CMR30.120 The four hazardous waste characteristics include: ignitability, corrosivity, reactivity, and toxicity.
- Meets the description of Massachusetts Regulated Waste as listed in 31- CMR 30.110.

The USEPA has developed a federal list of wastes known to be hazardous in order to provide clear direction to generators on the typical industry-generated wastes that must be managed as hazardous wastes. The four listed wastes are:

F-listed wastes, non-specific industry generated process wastes.

K-listed wastes, industry-specific generated process wastes.

U-listed wastes, off-specification materials.

P-listed wastes, acutely toxic hazardous wastes.

Of the four (4) federally listed waste codes, the one that is of most concern to the Commission's VMF is the F-listed hazardous waste. Many of these non-specific hazardous wastes are generated through processes that use solvents. A small subset of F-listed wastes that are applicable to VMF operations can be found on the following page. Once it is determined that a waste is not a listed hazardous waste, it must then be reviewed to determine if it possesses hazardous characteristics that would require it to be managed as a hazardous waste. These hazardous characteristics and their waste codes follow.

Ignitability - A waste is ignitable and has an EPA hazardous waste code of D001 if it is:

- A liquid with a flashpoint of less than 60 °C (140 °F).
- Not a liquid and is capable of causing fire and when ignited, burns vigorously and persistently.
- An ignitable compressed gas.
- An oxidizer, as defined in 310 CMR 30.010.
- An ignitable solid waste (not listed in 40 CFR Part 261, Subpart D).

Industry and EPA Hazardous Waste Number	Hazardous Waste	EPA Hazard
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvents mixtures.	Ignitable and Toxic for mixtures with toxic constituents

F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	Toxic
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms for the recovery of these spent solvents and spent solvent mixtures.	Toxic and Ignitable
F039	Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, FO26, FO27, and/or FO28.	Toxic and Ignitable

Corrosivity - A waste is corrosive and has an EPA hazardous waste code of D002 if it is:

- Aqueous and has a pH level < 2 or > 12.5.
- A liquid and corrodes steel at a rate of > 0.250 inch per year at a test temperature of 130°F.
- A corrosive solid waste (not listed in 40 CFR Part 261, Subpart D).

Reactivity - A waste is reactive and has an EPA hazardous waste code of D003 if it is:

- Unstable and undergoes violent change without detonating.
- Reacts violently with water.
- Forms potentially explosive mixtures with water.

- Generates toxic gases, vapors, or fumes when mixed with water.
- A reactive cyanide (greater than 250 ppm) or reactive sulfide (greater than 500 ppm) bearing waste, which when exposed to pH conditions between 2 and 12.5, can generate toxic gases, fumes, or vapors.
- Capable of detonating or exploding if subjected to strong initiating source or heating under confinement, or at standard temperature and pressure.
- Capable of detonating or exploding at standard temperature and pressure.
- A forbidden explosive as defined by 49 CFR 173.51, .53, or .88.
- A reactive solid waste (not listed in 40 CFR Part 261, Subpart D).

Toxicity - A waste is toxic if a laboratory-extracted leachate (derived from using the Toxic substance Contract Act (TCLP) method - regulatory limits) from the original sample contains any of the contaminants listed in the following table in excess of the concentrations specified by the EPA (see the regulatory limit column). If an extract from the waste following a laboratory procedure contains any contaminants in levels equal to or in excess of the regulatory concentration limits specified in the table, the waste is hazardous.

Once a waste has been identified as hazardous, the waste stream must be appropriately managed in accordance with federal and state regulations. Additionally, the VMF Manager should work to eliminate the hazardous characteristics by managing generation of the waste. Subsequent re-analyzes of the waste can then concentrate on constituents initially detected at levels which would make it a hazardous waste.

The following table presents the TCLP contaminants of concern and their regulatory limits.

