1.1 GOALS

A. The goal of this section is to provide guidance in the design of Plumbing and Fire Protection systems to LAWA standards. The LAWA Plumbing Design Standards are a compilation of general design and construction practices that are already in place in our facilities, as well as recent discoveries that should be implemented throughout the facilities to maximize the performance of existing systems, minimize maintenance costs and improve the passenger experience. These standards are by no means an exhaustive description of all plumbing systems practiced in our facilities; however, this document does present LAWA's minimum design standards for the major building plumbing systems. If any discrepancy is found between these standards and the LAWA Design & Construction Handbook, the more restrictive standards shall take precedence.

1.2 GENERAL

A. See LAWA Airport Mechanical Design Standards for general design and drawing requirements.

1.3 PLUMBING SYSTEMS

A. Submittals

1. Design Phase: A complete package of design calculations and plans shall be provided to LAWA for review during the design phase of the project. Calculations and plans shall be provided with any markings or notations that are needed to make them clearly understandable.

B. System Design Criteria

1. Energy conservation design practices should become integrated into the building, allowing it to operate more efficiently and to use less energy, while meeting the needs of the user. Designers shall consider techniques and equipment to maximize efficiency and minimize energy consumption. These include: water temperature control, water pressure regulations, faucet flow restriction, economical use of thermal insulation, automation (sensors or otherwise) of flushing, faucet closing and water heating and circulation systems shutdown.

2. Provide information on the existing plumbing lines and existing plumbing system that are affected by new work.

3. Provide separate riser diagrams for the water, waste/vent and gas systems. The water riser shall show the entire system from the main water meter to the most remote plumbing fixture outlet. The waste/vent riser shall show the entire system from the street sewer main point of connection to the most remote plumbing fixture outlet. The gas riser shall show the entire system from the main gas meter to the most remote gas outlet.

4. Terminal domestic hot water system:

   a. Primary high temperature water is provided by the Central Utility Plant (CUP) for the use of domestic hot water and delivered at 220 degrees Fahrenheit to the terminal/building pump room.
   b. Design the domestic hot water system secondary loop from the domestic heat exchanger, with a backup electric water heater, at the terminal/building pump room.
   c. Secondary domestic water loop is set at 140 degrees Fahrenheit for supply and 120 degrees Fahrenheit for return.

d. Restrooms with 3 or more lavatories shall use master mixing valve on the main header supply line serving the lavatories. A temperature gauge shall be provided on the supply line on the discharge side of the mixing valve.
e. Mixing valve setting shall be at 110 degrees Fahrenheit.
f. The public restrooms shall utilize the building domestic hot water system secondary loop for hot water connection.

C. Calculations

1. Existing Plumbing Systems

a. Provide a table of the fixture unit count with the total of existing fixtures and new fixtures. If the number of new fixtures is more than the number of removed fixtures, provide hydraulic calculations of the water system.
b. If pipe sizing for modified system is per Appendix A of the LA Plumbing Code, verify that the pipe sizing criteria corresponds with the existing plumbing system.

D. Piping

1. Piping should meet the following requirements:

a. Discharge line from Trash Compactor – ABS (to where it meets the Point of Connection to the existing waste line).
b. AC unit condensate drains – Copper Type M.
c. Equipment vents – Black Carbon Steel, ASTM A53, Type S (Seamless) or Type E (Electric-Resistance Welded), Grade B, Schedule 40 or Copper Type L.

NOTE: 50-50 solder shall not be used for any pipe jointing. No direct buried copper piping shall be permitted inside or outside terminals or other buildings. The use of ferrous metal pipe and fittings under slabs shall be reviewed by LAWA on a case by case basis.

2. Installation methods shall be in accordance with the latest edition of the Los Angeles Plumbing Code.

a. No piping connections shall be made through hot tapping method, unless approved by LADBS and LAWA. Provide connections with standard tee fittings and reducers where hot tapping method is not used.
b. Provide a brass ball valve and a 6” brass nipple at each location where the piping transitions from copper to steel. Dielectric fittings, flanges and unions shall NOT be used on any piping, except dielectric flanges may be used inside the mechanical and pump rooms. Additionally, dielectric unions MAY be used in natural gas piping at the meter and at the equipment connections.

