

Scope of Work

Wind-Driven Rain Tests of Building Envelope Systems up to Hurricane-Strength Wind-Driven Rain Intensity

The State of Florida Department of Business and Professional Regulation

Florida Building Commission

And

University of Florida, Engineering School of Sustainable Infrastructure and Environment
(ESSIE)

Project Leader: David O. Prevatt, PhD Civil Eng., F. ASCE, Univ. of Florida

1. Introduction

The University of Florida, Engineering School of Sustainable Infrastructure and Environment (ESSIE) shall conduct research to study issues related to water intrusion through mid – to high-rise building envelope systems during hurricanes. This project will be led by Dr. David O. Prevatt, Associate Professor of Civil Engineering.

2. Tasks

- a. The Contractor shall assemble a Project Team consisting of a management representative of Florida homeowners of a condominium unit in a high-rise building, and if possible one owner of an apartment or condominium unit in a high-rise building located in South Florida. The Team shall be led by a licensed building envelope consultant with at least 25 years in-charge experience working on building envelope systems for high-rise structures and with experience in Florida, and a representative from an accredited testing laboratory. Other team members will be drawn from a municipal authority representative, Miami-Dade building code official familiar with the issues related to mid- to high-rise building construction., and representatives of the fenestration and building cladding manufacturing industries (e.g. EIFS, masonry, fenestration, curtain wall systems) with product offerings for high-rise construction as recommended by the DBPR Staff.
- b. The Project Team shall convene by teleconference on five occasions to discuss issues critical to prosperity of the Florida residents. The Building Envelope Consultant will lead this discussion and invite others to contribute their expertise and knowledge as appropriate. The discussion shall strive to maintain openness in highlighting desired standards and their pros and cons. If feasible the Project team will visit a hurricane testing laboratory to witness the conduct of hurricane-resistance testing. The meetings will document where different interpretations of facts about hurricane risk and water

intrusion in high-rise structures exist between the lay persons and professionals in a construction team, including but not limited to the following:

- i. Are Florida homeowners fully aware of potential liability risks from wind and water leaks?
 - ii. Did any homeowner units experience water leaks and what were the consequence?
 - iii. Is sufficient knowledge available of magnitude and duration for wind-driven rain on in high-rise buildings surfaces?
 - iv. Can emergency buildings or a critical facility remain leak-free during a design-level event?
 - v. What are successful approaches by building envelope consultants to mitigate water leakage in FL hurricane-prone coastlines?
 - vi. Quantify costs to of upgraded building envelope systems to homeowners, including immediate capital costs, plus estimated damage repair costs over the life of a structure
 - vii. Is a 100% water-impermeable building envelope system achievable, and at what cost?
- c. The Contractor shall report to the FBC on findings of the Project Team summarizing the following:
- i. The Current standards for testing, product approvals that are generally accepted by building envelope consultants for installing curtain wall systems on high-rise structures in hurricane-prone regions in Florida.
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 - ii. Defining successful tests for product approvals of fenestration and the potential incompatibility between existing testing standards during hurricanes and post-hurricane performance for building envelope systems
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 - iii. Florida Building Code provisions (and other guidelines) that are used by Building Envelope Consultants and Building owners in developing curtain wall systems
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 - iv. Summary of homeowner/condominium owner experience during Hurricane Irma and other recent hurricanes.
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 - v. Current homeowner desired expectation for water infiltration and wind-driven rain resistance in condominium or apartment units of high-rise buildings. The Team will report whether any or all water infiltration is unacceptable or whether the Homeowners discern a level range of water infiltration that is tolerable.
- d. The building envelope consultant shall lead a charette with the Project Team and a handful of product manufacturers and homeowner to help develop a "Desired Specifications" for fenestration system/curtain wall system that will perform during and even after a design-level hurricane event. The desired outcomes may be incompatible with current testing and expectations for building envelope systems, but it should be helpful to frame enhanced testing criteria for future systems. The outcome of the

charette shall be a document that is understandable and acceptable to condominium owners and code officials as desired performance, as well as to building envelope product manufacturers.

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- e. The Project Team shall use this desired specification wish list to develop guidelines for the industry to follow in develop the feasibility and required steps towards post-hurricane performance design guidelines for fenestration and building wall cladding systems. The Team shall report to the Commission on their findings to include, but not limited to:

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- i. Include knowledge of current and future testing options and testing on new systems currently underway that manufacturers are willing to share with the goal of establishing reliable post-hurricane performance of curtain wall and fenestration systems.
- ii. Consider benefits of structural glazing and curtain walls - most hurricane regions now utilize curtain wall assemblies that are structural glazed to aid with glass retention; such full perimeter structural seals may likely provide the post hurricane performance that homeowners would desire. Window manufacturers currently do not structurally glaze their systems, but if they did, it would most definitely improve their post-hurricane performance.

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- f. Summarize findings and make recommendation in a final report to the Florida Building Commission on one or two approaches for addressing Phase II.

3. Method of Payment

A purchase order will be issued to the University of Florida/Engineering School of Sustainable Infrastructure and Environment (ESSIE). This project shall start on the date of execution of the purchase order and end at midnight on June 30, 2020. The purchase order shall not exceed \$70,000 and shall cover all costs for labor, materials, and overhead. Payment will be made for the study after the Contract Manager, Program Manager and Commission's Structural Technical Advisory Committee have approved the final report.

4. Deliverables

- a. An interim report shall be prepared and delivered no later than April 15, 2020. The interim report shall address each task as enumerated above and shall summarize the project progress to date. In addition, the interim report shall be formally presented to the Commission's Structural Technical Advisory Committees at a time agreed to by the Contractor and Department's Program Manager.
- b. A final report shall be prepared and delivered no later than June 19, 2020. The final report shall explain the purpose, approach and results of research. The final report shall include a summary of the project activities including summary of the procedure for conduction the mock-up test and summary of discussion and findings regarding the issues outlined under task e above. In addition, the final report shall be presented to the

Commission's Structural Technical Advisory Committees at a time agreed to by the Contractor and Department's Program Manager.

5. Performance Measures and Financial Consequences

ESSIE is solely and uniquely responsible for the satisfactory performance of the tasks and completion of the deliverables as described in this Scope of work.

Failure to complete the task and deliverables in the time and manner specified in Sections 3 and 5 shall result in a non-payment of invoice until corrective action is completed as prescribed by the program manager or contract manager.

6. Contract Manager and Program Manager

The Contract Manager for this purchase order is Barbara Bryant and the Program Manager is Mo Madani.