Contaminant	EPA Hazardous Waste Code	Regulatory Limit (mg/L)
Petroleum Solvents-flashpoint <140F	D001	NA
Arsenic	D004	5.0
Barium	D005	100.0
Cadmium	D006	1.0
Chromium	D007	5.0
Lead	D008	5.0
Mercury	D009	0.2
Selenium	D010	1.0
Silver	D011	5.0
Endrin	D012	0.02
Lindane	D013	0.4

Methoxychlor	D014	10.0
Toxaphene	D015	0.5
2, 4-D	D016	10.0
2, 4, 5-TP (Silvex)	D017	1.0
Benzene	D018	0.5
Carbon Tetrachloride	D019	0.5
Chlordane	D020	0.03
Chlorobenzene	D021	100.0
Chloroform	D022	6.0
o-Cresol	D023	200.0
m-Cresol	D024	200.0
p-Cresol	D025	200.0
Cresol	D026	200.0
1,4-Dichlorobenzene	D027	7.5
1,2-Dichloroethane	D028	0.5
1,1-Dichloroethylene	D029	0.7
2,4-Dinitrotoluene	D030	0.13
Heptachlor (and its epoxide)	D031	0.008
Hexachlorobenzene	D032	0.13
Hexachloro-1,3-butadiene	D033	0.5
Hexachloroethane	D034	3.0
Methyl ethyl ketone	D035	200.0
Nitrobenzene	D036	2.0
Pentachlorophenol	D037	100.0
Pyridine	D038	5.0
Tetrachloroethylene	D039	0.7
Trichloroethylene	D040	0.5
2,4,5-Trichlorophenol	D041	400.0
2,4,6-Trichlorophenol	D042	2.0
Vinyl Chloride	D043	0.2

MADEP goes beyond federal regulations in classifying wastes as hazardous. The wastes presented in the following table from non-specific sources are regulated as hazardous wastes, according to 310 CMR 30.000:

Massachusetts Hazardous Waste Number	Hazardous Waste Description
MA00	Hazardous waste designated as such pursuant to 310 CMR 30.144. The manifest shall include (1) a description of the most hazardous constituent of the waste, and (2) a reference to the date when the Department designated the waste as hazardous, and (3) a reference to the office of the Department which designated the waste as hazardous. For example: "Alizarin mixture, 3/7/85 NE".
MA01	Waste oil that is not otherwise hazardous waste pursuant to 310 CMR 30.120 through 30.136.
MA02	Wastes which contain polychlorinated biphenyls (PCBs) in concentrations equal to or greater than 50 parts per million.
MA04	Waste generated in the manufacture of paint (e.g., oils, shellac, varnish, stains, lacquer, latex, enamel, alkyds, urethanes, acrylics, casein) which is not otherwise regulated as hazardous waste pursuant to 310 CMR 30.120 through 30.125 (characteristics of hazardous waste) or 30.130 through 30.136 (lists of hazardous wastes) if: (1) The paint is formulated with one or more ingredients which are listed as hazardous constituents in 310 CMR 30.160; or (2) The paint is formulated with any ingredient which contains one percent or more by weight of hazardous constituents listed in 310 CMR 30.160.
MA97	Class A regulated recyclable material (including, but not limited to, specification used oil fuel for which the generator (i.e., the VMF) has a current DEP recycling permit. that is shipped using a hazardous waste manifest).
MA98	Off-specification used oil fuel that is shipped using a hazardous waste manifest
MA99	Not hazardous waste. This designation is to be used only for material that is not hazardous waste and that is shipped using a.

Wastes of Concern to the Commission's Vehicle Maintenance Facilities

For Commission VMF activities, the primary concern is the management of oil and parts washer cleaning solutions. Waste oil is a material that is regulated in Massachusetts and is listed as an MA01 waste. Since part washer solvents are contaminated by oily parts through the cleaning process, spent solutions are typically regulated as waste oils in Massachusetts. The Commission generates approximately 20-30 gallons of waste oil from this process annually.

Keep in mind that many solvents have the potential to contain chlorinated solvents or become cross contaminated with chlorinated cleaners (some brake and carburetor cleaners contain tetrachloroethylene, for example). Oils also have the potential to pick up contaminants, such as gasoline and chlorinated solvents. Once a waste oil exhibits characteristics of a hazardous waste, it must be managed as hazardous waste.

Waste oil Laboratory tests were performed on the Commission's VMF waste oil to ensure that it was property managed on- site and that it had not been contaminated by other VMF chemicals (i.e. gasoline or chlorinated solvents). Results indicated the waste oil did not exhibit sufficient characteristics of hazardous waste and therefore could be managed as a state-listed regulated hazardous waste: Waste oil (MA01).