3. Horizontal drainage pipe shall be provided with a cleanout at its upper terminal, and at every 75 feet of developed length, or fraction thereof.

E. Equipment Rooms Including Pump Rooms and Fan Rooms:

1. Include floor drains, floor sinks (condensate drain, pressure relief drain, blow down, etc.), make-up water connections and hose bibbs in each room.

F. IT Rooms, MPOE, Telecom Room, UPS, Battery Rooms, Electrical Rooms and Elevator Machinery Rooms:

1. No water, storm drain or waste lines shall pass over these areas, except for services related to these rooms, without the designer/contractor obtaining approved Exemption Request Form from LAWA Planning & Development Group (PDG) and Facilities &

Technical Services Division Management (FTSD Management). If any fluid piping passes over these rooms, the piping shall be provided with a drain pan under the pipe to catch any leaks. The drain pan shall extend throughout the run of piping over the room and drained to an approved receptor.

G. Restrooms, Janitor Closets and Pet Areas

1. Public and non-public restroom design including janitorial plumbing fixtures and accessories shall be in compliance with the latest version of LAWA Public Restrooms, Design Intent.

2. All faucets, fittings, supply stops for fixtures and similar devices shall be one manufacturer unless otherwise required. Each fixture shall contain standardized interchangeable operating units made up of separate renewable stem, seat, washer retainer and nut. All faucets and fittings must be capable of closing under the designed water pressure. All fixtures shall be installed with supply stops/valves accessible at the fixtures. Fixture shall be electronic with manual over-ride.

3. No seismic joints are allowed in restrooms or pipe chases.

4. Plumbing Design Requirements

   a. Public Restrooms (Men's, Women's & Family)
      (1) Each restroom, Men's and Women's only, shall be designed so that when half of the restroom is being cleaned or maintained, the other side of the restroom can still remain in operation. Provide two separate hot and cold water valves to accomplish this requirement for maintenance.
      (2) Provide a hose bibb connection for cleaning purposes.
      (3) Provide a floor drain with an electric trap primer.
      (4) Provide a water hammer arrester in the domestic cold water line.
   b. Non-Public Restrooms
      (1) Provide a hose bibb connection for cleaning purposes.
      (2) Provide a floor drain with an electric trap primer.
      (3) Provide a water hammer arrester in the domestic cold water line.
   c. Janitor Closets
      (1) Provide a floor drain with an electric trap primer.
      (2) Provide a separate valve for the mop sink in the janitor closet. The valve shall be located and accessible in the janitor closet.
   d. Pet Areas
      (1) Provide a floor drain with an electric trap primer.

5. Pipe Chase Requirements

   a. Design a separate cold water and hot water header for each set of back to back fixtures. Provide a minimum 30" wide access door in the pipe chase, minimum 48" clear dimension between inside face of walls of the pipe chase, with minimum 30" clear path of travel, and minimum height clearance of 7 feet.
      (1) Provide a shut off valve at each cold water and hot water header.
      (2) Provide a hose bibb.
      (3) Provide a floor drain with an electric trap primer.
      (4) Provide a water hammer arrester in the domestic cold water line.
      (5) Provide a waterproof floor.
      (6) Cleanouts.
         i. Cleanouts shall face toward the pipe chase.
         ii. Each urinal shall have a cleanout

iii. Each water closet waste line shall have a cleanout at each end and in the middle.

b. Where pipe chase is inaccessible or has inadequate access as defined above:
   (1) Provide a shut off valve at each cold and hot water header. Valves shall be in the Men's restroom or common area and shall be provided with an access panel.
   (2) Provide with water hammer arrester in the domestic cold water line and shall be provided with an access panel.
   (3) Cleanouts
      i. Cleanouts shall face toward the restroom.
      ii. Each urinal and water closet shall have a cleanout.

6. Trap primers and mixing valves shall be located between 2-4 feet above finish floor in the room that it serves. Trap primers and mixing valves shall be provided with an access panel, unless located in a pipe chase. Provide an accessible shut-off valve for each trap primer.

7. Hose bibbs shall be provided with an accessible shut off valve.

H. Valves

1. Isolation valves shall be class 300 gate valves for piping 2" and larger and class 150 bronze ball valves for piping 1½" and under.

