I. Excavations, Trenching, and Shoring

1. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.
2. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined before opening an excavation by contacting local utility companies and Facility Services, to establish the location of the utility underground installations.
3. An excavation permit shall be obtained from Facility Services prior to beginning the excavation on campus.
4. When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means, such as probing and hand digging.
5. While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.
6. Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.
7. Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.
8. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet of lateral travel for employees.
9. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.
10. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.
11. Where employees enter excavations greater than 4 feet in depth, and where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, the atmospheres in the excavation shall be tested before entry. A hazardous atmosphere is one with greater than 20% LEL or airborne exposure above OSHA PELs
12. Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres, such as a

concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

13. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.
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