> Note: VMF personnel should be aware that components of gasoline were found in the waste oil. If current management practices were to change and more significant amounts of gasoline were to enter the waste oil stream, contamination of the waste oil with gasoline would result in the generation of a hazardous waste. This could potentially affect the VMF's current hazardous waste generator category as a very small quantity generator requiring more stringent on-site management.

Parts washer cleaning solvent: Laboratory tests were performed on VMF parts washer cleaning solvent. Results indicated the cleaning solvent does exhibit characteristics of hazardous waste. Although the Material Safety Data Sheet (MSDS) indicates the virgin safety Kleen Premium solvent exhibits a flashpoint of 148 degrees F, test results indicates the product's flashpoint is lowered during the cleaning process to 120 degrees F, (this may occur if the product is contaminated during use with flammable or combustible hazardous materials, such as gasoline or diesel fuel). The resulting material's flashpoint of <140 degrees F, failed the hazardous waste characteristic of ignitability. Additionally, the parts washer solvent testing also detected tetrachloroethylene at a level of 83 parts per million (ppm). Assuming a worst-case scenario, that the entire concentration of tetrachloroethylene is leachable, the solvent would fail for the hazardous waste characteristic for this TCLP VOC. Therefore, the Commission currently manages any resulting waste generated from the parts washer as D001 and D034 waste.

The Commission will periodically order laboratory re-testing of the two (2) waste streams to ensure conditions remain stable.

Other wastes generated within the VMF may be regulated at the federal or state level. Examples include: spent fluorescent lighting, certain used batteries (not alkaline batteries, but rather nickel/cadmium, lithium, mercuric oxide, silver oxide and others), mercury-containing devices (thermometers and temperature-control devices), and commercial products that are no longer useable and must be discarded.

The following table summarizes the waste stream types and amounts produced at the Commission's VMF, whether the streams are identified as hazardous or non-hazardous and the current management practices in place:

Waste Type	Regulated Hazardous Waste?	Volume/ Period	Disposal Method and Company
Antifreeze	No		Recycled on site; no disposal
Batteries (lead-acid batteries for vehicles)	No	50 batteries/ year	Batteries are removed through an exchange program currently with the Jack Young Company
Gas Filters	No	10 year	Filters are drained back into vehicle tank and then co-mingled with the crushed oil filters on site in a 55-gallon drum for disposal.
Oil Filters	No	XX filters/year	Filters are hot drained, crushed, and disposed of in the trash.
Oils	Yes MA01	Approximately 1,700 gallons/year	Oil is stored on-site in a AST. Automatic transmission fluid and engine oil is removed/recycled by a qualified vendor - currently CYN Environmental Services
Oily Debris	No	Minimal	Co-mingled with crushed oil filters in a 55-gallon

			drum for disposal
Parts Washer Solvent	Yes D001 and F039	Minimal	Solvent is removed as a hazardous waste by Safety Kleen
Scrap Metals	No	Minimal	The Commission utilizes a qualified vendor for an on-site metal dumpster for the disposal of scrap metal.
Tires	No	100 tires/ year	The Commission utilizes a qualified vendor for tire pick-up/recycling/retread – currently Pete's Tire Barn, Inc.

Determining Generator Status

MADEP regulates hazardous waste generators based on the amount of waste they generate in a calendar month. The more waste generated in a calendar month, the bigger the potential threat to human health (accidents and injuries) and environmental emergencies making the requirements for onsite waste management more stringent. The three (3) categories of hazardous waste generators are provided below, with the amount of waste they can generate and time limits for on-site accumulation:

Generator category	Monthly hazardous waste generation	Time limit for on-site accumulation
Very Small Quantity Generators (VSQGs)	< 220 lbs/month (26 gal/month, approximately)	Unlimited time, but cannot exceed 1,320 lbs (165 gal) at any time
Small Quantity Generators (SQGs)	≥220 lbs/month but ≤ 2200 lbs/month (26 gal/month to 260 gal/month, approximately)	Must ship hazardous waste off site within 180 days of the accumulation start date
Large Quantity Generators (LQGs)	>2,200 lbs/month (260 gal/month, approximately)	Must ship hazardous waste off site within 90 days of the accumulation start date

The Commission has notified MADEP of their VMF waste generation activities and has a permit to conduct these activities. This notification informs MADEP of the type and amount of waste that is routinely generated in order to determine the proper generator category. In turn, the MADEP assigned a unique 12-digit identification number to the VMF for tracking purposes:

MV 6179897144.