2. Valves 8 feet and higher above the floor shall have chain wheel operators.

3. Valves shall be provided on the supply at the point of entry to all buildings for all domestic cold water and hot water distribution systems

4. Floor control valves shall be readily accessible and provided on every floor at every riser.

5. Sectional control valves shall be readily accessible and provided on the main horizontal domestic cold water and hot water lines at every 100 feet of main horizontal pipe, or fraction thereof, or at locations that divides the building into thirds, and as mutually agreed upon by the EOR, Contractor, PDG and FTSD Management in writing during the design phase. Provisions shall be made to drain the line with a hose connection, or other method acceptable to LAWA, in between isolation valves.

6. Shut off valves shall be readily accessible and provided on every main branch pipe connection from the main horizontal pipe.

7. Valves shall be readily accessible, within 12" of ceiling, for ease of maintenance. Otherwise, access for maintenance shall be provided via a ladder, platform, lift or other FTSD Management approved method and demonstrated graphically on the drawings.

8. Valves serving base building utilities shall be readily accessible in a LAWA space, and as agreed upon by PDG and FTSD Management in writing during the design phase.

   a. Where the valve cannot be located in LAWA space, provide a "KNOX box" or similar method for LAWA door access.

I. Pumps

1. Terminal/Building Pump Room

   a. Pumps shall be base mounted horizontal, split-case or end suction centrifugal type. Pumps located on ground or grade level will be mounted to concrete bases with vibration pads. Pumps located on structural floors shall have concrete filled

inertia vibration bases. All pumps to have flex connections, isolation valves, strainer, spring loaded check valves, pressure gage and flow measurement device. Pump manufacturer shall be Armstrong, Bell & Gossett or Taco.

2. In-Line Circulating Pumps

   a. Pumps shall be all stainless steel for domestic water service. Provide a line size ball valve on suction and discharge side of pump. Provide unions or bolted flange connection on each side of pump. Pressure gage and thermostat are required on in-line circulators.
   b. The designer shall study water usage periods and shall design pumps to operate just prior to usage periods and limit their operation as much as possible. A 7-day 12-hour timer shall be installed to control such pump operation, especially during peak demand periods as an energy reduction measure.

3. Submersible Pumps

   a. Generally, submersible pumps are avoided where possible except electric power maintenance holes where high voltage switches or tap boxes are installed. Diaphragm actuated pumps are preferred rather than float actuated pumps.

4. Sump Pumps

   a. Commercial type duplex sump pump is required. Explosion proof motor is required in a mechanical/electrical equipment room containing high voltage switchgear or motor control panels.
   b. Mechanical alternator, check valves, automatic float switch with rod, rod guide, copper float and high water alarm bell shall be provided on duplex pump.
   c. Pumps shall be of the wet-pit type complete with gas tight sump cover, vent, curb ring, grease lubricated, including alemite fittings extended to pump base plate.
   d. Pumps shall be heavy duty, vertical centrifugal, open non-corrosive impeller type with vertical drip-proof type motor with anti-friction grease lubricated bearings.
   e. Pumps shall be provided with separate circuit and circuit breaker.
   f. Where pumps are installed to provide protection for mechanical/electrical equipment and/or critical equipment, in addition to high water alarm bell in the area, alarm contacts should be provided for a central monitoring system.

5. Sewer Ejector Pumps

   a. Sewer ejector pump design and selection design criteria are the same as those listed for “Sump Pumps” except sewer ejector pumps shall be of the standard three (3) inch, non-clog, slicer/grinder type specifically designed and installed for purpose intended.
   b. For ease of access and maintenance, sewer ejector pumps shall be located outside of the building footprint. If outside the building footprint is not feasible, sewage ejector pumps shall be located in a dedicated room.
   c. Sewer ejector pump installation and location shall be approved by LAWA PDG and FTSD Management in writing during design phase.

J. Standard Water Heaters

1. Water Heaters shall adhere to the following:

   a. Water heaters shall be completely glass lined.
   b. Gas water heaters shall have automatic gas shut-off device and be equipped with an American Gas Association certified draft hood. Water heaters shall utilize electric ignition devices.

c. Electric water heaters shall be U. L. listed.
d. Electric water heaters shall be provided with submersed type thermostat.
e. All standard water heaters shall have a three (3) year limited warranty.
f. Energy saver water heaters shall meet ASHRAE Standards for Energy Efficiencies, latest edition.
g. Water heater drains shall have valves and shall be plumbed to a floor drain with Copper Type L piping.
h. All water heaters shall be readily accessible.
i. Electric water heaters shall not be installed above the ceiling.

