April 21, 2005

UCF'S MEMORANDUM CM-N-16.02-02/00

TO: Members, Council of Presidents

SUBJECT: Roof Systems for University Facilities

AUTHORITY: Section 240.209(3)(p), F.S.

POLICY/PURPOSE: To provide guidelines for the selection, design, installation, repair and maintenance of roofs for all State University System facilities

Roof System Components. The roof system includes the following basic components: roof deck or substrate, insulation, waterproofing membrane, protective surfacing, flashing, counter flashing, roof cants where applicable, caps and copings, perimeter fascia/gravel stops, sealants, roof expansion and control joints, roof walkway systems, roof hatches, skylights, roof drains, emergency overflow protection, roof drain flashing, scuppers, gutters, downspouts, and ballast material where applicable. These components and all types of roofing material, including metal and tile, are subject to the requirements of this Chancellor's Memorandum (CM). Patios and decks constructed on roofs require special design consideration and shall not violate the roofing requirements of this CM.

Approved Roofing Materials. The selection of roofing materials shall be limited to those manufacturers with a 15-year history of satisfactory manufacture and installation of at least 250,000 squares of their roof system, and who provide a minimum 20-year unlimited warranty/guarantee for labor and materials, including metal finishes.

Registered Architect or Engineer Required. All new, repair, and replacement roofing projects shall have plans and specifications developed by a registered architect or engineer licensed by the State of Florida. The engineer shall be a professional engineer, with a minimum of ten (10) years direct experience in design and analysis of roof systems, and certified as a registered roof consultant by the Roof Consultants Institute.

Steep Slope Roofing. Steep slope roofing includes slate, tile and metal roof systems. Steep slope roofing shall not be utilized on university facilities on slopes less than four (4) inches per foot unless a waterproof underlayment system is utilized beneath the steep roofing components. Under no circumstances shall slate or tile be installed at slopes less than two (2) inches per foot.

Energy Management. Roof system design shall be consistent with energy management requirements of the State University System, Florida Statutes and applicable Codes. Insulating values of the finished roof system shall be designed on the basis of economic life cycle return on investment when evaluated against fuel costs.

Roofing Work Carried Out By University Personnel. Roofing projects carried out by university personnel shall be performed in a manner approved by the roof system manufacturer or one of its licensed roofing contractors. Repairs to low slope roofs shall be accomplished in accordance with the National Roofing Contractors Association Repair Manual for Low-Slope Membrane Roof Systems or manufacturer's requirements to maintain warranty.

Roof Membrane Penetrations. All penetrations of the roof membrane shall be detailed according to the recommended procedures provided in the latest National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual and installed per manufacturer's instructions. The details in the Manual show standard conditions which should be adapted to suit each individual project.

Expansion Joints. Structural expansion joints occurring in new construction shall be located at high points in the structure or roof insulation to the maximum extent practicable to allow water to flow away from them on the roof surface. Under no circumstances are expansion joints to be placed such that roof water must flow across them to reach drains.

Utility Supply Lines. Utility supply lines (electrical, water, gas, etc.) to roof-mounted equipment shall be installed within the supporting curb of that equipment.

Through-Wall Flashings. Architects/Engineers designing new facilities shall be cautioned to carefully locate through-wall flashings at sufficient elevation above anticipated finished roof level to ensure minimum base flashing heights as defined herein can be met. Elevations and accessibility of other components shall also be considered for their impact on roofing installation including reroofing of the facility. Such components as siding, window sills (above roof level), equipment supports, stucco facades, etc. can greatly hamper appropriate installation of roofing components and thus have a significant impact on the costs and feasibility of reroofing.

Emergency Overflow Protection. All roof systems shall have a secondary means of evacuating water from the surface of the roof in the event the primary drainage system is blocked. The secondary system shall be totally independent of the primary system and may consist of overflow scuppers through walls, an independent internal overflow drainage system, or other suitable means. The

structural components of a roof system shall be reviewed by a licensed professional structural engineer to ensure that any water which accumulates on a roof system in the event of failure of the primary system will not overstress the structure. Water shall not be allowed to accumulate to a depth greater than four (4) inches.