MADEP has categorized the Commission's VMF as a VSQG of hazardous waste. As the MADEP provides a separate waste generator category for waste oil, the volume of waste oil does not count towards the VMF Generation of Hazardous waste. The Commission is currently categorized by the MADEP as SQG of waste oil.

Identification Numbers - permit

The VMF manager and Fleet and Facilities Personnel must know the generator identification number and category of their VMF, as the category defines the requirements for proper on-site management of hazardous waste. It is the responsibility of the VMF manager to continuously track the amount of waste they generate by completing the "Waste Generation Tracking Form" (see Appendix A). Each time hazardous waste is shipped off site, this form should be used to keep track of the amount of hazardous waste and/or waste oil generated. Each month, the VMF manager or designated alternate should review the amount shipped and if, in any calendar month the waste amount exceeds the VMF could be in violation of their permit unless a "Change of Status Notification Form" is completed and forwarded to MADEP.

Procedures for Managing On-Site Waste

Under Massachusetts regulations, VSQGs, SQGs and LQGs are allowed to manage hazardous waste and waste oil at satellite accumulation areas (point-of-generation). Generators may accumulate hazardous waste in containers at or near specific point-of-generation (satellite accumulations area) where wastes first accumulate, provided that all of the requirements noted below are met. The Hazardous Waste Point-of Generation Area Weekly Inspection Form will be used by the VMF manager to verify compliance (Appendix A).

- The waste(s) must be generated as a result of an activity taking place at the specific point-of-generation where the waste(s) is first accumulated.
- Each specific point-of-generation where waste(s) first accumulates must be under the control of the vehicle maintenance manager, who is directly responsible for the activity resulting in the generator of the waste.
- For each specific point-of-generation, only one (1) container can be used at any one time for each waste stream.

- Floors of a satellite accumulation area (point-of-generation) must be free of cracks and gaps and sufficiently impervious to not allow leaks, spills or accumulated precipitation of the waste to pass through the surface.
- Wastes should not be located over or next to a working floor drain; affected areas should be marked to indicate the boundary of the satellite accumulation area (when applicable, both requirements can be accomplished by using an epoxy paint which is chemical resistant or use a spill containment system).
- Containers at satellite accumulation areas must always be labeled and visible for inspection. The label must include, at a minimum:
    1. Words "Hazardous Waste"
    2. Words which describe the contents of the container, such as the chemical name and/or the words "Waste Oil"; and/or "Oil in Process"
    3. Hazards(s) associated with the waste (such as ignitable, corrosive, reactive or toxic).
    4. Containers must be:
        - Closed at all times (except when waste is either being added or removed from the container).
        - Bungs must be kept closed and rings fastened.
        - Compatible with the waste it contains.
        - Kept in good physical condition (not rusting, bulging, leaking or noticeably defective).
        - Stored in a manner to prevent damage.

The waste and/or "oil in process" must be emptied (transferred to the UST or AST) at the end of the work shift.

Primary waste oil storage - the Commission utilizes (1) 280 gallon, double wall steel, above ground storage tank (AST) for "waste oil", located in the VMF Lube Room, adjacent to the service bays, ground level of the garage.

Secondary waste oil storage - 55 gallon containers may be used to store waste oil under the following designated waste storage requirements:

Hazardous waste storage area

- Once a container becomes full, the container must be dated and brought to the designated hazardous waste storage area (Chemical Shed) used on-site or transported off-site by a licensed facility.

- A designated area for waste storage is for a temporary period of time. At the end of the temporary period, the waste must be recycled on-site or transported off-site via a licensed transporter to a licensed TSDF. A storage area can also be used to accumulate hazardous waste in excess of 55 gallons.

- Waste Storage areas must comply with the following:

    1. Aisle spacing for containers – sufficient to easily inspect hazardous waste labels (a minimum of 24 inches).

    2. Floor surfaces must be free of cracks and gaps and sufficiently impervious to contain leaks, spills or accumulated precipitation of the waste until the material can be detected and removed.