K. Roof and Overflow Drains

1. Roof and overflow drains shall be compatible with roof system. The designer shall use two (2) inches per hour as a minimum rainfall intensity guideline for sizing roof drains.

L. Backflow Preventers

1. Where the service line provides potable water for domestic service, a backflow preventer shall be installed on any domestic water line serving other closed or chemically treated systems that could foreseeably contaminate the potable water line.

2. Guidelines for selection of backflow prevention shall be in accordance with LADWP Water Service Rule 16-D, August 2006 or latest revision. Copy can be obtained from the Los Angeles Department of Water and Power. Water Quality and Distribution Division, 111 North Hope Street, Room 1213, Los Angeles, California 90012.

M. Grease Traps or Interceptors

1. Waste water from disposers, sinks, dishwashers, floor drains and floor sinks in food facilities shall drain to a grease collection system or through a grease trap or grease interceptor serving one or more facilities. Installation shall comply with the latest edition of the Los Angeles Plumbing Code.

2. Grease interceptors shall not be located in any Mechanical Rooms.

3. See Airport Structural Design Standards for loading criteria.

4. Waste pipes from grease producing fixtures shall be provided with heat trace system per Specification Section 22 05 33.

N. Kitchen Sinks: For food service tenants utilizing kitchen sinks and commercial kitchens, the following shall be included in the design

1. Sinks used for food service shall each have a food grinder.

2. Food grinder in commercial kitchen shall require approval from City of LA Bureau of Sanitation Industrial Waste Division (Amended by Ord. No. 174,047, Eff. 8/5/01). When the use of grinder is allowed, the following fineness of grind requirements shall be met at all times:

a. At least 40% shall pass a No. 8 sieve.
b. At least 65% shall pass a No. 3 sieve.
c. 100% shall pass a ½-inch screen.

O. Sub-meter:

1. Provide individual sub-meter for domestic water system, for each building, terminal, and tenant area with option for future remote data gathering connection.

a. Tenant areas include:
   (1) Concessions spaces: Provide sub-meter for each concession space with major domestic water load.
   (2) Any spaces with major domestic water load, not covered by lease agreement.

2. Provide individual sub-meter for gas systems, for each building, terminal, and tenant area with option for future remote data gathering connection.

   a. Tenant areas include:
      (1) Concessions spaces: Provide sub-meter for each concession space with major gas load.
      (2) Any spaces with major gas load, not covered by lease agreement.

3. See LAWA DCH Submetering Policy.

P. Domestic Water Sampling Port Requirement

1. LAWA requires the installation of sampling ports in all new construction, or in renovations of existing terminal buildings that are to be monitored by LAWA's Water Safety Program (WSP). The sampling port requirement is for a "sampling hose bibb" installed on the building's domestic water line prior to connecting to the water distribution system which delivers water via the water cabinet to the aircrafts. The "sampling hose bibb" is strictly used for collecting water samples only and cannot be used for any other purposes. LAWA Water Management Team shall review and approve the location of sampling ports. See Section 1.3P7a-e for sampling port specifications. Contact information for LAWA Water Management Team:

   LAWA Environmental Programs Group, Environmental Compliance and Sustainability Division – (424) 646-6500

2. LAWA is responsible for the maintenance of the sampling port to ensure it to be safe and accessible at all times to the sampling personnel. Sufficient room shall be provided as to allow sampling equipment to be used to monitor and collect water samples to be analyzed for compliancy in accordance with Global, Federal, State, and local rules and regulations.

3. National Primary Drinking Water Regulations: Drinking Water Regulations for Aircraft Public Water Systems promulgated by the Environmental Protection Agency (EPA), Guidelines for Drinking Water Quality and Guide to Hygiene and Sanitation in Aviation promulgated by the World Health Organization (WHO) are some of the statutory basis for this requirement.

