

1006 Vance Jackson
San Antonio, Texas 78201
(210) 591 - 8829



401 Congress Avenue, Suite 1540
Austin, Texas 78701
(512) 298 - 3360

F-12583

A1E Project No.21-7102

December 14, 2022

Ms. Gwen Peterson
Olmos Towers
700 E. Hildebrand
San Antonio, Texas 78212

Re: Roof Deck Distress Assessment & Recommendations – Proposed Scope of Services

Olmos Towers
700 E Hildebrand
San Antonio, Texas

Dear Ms. Peterson:

As requested, A-1 Engineering, LLC (A1E) visited the above referenced building to observe the overall condition of the concrete roof deck in order to develop a scope of services for repairs. Our observations were limited to the roof deck areas visible from within the mechanical penthouse and from the corridor of the floor below. Access through the ceiling in Unit 1501 was also provide; however, visibility of the concrete roof slab was limited.

Our observations were conducted in general conformance with engineering practices consistent within the structural engineering profession; however, to be clear, this *First Impression Assessment* was limited to readily visible conditions for specific roof deck areas. No destructive or invasive means of examination were employed as a part of our site assessment. Conditions not readily apparent may exist.

The primary areas of distress observed were as follows:

- Spalling concrete on the topside of the concrete roof deck in the vicinity (and likely beneath) the a/c equipment attributable to a leaking water line(s) has resulted in corrosion expansion of the reinforcing steel and a loss in the integrity of the floor slab reinforcing steel
- The opening in the concrete roof deck directly against the West side of the West stairway for a large duct penetration does NOT appear on the structural drawings provided for our review. Without “As-Built” drawings or other documents verifying how this area was constructed, we cannot ascertain if the design is suitable to support code required loads. Further examination of this area is needed and will require access to Unit 1500 in order to examine construction at the duct penetration and beneath the reinforcing steel corrosion areas previously noted.
- Spalling concrete (delamination of concrete strips or patches) on the soffit (underside) of the concrete roof deck suggests that overloading of the roof deck exist due to either excessive loading and/or damage to reinforcing steel
- Overloading of the concrete beam extending from the North wall of the West stairway has caused some spalling at the deck to beam interface. The beam has four (4) holes cut into it within 2’ of the stairway wall. The holes have new piping passing through and appears to have been part of an MEP “upgrade”. Shear reinforcement in the beam may have been cut. Further examination is needed.

F-12583

A1E Project No.21-7102

OBSERVATIONS

The Carrier air handler (SN: 1116U30863 – See Photo #1 & #2), hereafter referred to as AHU-1, was located at the west end of the mechanical penthouse. The AHU-1 is supported above the concrete roof deck on a steel frame with a galvanized sheet metal drip pan below the air handler (See Photo #3) that prohibits the surface of the concrete roof deck from being viewed. Adjacent to the VFC-3000, the exposed concrete roof deck exhibits spalling where strips of concrete have delaminated from the reinforcing steel (rebar) due to expansion of the corrosion as the rebar is exposed to water, apparently due to leaking pipes above (See Photo #4). Water from the leak is currently being collected in a plastic trash can (Review Photo #2).

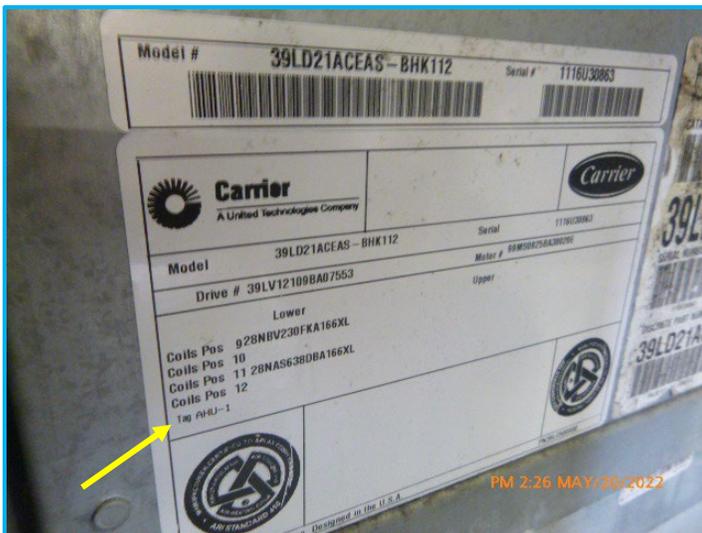


Photo 1: Air Handler at the west end of the Mechanical Penthouse marked as AHU-1



Photo 2: AHU-1 with plastic trash can below piping to collect leakage



Photo 3: Galvanized drip pan and steel frame supporting AHU-1



Photo 4: Spalling concrete at rebar due to corrosion expansion adjacent to AHU-1

F-12583

A1E Project No.21-7102

The concrete roof deck penetration at the West side of the West stairway for the large 3' x 4' air duct (See Photo #5) does not appear on the structural drawings provided for review. Less pronounced spalling of the top of the concrete roof deck was visible near the mechanical penthouse West wall (See Photo #6).