    3. A sign with the words “HAZARDOUS WASTE” for hazardous waste storage areas (the letters must be at least one inch high).

    4. A “NO SMOKING” sign.

    5. A sign reading “DANGER”.

    6. Signs marked to indicate the boundary of the storage areas and security provided to prevent unauthorized entry into hazardous waste storage areas.

- No hazardous waste will be stored outdoors.

- Designated storage areas will be inspected weekly by the VMF manager or designee using the Hazardous Waste designated Storage Area Weekly Inspection Form.

There are differences between the storage requirements for LQGs SQGs and VSQGs’. The major difference is the amount of waste which can be accumulated and the amount of time in which it can be kept on-site. The accumulation start date begins when the first drop of waste enters the container, unless the container is transferred from a point-of-generation area. The specific requirements follow:

- VSQGs have no time limit for storage of waste as long as they:

    1. Generate less than 220 lbs. each of hazardous waste in any calendar month.

    2. Never accumulate more than 1,320 lbs (approximately 3-55 gallon drums) of hazardous waste at any one time.

- SQGs can store hazardous waste and waste oil for up to 180 days or until the storage reaches the volume accumulation limit, whichever is sooner.

    1. Cannot generate more than 2,200 pounds of each hazardous waste in any calendar month.

- LQGs can store waste for no more than 90 days.

    2. No volume limits on how much waste a LQG generates in a calendar month or how much waste can be accumulated in any one time.

Storage area procedures are the same for LQGs, SQGs and VSQGs. All of the same container management requirements for point-of generation areas must be followed.

Procedure for Spill Reporting

In the event of an actual or threatened spill or release of hazardous waste or material which presents any risk of injury to health or the environment, or during an emergency event where the facility must implement its contingency plan, the VMF manager must immediately notify MADEP. The Commission must also take immediate steps to prevent, contain and/or clean up the spill or release, it if is safe to do so.

Waste oil is the most likely pollutant in VMF, which is subject to spill or release notification requirements. Releases to the environment include releases:

- Outside the building.
- To the ground.
- To a storm drain/floor drains.
- To unlined trenches or sumps.

If more than 10 gallons of waste oil is spilled and reaches the environment (or threatens to reach the environment), the VMF Manager or designated alternated must:

- Notify the MADEP as soon as possible, but not more than two hours after sudden, continuous, or intermittent release; and

- Obtain a Release Notifications Form (BWSC-103) from the DEP, and submit it to the DEP within 60 days following the date of original notification.

(See the Commission's Spill Prevention Control and Countermeasure Plan (SPCC) excerpts of which can be found in this manual).

Contingency Planning

The Commission has developed a written contingency plan as a best management practice, which provides information to VMF personnel on proper notification, evacuation, response and spill procedures for any unplanned release involving hazardous waste or hazardous waste constituents that could threaten human health or the environment. It is necessary for all personnel to act quickly to protect employees, emergency response personnel, and the environment.

The Manager of Fleet and the Deputy Director of Health and Safety will serve as on-scene emergency coordinators and commit the necessary resources during a hazardous waste emergency. At all times, there will be at least one coordinator (Primary or Alternate) either on site or on-call.

The emergency coordinator must be:

- Familiar with all aspects of the contingency plan, all operations and activities conducted on site, the locations and characteristics of wastes generated and stored, the location of all company records and the physical layout of the facility.

- Able to take all reasonable measures to ensure that fires, explosions, and/or releases do not occur, recur, or spread to other areas (measures include stopping processes and operations; collecting and containing release waste; and removing or isolating containers, as required).

- Emergency Coordinators must be qualified and trained to take appropriate action to address spills and other emergencies only if it is safe to do so. Otherwise, it is expected that the coordinators will evacuate the area as necessary and make appropriate notifications to obtain help.

Emergency Procedures

During an emergency, the emergency coordinator will take all necessary actions to ensure a timely and appropriate response. The coordinator shall choose the order and applicability of the following actions, based upon the situation and the hazardous waste or hazardous waste constituents involved:

- Identify and assess the situation (source, health and environmental impact).
- Notify personnel of the spill or release, as necessary.
- Evacuate the immediate area or storeroom, if necessary.
- Determine clean-up and response action to be taken, if actions can be safely performed by personnel (such as spill containment or absorption).
- Oversee the clean-up throughout its entirety.
- If clean-up and response actions are beyond VMF personnel, contact external support listed on emergency response notification list.