4. LAWA routinely collects domestic water samples that are representative for each specific terminal building to ensure water delivered to our customers meets drinking water standard. Water samples collected may be tested for field parameters such as water temperature, pH, turbidity, and total/free chlorine residual. In addition, water samples may be sent to a certified laboratory for testing of heterotrophic plate counter (HPC), and presence and absence of total coliforms, E. coli and fecal coliforms to monitor the condition of the piping system. LAWA's Water Safety Program (WSP) monitors the sampling results and takes corrective action(s), if needed, to ensure that LAWA delivers quality water to our tenants and airlines at all time.

5. A U-shaped "sampling hose bibb" assembly used as a sampling port, prevents water stagnant in the piping system; thereby, allows staff to collect representative samples of drinking water for testing. See 1.3P7f for a standard detail of the sampling ports.

6. Sampling Port Specifications

   a. U-Shape Piping Configuration: As shown in the standard sampling port detail per Section 1.3P7f, the copper piping of the sampling port is configured in U-shape to avoid water stagnation. The upstream piping for the sample port shall be connected to the rigid water line exiting the terminal building while the downstream point of connection (POC) shall be to the flexible hose leading to the portable or stationary water cabinet for the passenger boarding bridge (PBB). The hose bibb (spigot) shall be located at 24-inches from the top of pavement or sidewalk, and shall always be installed on the down-flow side of pipe layout. Sampling port assembly shall be securely attached to the wall or the columns or to the specific pipe support; and shall not be in the vicinity of electric conduits, fire alarms, or at the egress/ingress of a door way or pathway.

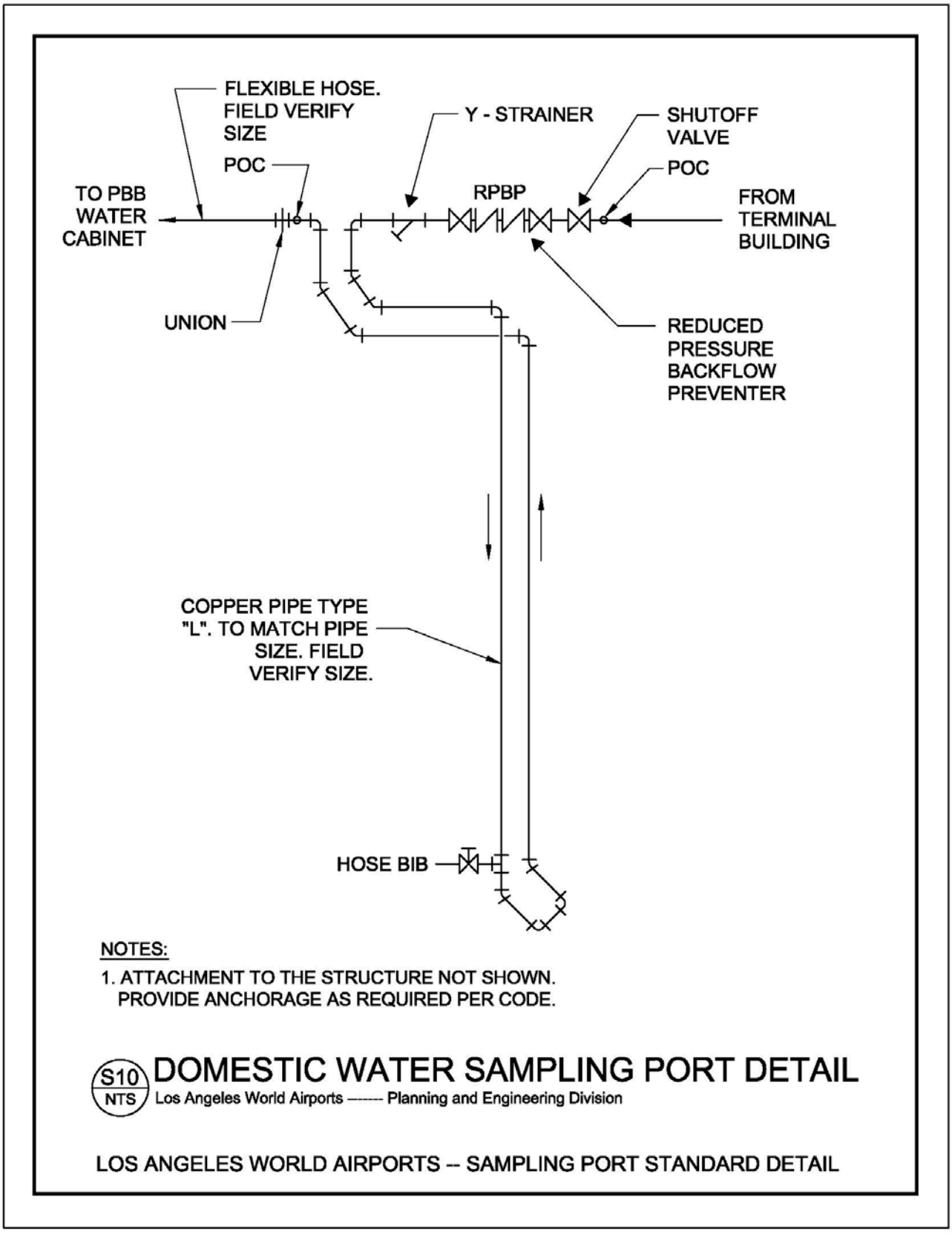
   b. Size of Sampling Port Assembly: The sampling port assembly including all elbows and connections, which is installed between the rigid potable water line exiting terminal building and the flexible hose leading to PBB water cabinet, shall match the size of the existing piping. The piping for the sampling port shall be copper pipe Type "L".