Photo 5: Duct penetrating the concrete roof deck at the West side of the West Stairway



Photo 6: Spall in the concrete roof deck near the mechanical penthouse West wall

Spalling of the soffit (underside) of the concrete roof deck was visible from the corridor outside of Unit 1501 (See Photo #7 & 8).

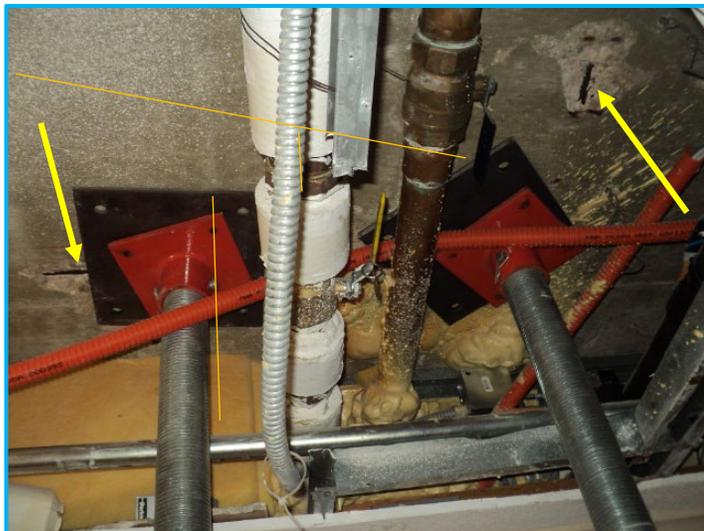


Photo 7: Spalls at concrete roof deck soffit outside of Unit 1501 with slight to moderate rebar corrosion



Photo 8: Close-up of spall location outside of Unit 1501

F-12583

A1E Project No.21-7102

The concrete beam (for discussion purposes identified as B-1) extending to the North from the North face of the West stairway exhibits spalling along the line that joins the slab to the beam face (See Photo #9) as viewed from the corridor closet. The end of beam B-1 adjacent to the West stairway has four (4) new holes cut for mechanical/plumbing lines. The holes were cut close to the bottom of the slab (approximately at mid-height of the beam). While this is the best height to minimize the impact on the beams ability to resist bending, placing the holes at the end of the beam reduces the beams shear capacity. Simply stated, the beam is less able to resist a sudden snap failure at this end. This reduction can be further magnified if the stirrups (vertical steel “bands”) that are installed to resist shear forces were cut. **Examination of the beam end by Ground Penetrating Radar and/or Radiography is highly recommended to gather needed information to address this modification.**



Photo 9: Duct penetrating the concrete roof deck at the West side of the West Stairway