Emergency procedures should be conducted only by qualified individuals who have been trained to assess the situation and respond safely. In no instance should any Commission employee take action that would put them at risk. When in doubt, seek external support.

Contingency Plan

A two (2) page Contingency Plan and Notification of Contingency Planning documents emergency notifications, contact phone numbers, including phone numbers for the Commission's Emergency Coordinators and emergency procedures to ensure a timely and appropriate response. The Emergency Response Notification list must be posted in close proximity to the telephone of the Emergency Coordinators and waste generation/storage areas in order to expedite any emergency notifications.

The Emergency Response Notification list along with a letter confirming that a Contingency Plan is in place at the Commission must be forwarded to local authorities (Boston Fire Department and Boston Police Department) informing local authorities that a contingency plan exists at the Commission.

Evacuation Route

In the event evacuation from the VMF becomes necessary, Fleet personnel must evacuate the area using the most expeditious means. However, it will be the responsibility of the Emergency Coordinator or his/her designee to determine the evacuation route and ensure adequate Fleet personnel is assigned to redirect traffic entering Commission facility from Albany Street , Fellows Street and/or Harrison Avenue. The primary evacuation route (across Harrison Avenue to Parking Lot 4) shall be used in the event the emergency results in a full evacuation from the facility ;the secondary route will be to proceed to Albany Street parking lot areas located at the entrance of the Commission facility at Albany Street and wait for further instruction. The Emergency Coordinator may employ alternative routes when emergency circumstances dictate.

Employees who are located outside the facility for any reason during an emergency situation are to proceed across Harrison Avenue to the outside emergency muster area Parking Lot 4 and report to their department manager or emergency coordinator.

Procedure for Completing Hazardous Waste Manifests and Shipments

A Hazardous Waste Manifest Form must be completed every time hazardous waste is transported off-site for treatment, storage or disposal. An eight-part manifest is used when hazardous wastes are shipped outside of Massachusetts or when the generator is a large quantity generator. The eight-part form ensures that MADEP and the applicable state department of environmental protection (where the waste will be treated and disposed of) is notified of the waste shipment activity. If the consignment (destination) state has a state hazardous waste manifest, that state's manifest should be used. If the consignment state does not have a manifest, the Massachusetts manifest can be used. Ordinarily, a manifest form is supplied by the waste transporter, although this is not required by regulations.

The manifest form includes information on:

- What wastes were shipped (including Massachusetts and/or EPA waste code(s), Department of Transportation (DOT) shipping name(s), hazard class, ID number, packing group, and reportable quantity (RQ) (in the event of a release during transportation).
- The amount of waste shipped.
- Who transported the wastes and by what method.
- Where the wastes were sent.
- Emergency response telephone number.
- Name, address and telephone number of generator, transporter and treatment, storage, and disposal facility (TSDF).
- Appropriate signatures.

It should be noted that the person signing a hazardous waste manifest is signing a legal document attesting to the fact that the paperwork is complete and accurate and in accordance with all state and federal regulations. Only personnel who have been trained on hazardous waste management and DOT regulations can sign manifests.

The generator is responsible for:

- Ensuring the waste reaches its final destination for treatment or disposal.

- Tracking waste shipments: a Waste Manifest Tracking form has been developed to help staff track the paperwork associated with hazardous waste shipments.

- 1) Store copy 8 of the 8-part manifest in a secure place while waiting for copy 3 of the manifest. (Copy 3will be sent to the generator (BWSC) by the Treatment, Storage, and Disposal Facility (TSDF) along with the Land Disposal Restriction (LDR) form, which indicates that the waste has made it to its proper destination).

- 2) Staple copy 3, together with copy 8 and the (LDR). If copy 3 is not received and signed by the TSDF within 35 days of the waste shipment, the Fleet Manager must contact the (TSDF) to determine the status of copy 3. If copy 3 is not received signed within 45 days from the date of shipment, the Fleet Manager must forward a Manifest Exception Report, stating the steps taken to resolve the matter to the MADEP. The exception report must be retained for a minimum of three (3) years.