   c. Piping Insulation from Heat (Optional, but highly recommended): The sample port piping shall be wrapped with the insulation materials to avoid unacceptable temperature fluctuations which can occur during the summer as well as to prevent unwanted condensation. The thickness of the insulation materials which roughly corresponds to the pipe's outer diameter shall be applied. Insulation materials shall be AF/Armaflex Class O, Armaflex Tuffcoat and Tubolit, or equal.

   d. Protection from Contamination: To avoid cross-contamination of the sampling test port, the hose bibb (spigot) shall be exclusively used for sample collecting and water quality monitoring. Hoses for any other purposes shall not be attached to the hose bibb (spigot).

   e. Sampling port labels: Each sampling port shall be tagged with its ID # and properly labeled with language stating that the sampling port is for water sampling only and no hoses should be attached to the sampling port, i.e. "LAWA Authorized Use Only, No Hoses". LAWA Water Management Team will review and approve ID # and language on the label for each sampling port on a case by case basis.

   f. Sampling Port Standard Detail.


FLEXIBLE HOSE. FIELD VERIFY SIZE
POC
Y - STRAINER
SHUTOFF VALVE
POC
TO PBB WATER CABINET
RPBP
FROM TERMINAL BUILDING
UNION
REDUCED PRESSURE BACKFLOW PREVENTER
COPPER PIPE TYPE "L". TO MATCH PIPE SIZE. FIELD VERIFY SIZE.
HOSE BIB
NOTES:
1. ATTACHMENT TO THE STRUCTURE NOT SHOWN. PROVIDE ANCHORAGE AS REQUIRED PER CODE.
S10
NTS
DOMESTIC WATER SAMPLING PORT DETAIL
Los Angeles World Airports ------- Planning and Engineering Division
LOS ANGELES WORLD AIRPORTS -- SAMPLING PORT STANDARD DETAIL

1.4 FIRE PROTECTION SYSTEMS

A. Submittal

1. Design Phase: A complete package of design calculations and plans shall be provided for review by LAWA. Calculations and plans shall be provided with whatever markings or notations that are needed to make them clearly understandable.

B. Building Main Electrical Room

1. Building Main Electrical Room shall be protected with a Clean Agent System and Pre-Action System. Provide double interlock Pre-Action Fire Suppression System. The sequence of operation shall have the Clean Agent System as primary with the Pre-Action System secondary.

C. IT Rooms, MPOE, Telecom Room, UPS Rooms, Battery Rooms and Electrical Rooms

1. Provide double interlock Pre-Action Fire Suppression System.

D. Extended Coverage Sprinkler Heads

1. The mixing of standard coverage with extended coverage sprinkler heads in an area is not acceptable.
2. The use of extended coverage sprinkler heads shall be approved by LAWA PDG and FTSD Management in writing.
3. Clearly identify on the plans the location of the extended coverage sprinkler heads.
4. Provide label or tag at each extended coverage sprinkler head noting that this head is an "Extended Coverage" head. Label or tag type and attachment method shall be permanent and subject to approval by PDG and FTSD Management in writing.

END OF SECTION