1. DEFINITIONS

A. Area – Contiguously-heated pavement, which may include several “zones.”

B. Zone - Heated portion within area served by only ONE manifold.

C. Loop - one continuous run/circuit of tubing from supply manifold to return manifold. A single manifold may have multiple “loops.”

2. MECHANICAL DESIGN

A. Depending on the zoning, the design (and possibly future consideration of areas served by the manifold), each loop may include valves on the supply & return, as well as the supply & return piping mains feeding the manifold.

B. One manifold shall not serve more than one zone. However, the total area may have more than one manifold, depending on the design.

C. Each manifold shall be served by one heat/humidity sensor.

D. Utilize MSU 36” round manifold vault detail.

E. Maximum loop lengths shall be: 300’ for ½” tubing, 400’ for 5/8” tubing and 500’ for ¾” tubing.

F. Minimize crossings at expansions joints. See #3 under Concrete and Layout.

G. The Mechanical consultant must coordinate with MSU civil/landscape architect preparing flatwork design, and include a Concept Plan in the construction documents. This Concept Plan shall include proposed zones, manifold location(s), sensor location and proposed concrete jointing.

H. Tubing **size** (1/2”, 5/8” or 3/4”) and **spacing** (6” or 9”) shall be based upon flow & velocity rates.

3. CONCRETE & LAYOUT DESIGN

A. Heated concrete shall be 6” thick, minimum. Depth may be deeper in areas of heavy vehicular traffic.

B. The concrete beneath pavers may be heated. Utilize IPF/PDC details.

C. Zone boundaries must be separated by expansion joints to accommodate future repairs. Sometimes expansion joints may be recommended within a heated “zone” (i.e. where a sharp turn in the layout occurs.) In this case, piping shall extend beneath the expansion joint and into the aggregate subbase. Utilize IPF/PDC detail.

D. Within traditional curb and gutter, place tubing linearly /parallel. Consider monolithically poured curbs within heated areas. Parking spaces, including curb and gutter, shall be separately heated

zone from adjacent walks. Limit the amount of times piping passes thru curb and gutter boundary; if necessary (and approved), a control joint must be provided.

E. Tubing, which is placed within a frost-free entrance slab, shall pass through foundation via two "Armaflex" (or approved equal) gapped sleeves, joining the adjacent heated walk.

F. Locate structures (sensors & manifolds) within the pavement. Coordinate placement of manifold manhole with concrete jointing plan. When possible, place out of wheelchair and vehicle paths.

G. Temperature/moisture sensor (a single device) shall be installed flush with top of concrete, and not within a joint.

H. Stamp "HEATED PAVEMENT" at perimeter of heated area, as specified. Concrete stamp is available at IPF/PDC for Contractor's use.

4. SHOP DRAWINGS & INSTALLATON

A. Shop Drawings shall delineate areas, manifold location(s), heat and moisture sensor location and proposed jointing. MSU mechanical engineer and MSU civil/landscape architect shall review Shop Drawings.

B. Shop Drawings shall state tubing diameter, loop lengths, supply temperature, heat output (and assumptions), glycol type and ratio, design flow and velocity rates.

C. Tubing shall be fastened to insulation, as recommended by manufacturer.

D. Where adjacent to non-heated pavement, tubing shall be held 3" clear from edge of heated pavement.

E. Pressure test shall be executed prior to concrete pour and witnessed by Owner's representative.

END OF SECTION