- MADEP requires that manifest copies are maintained for a minimum of three (3) years and LDR forms maintained on-site for five (5) years. The Commission requires this paperwork is retained permanently.

Training

Personnel dealing with hazardous waste at the facility must successfully complete a program of classroom instruction or on-the-job training that teaches them hazardous waste management procedures (including contingency plan implementation) relevant to the position in which they are employed. The program will be directed by an individual trained in hazardous waste management procedures; and include instruction that teaches employees dealing with hazardous waste the following:

- Knowledge of hazardous wastes and hazardous wastes at their VMF location.

- The VMF's generator status, based on the quantity of waste generated per month.

- What proper management procedures include for hazardous waste storage and accumulation (labeling, accumulation management and storage area inspections).

- Knowledge of waste manifesting and tracking requirements.

- What to do in an emergency (preparedness/prevention and contingency plan implementation).

The training will be designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing them with emergency procedures, emergency equipment and emergency systems including:

- Procedures for using, inspecting, repairing and replacing facility emergency and monitoring equipment.
- Communications or alarm systems.
- Response to fires or explosions.
- Response to groundwater contamination incidents.
- Shutdown of Operations.
- What the VMF's generator status is.
- Explanation of proper management procedures for hazardous waste storage and accumulations (labeling, accumulation management and storage area inspections).
- Explanation of waste manifests and tracking requirements.
- Emergency response procedures - (preparedness, prevention and contingency plan implementation).

The training program will ensure that facility personnel can respond effectively to emergencies by familiarizing themselves with emergency procedures, emergency equipment and emergency systems.

VMF personnel will be provided training within three (3) months after the date of their employment or assignment to the Fleet Department or to a new position, whichever is later. Employees must not work in unsupervised positions until they have completed the training requirements. VMF personnel must take part in an annual review of the initial training.

Recordkeeping

The VMF manager must maintain the following documents and records on site:

- The job title for each position at the VMF related to hazardous waste management; and the name of the employee in each position.
- A written job description for each position responsible for hazardous waste management.
- Records that document training has been provided.
- Training records on current personnel must be retained permanently. Training records on former employees must be retained for at least three (3) years from the date of separation

of employment. Copies of all training records must be provided to the Commission Training Manager.

BOSTON WATER AND SEWER COMMISSION

HEALTH AND SAFETY MANUAL

REPORTING UNSAFE WORKING CONDITIONS

REPORTING UNSAFE WORKING CONDITIONS

The Boston Water and Sewer Commission's "Report of Unsafe Condition or Safety Hazard" form can be used to report potential safety concerns to supervisors/managers and the Safety Committee. Employees can obtain these forms from their supervisors/managers or a Safety Committee member.

Noted below is the procedure for reporting an unsafe condition. The 4-steps noted below must be completed in detail by the employee reporting the potential hazard.

1. Name and job title of the employee reporting the issue.
2. Name of the supervisor/manager and their job title - Name of Safety Manager
3. Describe in detail the unsafe condition or deviation from standard safety procedures. Be specific and provide examples.
4. Submit the form to your supervisor/manager for review.

Supervisor/Managers will review the issue, investigate and consider its merit utilizing immediate resources within ten (10) days of receipt of notice.

Supervisors/managers are required to thoroughly investigate the reported issue and develop an "Action for Resolution". At no time should the reported issue be dismissed without review and consideration.

Issues resolved at this level must be fully documented in the "Action for Resolution" area of the form. The form is signed by the supervisor/manager and forwarded to the Safety Manager.

If the issue is not resolved: the steps taken by the supervisor/manager to resolve the matter must be documented under "Comments" and include and explanation why the matter could not be resolved at their level. Comments may include, if applicable, "Denied no Merit". The form is signed by the supervisor/manager and forwarded to the Safety Manager (or committee member) for review.

The Safety Manger will discuss and/or attempt to resolve the matter with the supervisor/manager or other involved parties.

All resolved issues will be presented for informational purposes at the next scheduled Safety Committee Meeting.

Issues unable to be resolved will become agenda items for the next scheduled meeting. A Safety Committee emergency meeting will be called for any issue deemed critical.

The committee will discuss the results and/or status of progress on resolutions of issues reported through this forum.

Any and all issues not resolved in the preceding steps will be brought before the Executive Director or his designee.