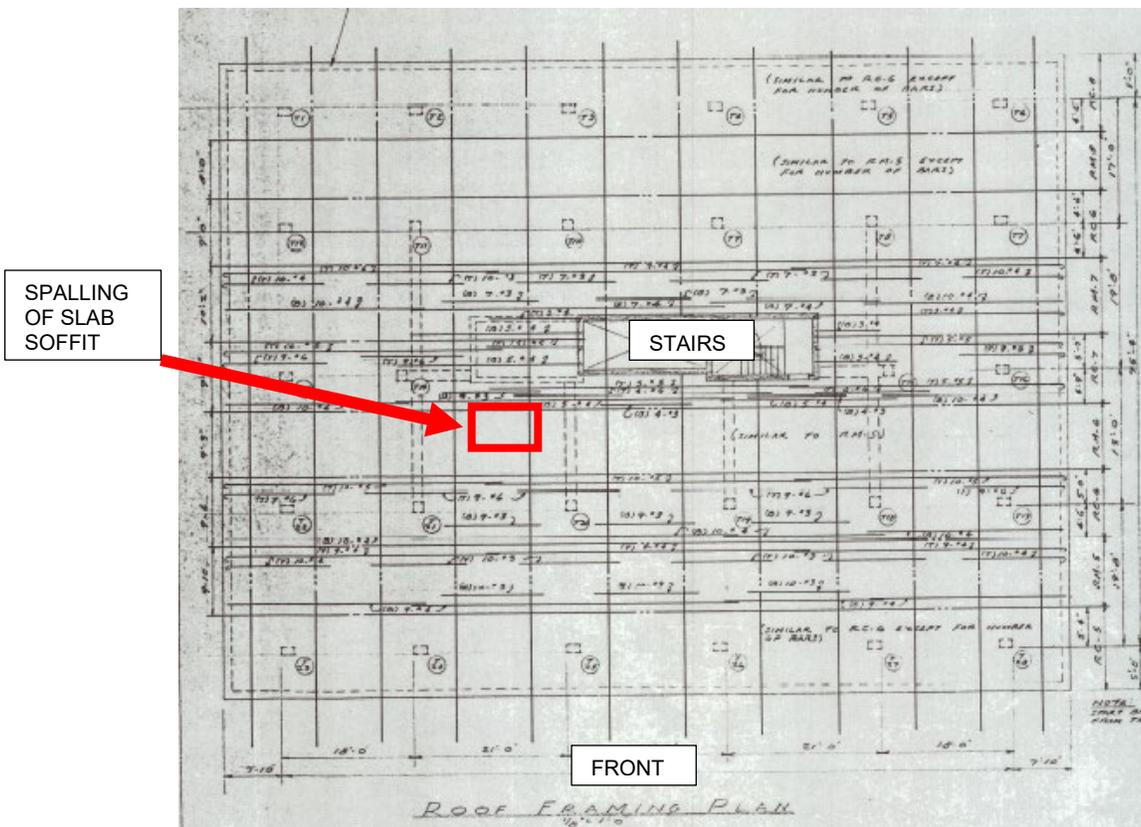
F-12583

A1E Project No.21-7102

GENERAL RECOMMENDATIONS

Additional information regarding the as-built construction of the concrete roof deck is needed to develop a comprehensive repair plan. Please be aware that additional information may uncover other conditions that may warrant attention. Based upon the information at hand, we recommend the following:

- **Addition of Supplemental Reinforcement:** The corrosion causing the spalling of the concrete near and likely under AHU-1 is extensive and has reduced the load carrying capacity of the roof deck. We recommend to supplement the corrosion attacked reinforcing steel with carbon reinforcing rods embedded into the top of the concrete roof deck. **These rods will likely need to extend PAST the west end of the mechanical penthouse and into the adjacent open roof area.** As a minimum, the concrete curb at the West end of the mechanical penthouse will need to be partially removed for access and replaced after repairs. Additionally, the roof membrane and/or insulation board outside of the mechanical penthouse West end will need to be REMOVED in order to extend the added carbon rod reinforcement
- **Repair of Roof Deck Soffit Spalls:** Corrosion of the reinforcing steel at the soffit of the roof deck appears light but enough to cause spalling of the concrete due to expansion of the lightly oxidized steel. We anticipate that repairs can likely be done by cleaning the reinforcing steel, patching the spalls with a high strength grout and possibly adding a fiber reinforced polymer (FRP) band to the spalled areas. The extent of any FRP repairs will be dependent on the structural analysis of the as-built conditions.





F-12583

A1E Project No.21-7102

Terms, Conditions, and Limitations

A-1 Engineering (A1E) provided engineering services under the following terms, conditions, and limitations:

- 1) **Use of A1E Report:** Our report is provided for information purposes only to the addressed party on the report. Our report, opinion, suggestions and findings is not intended to persuade, convince or justify the purchase, sale or transaction of a property for any means. Readers basing their decision on the purchase of a property, based on our discussion, do so at their own risk. A1E's engineering opinion is not an indefinite opinion of the structure nor does it suggest that structure will remain in the condition that we observed it in during our visit.
- 2) **Access to Site:** Unless otherwise stated A1E will have access to the site for activities necessary for the performance of the services. A1E will be cautious to minimize damage due to these activities, but has not included in the fee the cost of restoration of any resulting destructive measures associated with our scope. A1E requests at least a one-day advance notice for site visits.
- 3) **Hidden Conditions:** A structural condition is hidden if existing finishes conceal it or if it cannot be investigated by reasonable visual observation. A1E shall not be responsible for costs associated with the investigation of a hidden condition or costs necessary to correct said condition. The Client shall facilitate and coordinate exposing all elements to increase the potential for hidden conditions to be uncovered. Investigations are limited to our visual observations only. No destructive means or tests are performed. Hidden or unknown problems that may occur within the building are not being addressed. Our Investigation does not include discovery, testing, monitoring, cleanup, or neutralization of pollutants, hazardous substances, or asbestos. Our investigation also does not include reviewing mechanical, electrical, plumbing, fire protection, or permitting and zoning conditions, and any non-structural conditions. Our opinions and recommendations expressed are based on the condition of the structure, as we are able to visually see it during our investigation at the site. No warranty of this structure for future use, operability or suitability is expressed or implied. Means and methods of construction and demolition, and temporary bracing, are the sole responsibility of the contractor. A1E does not assess or review the framing of the structure unless specifically stated otherwise. For investigations, A1E did not design the overall structure, foundation, cladding or components, egress or energy efficiency for this building and did not provide project management services and is not responsible for the management of permits, building planning or reviews by the building official unless stated otherwise. Plumbing leak detection is recommended for all foundations assessments regardless of the condition.
- 4) **Information Provided by Others:** A1E shall indicate to the Client the information needed for providing engineering services. The Client shall provide to A1E such available information, to include, geotechnical reports, inspection reports, and construction documents. A1E shall be entitled to rely upon the accuracy, completeness and sufficiency of such information. Accordingly, the Client agrees to the fullest extent permitted by law to indemnify and hold A1E and A1E's sub-consultants harmless from any claim, liability or cost (including reasonable attorney's fees and costs of defense) for injury or loss arising or allegedly arising from errors, omissions or inaccuracies in such information provided.
- 5) **Certifications, Guarantees and Warranties:** A1E shall not be required to execute any documents subsequent to the signing of the Agreement that in any way might, in the sole judgment of A1E, increase A1E's risk or the availability or cost of his or her professional or general liability insurance or cannot warrant, guarantee the existence of conditions A1E cannot ascertain.
- 6) **Applicable Law:** Unless otherwise specified, the laws of the principal place of business of A1E shall govern this agreement. If any term or other provision of this Agreement is determined to be invalid, illegal or incapable of being enforced by any rule or law, or public policy, all other conditions and provisions of this Agreement shall nevertheless remain in full force. Upon such determination that any term or other provision is invalid, illegal or incapable of being enforced, the parties hereto shall negotiate in good faith to modify this Agreement so as to effect the original intent of the parties as closely as possible in an acceptable manner to the end that transactions contemplated hereby are fulfilled to the extent possible.
- 7) **Resolution of Disputes:** In the event a dispute shall arise between the parties to this agreement, it is hereby agreed that the dispute shall be referred to designate a specific USA&M office or alternate service by agreement of the parties for arbitration in accordance with the applicable United States Arbitration and Mediation Rules of Arbitration. The arbitrator's decision shall be final and legally binding and judgment may be entered thereon. Each party shall be responsible for its share of the arbitration fees in accordance with the applicable Rules of Arbitration. In the event a party fails to proceed with arbitration, unsuccessfully challenges the arbitrator's award, or fails to comply with the arbitrator's award, the other party is entitled to costs of suit, including a reasonable attorney's fee for having to compel arbitration or defend or enforce the award.
- 8) **Risk Allocation:** In recognition of the relative risks, rewards and benefits of the project to both the Client and A1E, the risks have been allocated so that A1E and the Client agrees that, to the fullest extent permitted by law, A1E'S TOTAL LIABILITY TO THE CLIENT, FOR ANY AND ALL INJURIES, CLAIMS, LOSSES, EXPENSES, DAMAGES OR CLAIM EXPENSES ARISING OUT OF THIS AGREEMENT, FROM ANY CAUSE OR CAUSES SHALL NOT EXCEED HALF OF THE TOTAL AMOUNT OF A1E'S PROFESSIONAL FEE RECEIVED FOR THIS PROJECT. Such causes include, but are not limited to, A1E's negligence, errors, omissions, strict liability and breach of contract or breach of warranty. The Clients agrees that costs associated with change orders shall not be absorbed or deferred to A1E, regardless of the reason for the change order.
- 9) **Property Accessibility Requirements/Regulations:** The Texas Architectural Barriers Act (Article 9102, Texas Civil Statutes) requires that all construction documents for projects with an estimated construction cost of \$50,000 or more be submitted to the Texas Department of Licensing and Regulation for review prior to commencing construction. Failure to comply may result in up to \$1,000 per day administrative penalties for each violation. The Client understands A1E will perform only structural engineering services, which does not include submitting documents to the Texas Department of Licensing and Regulation.
- 10) **Ownership of Documents:** All documents produced by A1E shall remain the property of A1E. No one may use them for any other endeavor without the written consent of A1E.
- 11) **Special Inspections:** A1E specifically omitted services related to Special Inspections (International Building Code Chapter 17) from our basic services. A1E can provide services related to special inspections as additional services if requested.

End of Terms, Conditions and Limitations.