Internal Gutters. Internal gutters are prohibited on new facilities. Internal gutters on existing facilities shall be eliminated during reroofing projects to the extent practicable.

Roof Access. All roof areas shall be permanently equipped with a reasonable means of access for purposes of maintenance of the roof system and any roof mounted equipment. Access can be in the form of internal roof scuttles. External wall mounted ladders may only be considered if no other means of access is available and only where safety and security can be maintained.

Roof-Mounted Equipment. Roof-mounted equipment is not acceptable if other locations for placement can be found. All roof-mounted equipment shall be provided with roof surface walkway access to allow ease of maintenance and minimize roof surface damage. Roof-mounted antenna, lightning protection anchorage, lab equipment, or scientific devices shall be located in areas specifically designed for that purpose. Roof loads, walking surfaces, anchoring devices, mounting pads, curbs, or utility needs shall be designed and provided using appropriate details, adapted as required, from the NRCA Roofing and Waterproofing Manual.

Pitch Pockets Prohibited. Pitch pockets are not permitted, including those filled with a urethane, butyl rubber, or similar pourable caulking, and bituminous materials.

Roof Coatings. Specific spray-applied polyurethane foam roof systems and specific roof coatings shall be considered for new and reroofing projects where the architect/engineer and the university demonstrate that their use is appropriate and stucco facades, etc. can greatly hamper appropriate installation of roofing components and thus have a significant impact on the costs and feasibility of reroofing.

Roof Scans. All new roofing shall require acceptable roof scans to ensure satisfactory compliance with specifications.

Insulating Light-Weight Concrete. Insulating light-weight concrete over vented (perforated) metal roof decking is permitted. Insulating light-weight concrete over structural concrete slabs as part of the roof system or over existing roof assemblies is acceptable provided:

A. Insulating light-weight fill thickness (over substrate or insulation board) is a minimum 1", not to exceed 1 ½ " , and;

B. Insulating light-weight concrete is aggregate based and has a minimum compressive strength of 300 psi. Roof vents through the membrane will be acceptable provided they are insulated, spun aluminum roof vents having a one-way valve design. Roof vents constructed of pvc are not acceptable.

All lightweight insulating concrete systems must meet the following standards:

A. Tested by Underwriters Laboratories in accordance with the procedures of ASTM E 119 and listed in the most recent Underwriters Laboratories Fire Resistance Directory;

B. Tested by Factory Mutual Research and listed in the most recent Factory Mutual Approval Guide as non-combustible or Class 1; and

C. Tested by Factory Mutual Research for windstorm classification I-120 and listed in the most recent Factory Mutual Approval Guide.

Resaturants. Resaturants are not acceptable for rejuvenation of an existing built-up roof system.

Galvanized Metal Flashing. The use of galvanized metal flashing is not acceptable.

Asbestos. The use of roofing materials containing asbestos is prohibited in the installation of new or the repair of existing roof systems.

The removal of roofing containing asbestos shall be carried out by State certified roofing contractors. Asbestos roofing removal shall be conducted in accordance with all requirements of Environmental Protection Agency, Occupational Safety and Health Administration, and Florida Statutes; and all applicable rules of the Department of Business and Professional Regulation, Department of Environmental Protection, Department of Labor and Employment Security, or other state agencies having jurisdictional authority.

Codes and Standards. The university shall ensure that all architects, engineers, specifiers, consultants, inspectors, installers and university maintenance personnel utilize the following resources: the latest edition of all applicable building codes, the Factory Mutual Systems Approval Guide; the Underwriters Laboratory (UL) Building Materials Directory; the UL Fire Resistance Directory; the American Society For Testing and Materials Board of Standards Volume for Roofing, Waterproofing and Bituminous Materials; the Architectural Sheet Metal Manual by the Sheet Metal and Air Conditioning Contractors' National Association; recommended standards and technical details of the Metal Roofing System Association; and, the NRCA Roofing and Waterproofing Manual.

The university shall emphasize to the architect/engineer the need to design roof systems to resist extreme wind forces. Structural analyses shall be required to verify the integrity of all roof components. Wind uplift design shall comply with the most stringent requirements of applicable codes and the latest edition of American Society of Civil Engineers - Minimum Design Loads for Buildings and Other Structures (ASCE 7-98). The architect/engineer shall also be required to consider long-term serviceability in the design of all roof systems.

Plan Review. The university Offices of Facilities Planning and Physical Plant shall review plans and specifications for compliance with State University System roofing standards and ensure that the requirements of this CM are met.

Alternative Roof Systems. If the architect/engineer proposes a specific alternative roof system, i.e. a unique or non-traditional system, the university Offices of Facilities Planning and Physical Plant shall conduct a preliminary evaluation of the system and make the necessary recommendations to the State University System Office of Facilities Planning (SUSOFP). A request to install an alternative roof system shall be in writing and include justification data. The SUSOFP will advise the university whether or not the request is approved.

Pre-Construction Conferences. The university shall ensure that a roofing preconstruction conference is conducted for all new and reroofing projects at which the university Offices of Facilities Planning and Physical Plant, architect/engineer, general contractor, roofing contractor, roofing manufacturer's representative, and other related trades representatives are present.

Protection Plans. The university shall require a specific protection plan for all new and reroofing projects to describe the means of maintaining the building in a safe and watertight condition throughout the construction period. Existing and newly installed roof systems shall be considered in the protection plan to ensure roofing operations do not damage them. Areas where the roof deck/structure are (or may be) damaged or deteriorated shall only be reroofed when the occupied spaces below are unoccupied. Other potential phases of reroofing operations can be hazardous to the facility and its occupants and shall be carefully reviewed with the architect/engineer during design, with prospective contractors during bidding, and at appropriate phases during construction.

Inspection of Installation. The university shall provide full-time inspection whenever the roof system is being installed (roofing, flashing, gravel, etc.). The inspector shall be knowledgeable in roofing specifications and appropriate installation or repair procedures. The inspector shall be required to issue written reports on a daily basis which include, at a minimum: the name, address and phone number of the roofing contractor, the name of the roofing foreman/superintendent, description of the day's weather, number of roofers/sheet metal mechanics on project, location of the day's

work, description of work accomplished, deficiencies observed in the work requiring correction, a description of materials incorporated into the work and those stored for later use, and a quantitative summary of unit price items incorporated into the day's work. Roof system installation inspection may be acquired as professional services from project funds. The university shall require the architect/engineer to include in the project specifications the requirement that the roof membrane manufacturer make a minimum of three visits during application and one visit at the time of the substantial completion inspection with a written report of each visit to the architect/engineer and owner. Manufacturer inspections shall be accomplished by technical representatives with a minimum of five (5) years direct working experience with the technical department of that manufacturer.

Warranties/Guarantees. The university shall maintain copies of all roof warranties/guarantees and records of all roof maintenance work. The effective date of warranties is the date of substantial completion by Owner.

Comprehensive Roof Management Program. The university shall establish a comprehensive roof management program for each facility to include:

a. Historic Records and Roof Asset Information - listing the architect/engineer, general contractor, roofing contractor, manufacturer and supplier, type of roof system including all individual components, warranty/guarantee dates and data, history of repairs, regular surveys and inspections data, preventive and planned maintenance procedures, projected replacement and budget needs.

b. Periodic Roof Inspections and Checklist - At least one inspection per roof area per year by qualified independent roof technicians who are not affiliated with roofing contractors, roof system manufacturers or suppliers including descriptions of roof related defects in the surfacing, membrane, membrane flashings, metal flashings, penetrations, equipment, walls, etc.

c. Action Required - itemized descriptions of remedial work requirements with itemized cost estimates for each necessary to restore the integrity of the defective area to the service level of the overall roof system. A roof plan for each roof area or group of roof areas indicating the precise location of each remedial action necessary and the non-destructive testing results. A cumulative summary of all maintenance and repair costs.

d. Projected University Cost Summary - an overall repair/replacement budget in tabular form summarizing the derived repair costs per facility. As part of this summary, maintenance costs are to be projected five (5) years from the date of each inspection to provide anticipated budget

requirements well in advance. Costs for roof replacement versus roof repair shall be included with respective costs by year.

Contact: Gina Seabrook
Office of Facilities Planning
(407) 823-2166
Internet Address: gseabroo@mail.ucf.edu